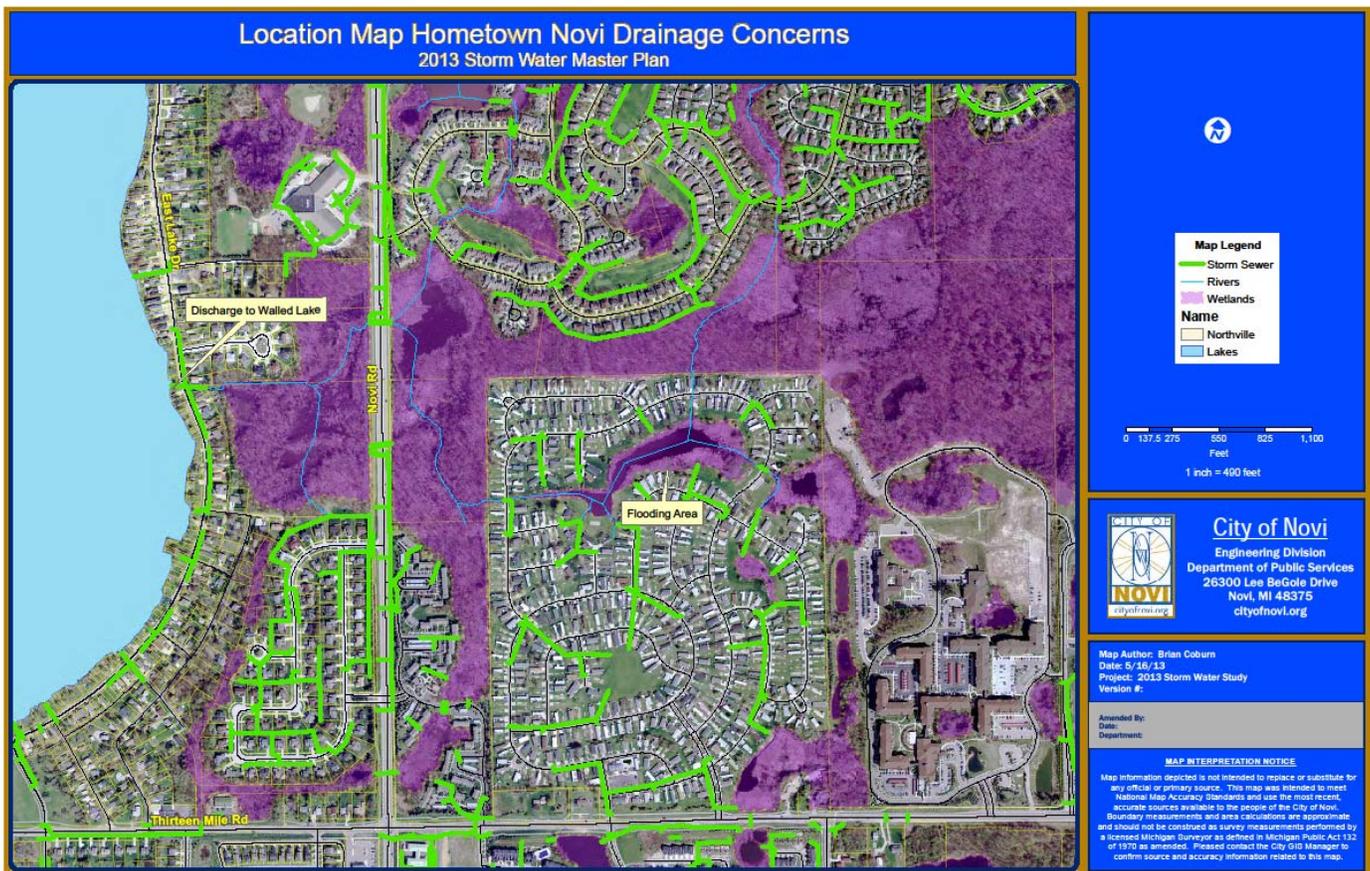


# SECTION 3 – OAKLAND GLENS MOBILE HOME PARK Storm Water Flooding Concerns

## INTRODUCTION

This report examines the Oakland Glens Mobile Home Park (formerly Hometown Novi, formerly Chateau Estates), which is located northeast of the intersection of Thirteen Mile Road and Novi Road. This report describes identified problem areas presented for review and observed in the field, and potential and recommended mitigation measures.



## BACKGROUND

During major storm events, the privately owned detention pond in the northern portion of Oakland Glens overflows into adjacent yards and streets. The detention pond receives flow

from within the site as well as off-site. The mobile home park is bounded on the west, the north, and partially on the east sides by a wooded wetland area. Refer to the above location map.

Flow from outside sources enters the site from areas to the north and east. The northerly inflow appears to originate in the Maples of Novi subdivision, and also includes water from the wooded wetland area north and east of the site. Water also enters the east end of the detention pond through a 42-inch corrugated metal pipe (CMP) culvert, which includes flows originating within the site as well as from off-site areas to the east. Although this is a private site, the City decided to review this drainage concern to determine if any improvements were necessary upstream or downstream of this site.

The detention pond is generally a continuous body of water with marshy overgrown wet areas, which flows to the west. The outlet of the pond to the wooded wetland to the west is through a 30-inch concrete culvert, which has 4- to 8-inches of sediment within the pipe.

Water leaving the detention pond flows westerly through the wooded wetland, continuing to the west through culverts crossing under Novi Road, which consist of three 43-inch-tall, 68-inch-wide elliptical culverts. There are also two culverts south of this crossing which appear to function as an overflow for the wetland area, and were observed to be dry.



*Novi Road Crossing*

Flows continue westerly through wetlands and areas of standing water. The ultimate discharge for the drainage system is westerly under East Lake Drive to Walled Lake through a single 43-inch by 68-inch elliptical culvert.

## FIELD INVESTIGATIONS

In October 2013, Spalding DeDecker Associates, Inc. (SDA) met onsite with the City of Novi Department of Public Services (DPS) staff for a review of the ponds and outlets. This field review included locating the outlet structure at Walled Lake, the culvert crossing under East Lake Drive, the culverts crossing under Novi Road, and the two culvert crossings in Oakland Glens, which include Montmorency Drive culvert to the west and Montmorency Drive culvert to the east.

These locations were surveyed on November 18, 2013, and it was found that across this drainage area, there was approximately 4 feet of fall from Oakland Glens to Walled Lake, which is a distance of approximately one half-mile. This is a very shallow slope (0.15% average) which likely contributes to the flooding by backing up



*Outlet under Montmorency Drive*

water into Oakland Glens. Based on this information, there may not be a feasible solution to completely control the flooding. Remediation options are described later in the report.

A summary of the pond and culvert drainage from the mobile home park to Walled Lake (direction of flow) is presented below.



| <u>Location</u>  | Pipe Invert<br>(outlet) | Water Elevation<br>(11/18/2013) |
|--|-------------------------|---------------------------------|
| East end of pond – 42” CMP (inlet)   | 934.21                  | 936.21                          |
| West end of pond – 30” Conc (outlet)   | 932.75                  | 934.44                          |
| Novi Road Culvert<br>43” x 68” Conc (triple culvert)                               | 932.94 (lowest)         | 933.83                          |
| East Lake Drive Culvert (outlet to Walled Lake)<br>43” x 68” Conc (single culvert) | 930.81                  | 932.23                          |

As noted in the table, the invert of the outlet culvert from the mobile home park pond is slightly lower than the invert of the downstream crossing of Novi Road. In general, the mobile home park site is just a few feet above the surrounding wooded wetland and detention pond, and the water flowing through the area moves slowly.

### **PRELIMINARY DETENTION POND CAPACITY**

The volume of the existing detention pond cannot be calculated using the existing GIS 2-foot contour map due to the lack of contour information in the pond area. In order to determine the volume of the pond, a detailed topographic survey of the pond and surrounding area will need to be completed.

Based on field observations and the elevation of the 30” outlet pipe, it appears that excavating accumulated silt and debris would provide additional stormwater storage volume in the pond during a rain event. A complete environmental analysis should be performed on the pond to determine if regulated water courses and/or wetlands would be impacted, which would require a permit from the MDEQ.

Beyond the above preliminary analysis of the existing detention pond, the largest contributing factor to the flooding is likely the off-site drainage areas from the north and east that flow into the detention pond.



## CONCEPTUAL REMEDIATION OPTIONS

A hydraulic analysis should be completed to further understand the behavior of the drainage area. However, some conceptual remediation options have been developed for budgeting purposes. It should be noted that one or more of these options could be implemented to reduce the volume of water overflowing the detention pond.

1. Dredge the existing detention pond: Based on the field investigation, there appears to be sediment within the detention pond reducing the available capacity. Additional volume capacity and improved flow can be achieved by dredging the existing pond. Assuming that this is a private detention pond that appears to have sufficient construction access, this would be a fairly simple method to increase storage capacity and reduce the chance of localized flooding. A complete environmental analysis would need to be performed on the pond to determine if regulated water courses and/or wetlands would be impacted, which would require a permit from the MDEQ.
2. Ditch clean out: Based on field investigation, several of the ditches in the mobile home park were overgrown with vegetation, which is likely slowing flow and contributing to sediment deposits. While the plants are providing some uptake of water, the overgrowth is restricting the storm water flow through the site. These ditches should be cleaned out and restored to their original condition (and maintained in this condition) to reduce the chance of localized flooding.
3. Re-route the upstream (inflow) drainage: Due to the minimal elevation change across the site and through the wooded wetland, it will be difficult for the City or Oakland Glens to make any changes that will significantly increase the storm water volume which can



flow through and out of the Oakland Glens site. There are two off-site drainage courses that flow into the existing detention pond, one from the north and one from the east. The northerly watercourse originates from the Maples of Novi and the nearby wooded wetland area, and it appears it could be re-routed to run along the north boundary of the park so it does not enter the site. The easterly watercourse appears to have flows which originate from within the park, as well as from outside sources, and would be more difficult to re-route. If one or both of these drainage courses were rerouted around the mobile home site, thus reducing the flows into the existing detention pond, the chance of localized flooding within the site could be reduced. However, the upstream drainage areas would have to be carefully studied, as well as the new route, to ensure that this would not cause new localized flooding downstream. A complete environmental analysis would need to be performed to determine if regulated water courses and/or wetlands would be impacted, which would require a permit from the MDEQ.

4. Replace and upsize the detention pond outlet culvert: The culvert that inlets into the pond is a 42-inch culvert and the pond outlets through a single 30-inch culvert which flows westerly to a large, flat, wooded wetland area that flows under Novi Road through two sets of 43" x 68" culverts. Since the inlet pipe into the pond is larger than the outlet pipe, the outlet pipe diameter could be increased to pass through larger flows, and if placed at the same invert elevation would not reduce the low water elevation or capacity of the detention pond.

A complete hydraulic analysis of the area would need to be completed to determine the effects of the current pipe and potentially upsizing the outlet pipe to fully understand the impact this would have on the flooding and to make sure there are no adverse effects downstream of the pond. The downstream culverts draining the wooded wetland and



flowing to Walled Lake appear adequate; therefore, increasing the capacity of these culverts would not improve the flooding concerns at Oakland Glens. As mentioned previously, a permit from the MDEQ will be required for improvements which impact regulated water courses and/or wetlands.

## PRELIMINARY ESTIMATES

Conceptual estimates for the improvements described above are as follows:

### Option 1. *Dredge Existing Pond*

| Item Description         | Unit | Unit Price | Quantity | Item Cost        |
|--------------------------|------|------------|----------|------------------|
| Mobilization             | LSum | \$5,000    | 1        | \$ 5,000         |
| Dredge Existing Pond     | Cyd  | \$15       | 10,000   | \$150,000        |
| Dewatering               | LSum | \$20,000   | 1        | \$ 20,000        |
| Restoration              | Syd  | \$5        | 1,000    | \$ 5,000         |
| <i>Contingency (25%)</i> |      |            |          | \$ 45,000        |
| <b>Estimate =</b>        |      |            |          | <b>\$225,000</b> |

### Option 2. *Ditch Clean Out*

| Item Description         | Unit | Unit Price | Quantity | Item Cost       |
|--------------------------|------|------------|----------|-----------------|
| Mobilization             | LSum | \$5,000    | 1        | \$ 5,000        |
| Ditch Cleanout           | Feet | \$15       | 2,000    | \$30,000        |
| Restoration              | Syd  | \$5        | 2,400    | \$12,000        |
| <i>Contingency (25%)</i> |      |            |          | \$11,750        |
| <b>Estimate =</b>        |      |            |          | <b>\$58,750</b> |

### Option 3. *Reroute Upstream Drainage (Northerly Watercourse)*

| Item Description | Unit | Unit Price | Quantity | Item Cost |
|------------------|------|------------|----------|-----------|
| Mobilization     | LSum | \$5,000    | 1        | \$ 5,000  |



|                           |      |          |       |                  |
|---------------------------|------|----------|-------|------------------|
| Construct Wetland Channel | Feet | \$75     | 2,000 | \$150,000        |
| Grading                   | LSum | \$10,000 | 1     | \$ 10,000        |
| Restoration               | Syd  | \$20     | 1,000 | \$ 20,000        |
| <i>Contingency (25%)</i>  |      |          |       | \$ 46,250        |
| <b>Estimate =</b>         |      |          |       | <b>\$231,250</b> |

Option 4. *Replace / Upsize Pond Outlet Culvert*

| <b>Item Description</b>  | <b>Unit</b> | <b>Unit Price</b> | <b>Quantity</b> | <b>Item Cost</b> |
|--------------------------|-------------|-------------------|-----------------|------------------|
| Mobilization             | LSum        | \$5,000           | 1               | \$ 5,000         |
| 42-inch Conc. Culvert    | Feet        | \$160             | 80              | \$12,800         |
| Pavement Repair          | Syd         | \$100             | 55              | \$ 5,500         |
| Curb & Gutter            | Feet        | \$25              | 40              | \$ 1,000         |
| Restoration              | Syd         | \$5               | 200             | \$ 1,000         |
| <i>Contingency (25%)</i> |             |                   |                 | \$ 6,325         |
| <b>Estimate =</b>        |             |                   |                 | <b>\$31,625</b>  |

Please note that the contingency is each of these estimates is intended to include permitting costs, soil erosion control measures, and miscellaneous additional work items to complete the improvement. The costs do not include engineering services.