

Clark and Leonard Drains IDEP Investigation

3/29/11

Project location

The Clark and Leonard Drains are County Drains established under Chapter 4 of the Michigan Drain Code and are located in the Village of Leonard and Addison Township north of Lakeville Lake.

The upper terminus of the Clark Drain is located in the downtown area of the Village of Leonard. This portion of the drain is enclosed and receives flow from local drainage systems along Elmwood and Forest Streets. The drain continues south of the downtown area as an open drain through rural and agricultural property and discharges immediately south of Rowland Road. The drain discharges to a wetland just upstream of Upper Lakeville Lake in Addison Township.

The Leonard Drain services primarily residential properties in the eastern portion of the Village of Leonard as well as some rural and agricultural properties to the south in Addison Township. The upper terminus of the Leonard Drain is an open drain located north of Elmwood Street. The drain is enclosed just north of Elmwood and Division Streets south through downtown Leonard Village. It continues as an open drain south of Baza Street where it merges with the Clark Drain immediately north of Rowland Road in Addison Township in a wetland area.

Previous sampling

Previous dry weather sampling of the Clark and Leonard Drains by the Oakland County Water Resources Commissioner's Office (WRC) indicated sewage contamination from illicit sanitary connections and failing Onsite Sewage Disposal Systems (OSDS). Sampling of the drains in 2005-2008 as part of a Clean Michigan Initiative (CMI) grant indicated high *E.coli* concentrations in the enclosed portion of the Clark Drain in the downtown area of the Village of Leonard. Illicit discharge investigations of the drains by the WRC and the Oakland County Health Division (OCHD) identified three illicit sanitary connections consisting of two residential connections and one commercial connection. All three of these illicit sanitary connections were corrected and each location is shown on Figure 1-Current *E.coli* Sampling Locations for reference. Sampling results identified additional sources of contamination from the Village of Leonard's local drainage system which required further investigation and follow up. All previous sampling locations and *E.coli* results are shown on Figure 3-Previous *E.coli* Sampling Locations.

Current sampling

In 2010, the WRC performed follow up wet and dry weather sampling of the Clark Drain, Leonard Drain and local Village of Leonard storm drains. The purpose of this sampling was to gather additional data on current *E.coli* levels after the above three illicit discharges were corrected. Current sampling data is used to identify areas with ongoing high *E.coli* concentrations from failed OSDS or direct sanitary connections. Current sampling locations and results are included on Figure 1 and Figure 2-Current *E.coli* Sampling Locations.

A total of seventeen locations were strategically selected along the Clark Drain, Leonard Drain and local Village of Leonard storm drains for follow up wet and dry weather sampling. Wet weather sampling is defined as sampling during, or within 12-hours from the end of a 0.5 inch rainfall event or greater. Dry weather sampling is sampling when precipitation is less than 0.1 inches (negligible) within the previous 48-hours. Wet weather sampling was performed on September 16, 2010 and dry weather sampling was performed on September 21, 2010. Single grab samples were collected at each location and samples were analyzed at the WRC Walled Lake-Novu EPA certified laboratory.

Sampling results and interpretation

E.coli sampling units are Colony Forming Units (CFU) / per 100 ml of sample. The following criteria is used to assist in interpreting *E.coli* results:

Less than 300 CFU / 100 ml (indicated as yellow on Figures 1 & 2)

- These locations meet *E.coli* State Water Quality Standards for full water body contact.
- No upstream illicit discharge sources.

Greater than 300 CFU/ 100 ml and less than 1,000 CFU / 100 ml (indicated as yellow on Figures 1 & 2)

- These locations do not meet *E.coli* State Water Quality Standards for full water body contact (swimming or immersion in water) but meet partial water body contact standards.
- *E.coli* may be related to sanitary sewage sources but may also be attributed to non-human sources, such as pet waste, waterfowl, livestock, raccoons, etc.
- There is a low potential for upstream illicit discharges of sanitary sewage.

Greater than 1,000 CFU/100 ml and less than 10,000 CFU / 100 ml (indicated as orange on Figures 1 & 2)

- These locations do not meet *E.coli* State Water Quality Standards for full or partial water body contact.
- There is increased potential for upstream illicit discharges of sanitary sewage.
- An upstream survey and investigation of dry weather flow sources is necessary. An upstream dye testing program may be recommended on a case-by-case basis depending on sampling results.
- *E.coli* could be related to wet weather runoff issues from non-human sources. An evaluation of storm water inputs and upstream land use is needed to determine sources of contamination.

Greater than 10,000 CFU / 100 ml (indicated as red on Figures 1 & 2)

- These locations do not meet *E.coli* State Water Quality Standards for full or partial water body contact.
- These locations have a high potential of upstream illicit discharges from nearby sanitary sources including direct sanitary connections or from failed OSDS.
- Upstream investigation is necessary to identify pollution source. Dye testing of buildings and OSDS investigation is recommended (See Figure 2).

Summary of Observations & Recommendations

General

- The Clark Drain, Leonard Drain and local Village of Leonard drain do not currently meet *E.coli* State Water Quality Standards.
- *E.coli* bacteria priorities are indicated on report figures as red-high priority, orange-medium priority and yellow-low priority.
- The WRC and Village of Leonard should continue to pursue grant funding to complete the recommendations included in this report. The WRC will investigate applying for funding under the Great Lakes Restoration Initiative grant (applications due April 11, 2011).
- The Village of Leonard should complete a comprehensive feasibility study for a new sanitary sewer collection system and wastewater treatment facility. There are currently 330 residents in the Village of Leonard.

Clark Drain

- The properties at the southwest corner of Elmwood Street and Forest Street show high concentrations of *E.coli* under both wet and dry weather conditions (See red priority parcels on Figure 2).
- The enclosed portion of the Clark Drain in this area may not drain properly as standing water exists on top of the drain days after a rain event.
- The enclosed portion of the Clark Drain should be inspected and televised to verify drainage deficiencies and all suspicious connections. This work will assist in determining why surface drainage above the drain ponds water and in locating suspicious drain connections that may be sanitary in nature.
- After review of all inspection data, WRC will update the “priority parcels” shown on Figure 2 and recommend necessary follow up work (dye testing, smoke testing and OSDS testing) to confirm illicit connections and failed OSDS.
- Future *E.coli* sampling should include a sample at the downstream Addison Township boundary per the Addison Township Supervisor’s request.

Leonard Drain

- Per discussions with the Village of Leonard President, the Leonard Drain should not be televised at this time.

Village of Leonard Local Storm Drain

- Current sampling shows that sanitary discharges from previously discovered commercial and residential illicit connections on the north side of Elmwood Street have been corrected (See Figure 1).
- Sampling of the Village of Leonard’s local storm drain at manhole 1 and manhole 2 indicates *E.coli* concentrations of 415,500 and 7,437, respectively, which is an indication of a direct sanitary connection or failed OSDS. These high samples result in properties

located southeast and southwest of the intersection of Elmwood and Forest Streets being “priority parcels” as indicated on Figure 2.

- The enclosed portions of the local Village of Leonard drains should be inspected and televised to verify drain deficiencies and all suspicious sanitary connections.
- After review of all inspection data, WRC will update the “priority parcels” shown on Figure 2 and recommend necessary follow up work (dye testing, smoke testing, and OSDS testing) for these properties to confirm illicit connections and failed OSDS.
- A grey water discharge (possible laundry sink) was observed from a pipe connected to a road catch basin at 4075 Forest (Rochester Road). Examination of the catch basin revealed high concentrations of detergents and a heavy odor of fabric softener. The Health Department has verified the illicit connection with the owner and will follow up to verify proper correction.
- The hydraulics of the Village of Leonard local drain system along Elmwood Street from Forest Street to the Polly Ann Trail needs to be confirmed. It is not clear what portion flows west to the Clark Drain and what flows east to the Leonard Drain. There are no As-built drawings for local drains which are very helpful during illicit connection investigations. A map should be developed showing all manholes and flow directions as part of the inspection work.
- Future *E.coli* sampling should include a sample at the Village of Leonard local storm manhole 14 to verify previous elevated sample results.

Report Figures

- 1) Figure 1- Current *E.coli* Sampling Locations
- 2) Figure 2 - Current *E.coli* Sampling Locations (Enlarged Downtown Area)
- 3) Figure 3 - Previous *E.coli* Sampling Locations

Figure 1- 2010 Clark & Leonard Drain Sampling Locations and Results

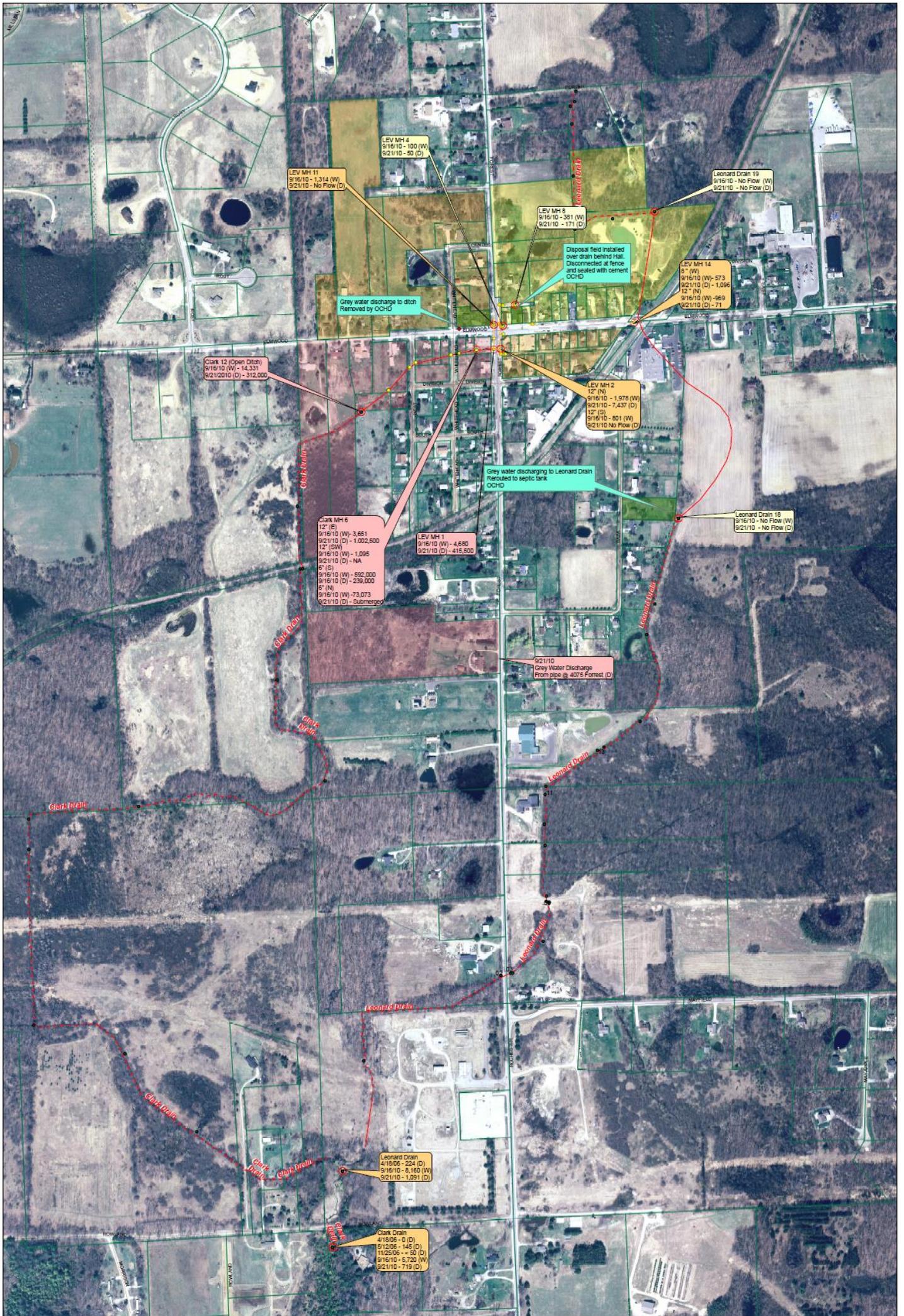


Figure 1
Clark & Leonard Drains
Current E. coli Sampling Locations
September 2010

<ul style="list-style-type: none"> ○ Project Sampling Locations ● Manhole Locations ● Discharge Point Locations 	<ul style="list-style-type: none"> - - - Open County Drains — Enclosed County Drains — Village of Leonard Drains 	<ul style="list-style-type: none"> ▭ Municipal Boundary ▭ River or Stream ▭ Roads ▭ Parcels ▭ Corrected Parcels 	<table border="0"> <tr> <td>E.coli Results (CFU / 100 ml)</td> <td>Follow-up Priority Areas Priority</td> </tr> <tr> <td>Low 0-999</td> <td>Low</td> </tr> <tr> <td>Medium 1000 - 9,999</td> <td>Medium</td> </tr> <tr> <td>High > 10,000</td> <td>High</td> </tr> </table>	E.coli Results (CFU / 100 ml)	Follow-up Priority Areas Priority	Low 0-999	Low	Medium 1000 - 9,999	Medium	High > 10,000	High
E.coli Results (CFU / 100 ml)	Follow-up Priority Areas Priority										
Low 0-999	Low										
Medium 1000 - 9,999	Medium										
High > 10,000	High										

(W) = Wet Weather Sampling (D) = Dry Weather Sampling

Figure 2- 2010 Downton Leonard Village Drains Sampling Locations and Results

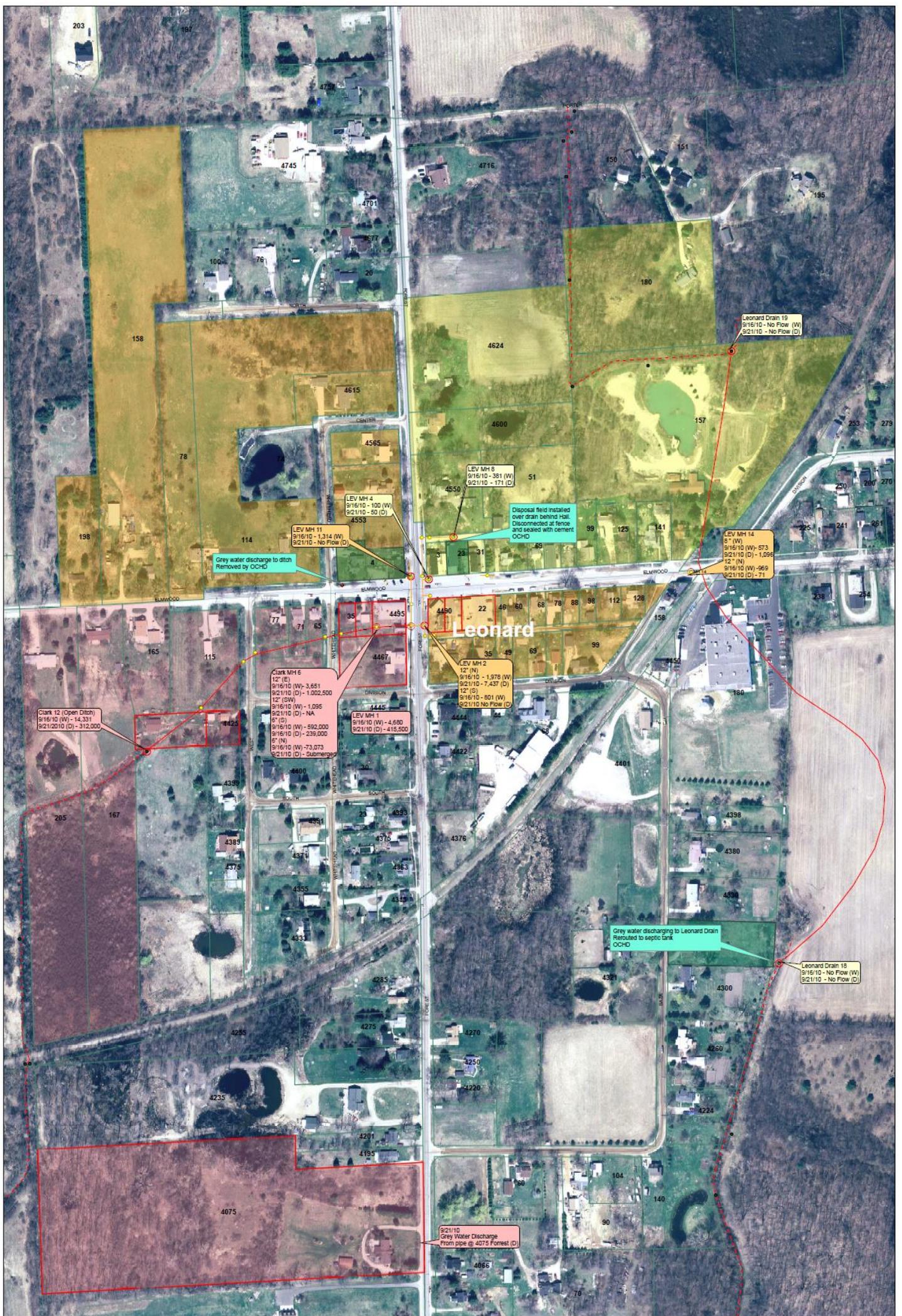


Figure 2
Downtown Leonard Village Drains
Current E. coli Sampling Locations
September 2010

Figure 3- Clark & Leonard Drains 2005-2008 Sampling Locations and Results



Figure 3
Clark & Leonard Drains
Previous E.coli Sampling Locations
2005-2008

Legend

- Sampling Locations
- Manhole Locations
- Discharge Point Locations
- Enclosed County Drains
- - - Open County Drains
- Enclosed Village Drains
- River or Stream
- Roads
- ▭ Municipal Boundary
- ▭ Lake Pond
- ▭ Parcels

E. coli Results
CFU / 100 ml

- 0 - 999
- 1,000 - 9,999
- > 10,000
- D = Dry Weather Screening

Oakland County
Illicit Discharge
Elimination Program

