

# Fox Glen Condominium Association Drainage System Final Report

May 2011



## Prepared By:



**Engineering Technologies Corporation**  
207 E. Michigan Ave., Saline, Mi 48176  
(734) 944-2020 Fax: (734) 944-2424  
<http://www.etcinc.com/>

## DRAINAGE INSPECTION REPORT

### **Background**

Following our meeting on site with Select Management Company and members of the Fox Glen Condominium Board, Engineering Technologies Corporation (ETC) was retained to evaluate the storm drainage throughout the condominium project. There were some particular areas of concern, especially lawn areas in the common yard between Fox Glen Drive and Bridle Pass, and the open lawn area behind Units 15 & 16 on the north side of Fox Glen east of Bridle Pass. These areas and other places around the development experienced surface “wetness” ponding and poor lawn growth.

### **Site Inspection**

ETC performed a physical inspection of the interior of all storm structures including manholes (MH) and catch basins (CB), plus storm detention basin control structures and discharge pipes. A list of our inventory of structures, the conditions noted and recommendations for rehabilitation is presented in Table A.

There are a total of five detention basins that serve this development along with a natural existing pond and surrounding wetland. An open, natural drainage course traverses this development and provides an outlet for detention basins A, B, C, D, and portions of the Valley Ranch Condominiums upstream of Fox Glen. Detention basin E is the largest basin, with permanent open water, and discharges across Lohr Road through an enclosed storm sewer. Detention basins A, B, C, and D are designed to be normally dry basins, except after rain events for a relatively short period of time. All of the Fox Glen detention basins, the existing wetland area on site, the existing natural pond, and the natural watercourse that travels through the Fox Glen property were visually inspected. A list of our inventory of the detention basins and water courses on the property is presented in Table B along with deficiencies noted and recommendations for maintenance and improvements.

Additionally, we visually inspected the surface drainage around entire development both during dry weather and during a rain event to determine the causes and conditions of the surface ponding, wetness and poor lawn growth. The surface drainage between units, along rear yards, from downspouts and natural drainage patterns were observed. Subsurface soils were excavated and to identify the underlying subgrade soils, moisture conditions, topsoil depth, and soil types.

### **Evaluation**

All off the storm structures were constructed of precast concrete, which is an excellent structure material. However, many of the structures had some block or brick leveling courses to bring the casting frame to proper elevations. Nearly all of the structures located in paved areas had

# Fox Glen Condominiums

Table A

Storm Structure Inspection Notes \*

Item No.	Structure ID	Diameter (ft)	Conditions Noted	Recommendations
1	R5-North	4	Fractured Mortar Joints	Point/Repair Under Casting
2	R5-South	4	Fractured Mortar Joints	Point/Repair Under Casting
3	R7	4	Fractured Mortar Joints	Point/Repair Under Casting
4	R8-East	4	Fractured Structure	Repair Structure
5	R9-West	2	Fractured Mortar Joints	Point/Repair Under Casting
6	R10-E	4	Fractured Mortar Joints	Point/Repair Under Casting
7	R11-W	2	Fractured Mortar Joints	Point/Repair Under Casting
8	R12	4	Fractured Mortar Joints	Reset Casting
9	R13	2	Fractured Structure	Repair Structure
10	R14	2	Good	
11	R15	2	Fractured Mortar Joints	Reset Casting
12	YB6A	4	Wet Spot Upstream Observed	Lower Casting Approx 8"
13	YB6	2	Good	
14	R23-W	4	Fractured Mortar Joints	Reset Casting
15	R24-E	4	Fractured Mortar Joints	Reset Casting
16	R25-W	2	Fractured Mortar Joints	Reset Casting
17	R27-E	4	Fractured Mortar Joints	Reset Casting
18	R29-E	4	Severe Offset > 2 feet	Minor Point/Repair Under Casting
19	R31-E	4	Offset < 2 feet	Minor Point/Repair Under Casting
20	TB28	2	Good	
21	YB30	2	Good	
22	YB32	2	Good	
23	R40	2	Fractured Structure, Apron Broken	Repair Structure
24	R42	4	Fractured Structure	Repair Structure

\* All Storm Structures Precast Concrete with No Sumps

# Fox Glen Condominiums

Table B

Detention Basin and Drainage Course Inventory

Basin	Location	Conditions Noted	Recommendations
A	Along East Property Line behind existing Wetland and Pond	Heavy Brush & Weeds in Basin, woody plant at outlet control structure	Remove all woody plant materials from Outlet Control and Basin
B	East of Fox Glen Drive behind Units 36-40	Heavy Brush & Weeds in Basin, woody plant at outlet control structure	Remove all woody plant materials from Outlet Control and Basin
C	Betw Rodeo Dr and Santa Fe Trail behind Unit 12	Heavy Brush & Weeds in Basin, woody plant at outlet control structure	Remove all woody plant materials from Outlet Control and Basin
D	Betw Rodeo Dr and Santa Fe Trail behind Units 13-14	Heavy Brush & Weeds in Basin, woody plant at outlet control structure	Remove all woody plant materials from Outlet Control and Basin
E	NE corner of Ellsworth Rd & Lohr Rd behind Units 26-28	Algae in Basin	None
Ex. Wetland & Pond	East of Intersection of Fox Glen Dr. & Santa Fe Trail	Heavy Brush in flow channel and around basin perimeter locations	Keep Flow Channel Clear of Woody Plant Materials & Sediment
Open Drainage Course	From Rodeo Drive to Ellsworth Road	Heavy Brush in flow channel	Keep Flow Channel Clear of Woody Plant Materials & Sediment

fractures in the mortar joints and cinder blocks. Some structures had the casting frame offset from the center of the structure. Nearly all of the MH and CB structures need mortar joint repairs and many need block replacement or repair. This work is not critical at this time, and can probably be performed when the street is repaved in the future. If these problems become more pronounced in the next few years, these CB and MH repairs can be completed as a separate project.

The normally dry detention basins A, B, C, and D on the site have heavy brush, weeds, and woody plants beginning to take root. While the brush and weeds present a minor problem and can be visually unpleasant, the presence of woody plants in these basins will impair the proper operation of these storm control basins. Woody plants in the basin areas begin to collect debris and sediment which eventually reduces the storage capacity of the basins. Woody plant near the outlet control structures block the inlet holes around the perimeter of the structures and artificially raise the water level in the basin and retain water much longer than designed. No woody plants should be allowed to remain around the outlet control structures and woody plants should be removed from the basin areas every 3+ years as needed.

The surface ponding and wetness along with poor grass growth in the lawn areas is caused by 3 conditions, as follows:

- 1) The underlying site subgrade soils are a heavy, variegated clay soil. These soils show that even prior to development many of these areas had retained water. This clay soil transmits water very slowly and holds water from passing through it to the underlying, natural ground water elevations.
- 2) The initial grading of the site as part of the development and construction was not completed to direct all surface runoff toward the new CB's and MH's that were installed. There are low areas and high spots even where sufficient slopes were available to provide good surface slopes. The construction grading was not carefully performed to assure proper drainage. Generally, surface runoff in lawn areas should be provided with 1% (minimum) to 2% (recommended) surface slopes to assure proper drainage. There are areas in the development where sufficient slope was available, but the grading did not provide consistent slopes, and left the site with steep sections that drain well and very flat sections that drain poorly. An example would be the lawn area behind Units 14–16 on the north side of Fox Glen Drive.
- 3) The entire site has very little topsoil. While most of the soils sampling was performed in areas showing surface ponding and poor grass growth, a few other areas were also excavated. Nearly all of this development was provided with about 1" to 2" of clay loam topsoil as part of the initial construction.

Areas that had the most pronounced surface ponding and poor grass growth had some additional sandy topsoil added on top of the existing clay loam topsoil. It appears this additional topsoil was added to raise the grade and change the ground slope so the surface water would naturally drain toward nearby inlets. However, this sandy topsoil absorbs storm water, acting like a sponge in a pan that could not drain through the underlying heavy clay subgrade soils. The areas of poor grass growth are widespread but all exhibit one or more of the above characteristics causes.

### Conclusions and Recommendations

The option to remove the existing topsoil from lawn areas, regrading the subgrade properly to provide a 2% +/- slope toward drainage structures, and installing minimum 3" to 4" of loam topsoil to all areas on a development wide basis would be cost prohibitive and very disruptive. The other option of extending under drains to collect downspout runoff would greatly diminish the amount of surface water in the low areas, but would not completely solve the problems nor provide sufficient topsoil to establish a dense lawn over the entire site. We offer the following specific recommendations for the specific areas that we noted as the worst surface ponding and poor grass growth. A summary of our recommendations is presented in Table C.

<b>Fox Glen Condominiums</b>			
PRIORITIZED RECOMMENDATIONS			Table C
No.	Description	Recommended Work	Estimated Cost
1	Detention Basin A-D Stream Corridor Wetland Pond	Remove Woody Plants from Outlet Control Structure Remove Woody Plants from Stream Channel Remove Woody Plants from Outlet Ditch	\$6,500
2	Detention Basins A-D Wetland Pond	Remove Woody Plants and Accumulated Brush Remove Woody Plants from Banks	\$5,000
3	Common Area between Fox Glen and Bridle Pass	Install under drains at center wet area and connect downspouts to existing CB's for all remaining units	\$23,500
	Rear Yard behind Units 15 & 16	Regrade to provide sloped ditch for runoff and install sufficient topsoil for dense lawn growth	\$3,000
4	Rear Yard behind Units 38 to 40	Install under drains to detention basin B	\$5,000
5	Repair Storm Structures	Perform with future Road Repaving Project	\$8,000
			\$51,000







