Appendix ‘A’

Cayuga Standpipe Remote, Inspection & Report

Prepared by Landmark Municipal Services
June 19, 2015

and

Cayuga Standpipe Fabrication Drawings (1988) By Landmark Structures Inc.
July 7, 2015

Haldimand County
Dunnville Water & Waste Water
206 Alder St. E,
Dunnville, ON N1A 1E1

Att: Mr. Brandon Hedges
Supervisor, Water & Wastewater
Environmental Services Division

LMS Job # LMS076: Remote, Inspection & Report:
Cayuga Standpipe; Potable Water Storage Facility

Dear Brandon;

An ROV underwater camera tank inspection was performed at the above mentioned potable water storage facility on June 19 2015. The ROV unit and tether cable were disinfected in accordance with AWWA-C652-11 Method #2 guidelines (200ppm solution) prior to entry into the tank interior. Landmark's ROV equipment is designated for potable water use only.

A thorough inspection of the structure including ladders, landings, handrails and appurtenances was completed.

Please find a comprehensive report enclosed as follows;

1) Standpipe Inspection Report  
Pages 1 – 5

2) Photographic Record of Report  
Photographs are numbered in accordance with the corresponding numbers throughout the report.  
Pages 6 - 19

3) Quotation #15087 for all recommended upgrades & repairs.

4) Coatings & Linings Condition Assessment

5) Ontario Ministry of Labour Fixed Rail Ladder (FRL) Fall protection system Alert – May 20, 2014

Should you have any questions or comments regarding the content of this report, please contact us at 905 319 7700. We look forward to the opportunity of further interaction with the Haldimand County and we thank you for your business.

Yours sincerely,
LANDMARK MUNICIPAL SERVICES

Encl.
Tank Asset Management Plan (TAMP)

The importance of good information and well executed Tank Asset Management is critical, and provides exceptional value.

The absence of well performed Tank Asset Management Plan can have cost implications that far exceed, by an order of magnitude, the investment required for the planning, inspection, preventative maintenance and execution of a Tank Asset Management Program. Over the life of Haldimand County’s Tank assets, improper recommendations and poor management of can cost millions of dollars more than a scenario where the best information is generated and the best practices are executed.

Landmark provides the comprehensive analysis, planning and communication plans that will facilitate the best Tank Asset Management value.

Landmark is best positioned to provide this service to Haldimand County. We are fully invested in world class asset management strategies. We know the product (tanks) better than anyone in the world. We invented the Composite Elevated Tank and have designed and constructed most of them. With respect to water storage, we have well developed in-house expertise in planning, design, project management, fabrication, construction, maintenance, operations and water quality. Our coatings capabilities – inspection, system design, application and Quality Management are world class. And we are accustomed to managing high levels of risk effectively for the best financial outcome.

Corporate Profile Summary

Profile:
Landmark is a specialty EPC firm focusing on the water storage industry. Our capabilities include design, build, finance, maintenance and operation.

History:
Landmark established in Canada (1974) and the United States (1985) with principal offices located in Toronto (Burlington, ON), Dallas (Fort Worth, TX) and Chicago (Wheaton, IL). Landmark also operates fabrication facilities at both the Ontario and Texas locations.

Landmark transformed elevated water storage in North America with the introduction of the Composite Elevated Tank (CET), first constructed for the Region of York in 1979 at Mt. Albert. The CET has become the predominate method of elevated tank construction in North America. Within 20 years Landmark moved from innovator to the elevated tank market leader.

Landmark continues to grow in market sectors involving water, energy and the environment by leveraging our core competencies in planning, engineering, cooperative project execution, and client service.

Philosophy:
Landmark’s philosophy is simple: Setting and advocating the highest standards delivered on three fronts:

- Comprehensive attention to detail.
- Dedication to collaborative project execution.
- Providing the best ownership cost.

We deliver on the high standards we set because they are supported by the accessible, accountable and responsible culture we have created and the values that enable it to thrive:

- Our clients and partners are the essence of our business. Their satisfaction provides our opportunities for growth.
- Our employees are the key to long term relationships, which they build by doing things right.
- Our work is the ultimate enduring mark of our organization, and must display excellence in every respect.
The attached report has been prepared in order to provide the tower owner with a detailed description of the following:

The present condition of interior and exterior coatings, any pitting and/or corrosion on the interior of the water retaining vessel, the apparent condition of exposed foundations and the status of and recommendations for upgrades on safety equipment and other appurtenances.

Landmark Municipal Services has not performed a design review, an ultrasonic, x-ray, or destructive and/or non-destructive testing. Comments and recommendations are based on visual inspection only.
Thank you for allowing Landmark Municipal Services to assist you in the maintenance of your water storage facility. To maintain the integrity of your facility we recommend that you schedule your next:

<table>
<thead>
<tr>
<th>Repairs Made During Inspection</th>
<th>Photo No.</th>
<th>Photo No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aircraft warning lights bulbs replaced</td>
<td>66-68</td>
<td>--</td>
</tr>
<tr>
<td>Recommended Repairs</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Siteworks</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Chlorine Analysis / Dead Zone Testing</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Security</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Mixing System</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Valve Chamber</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Fall Arrest System</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Apply grip tape to ladder rungs</td>
<td>43-52</td>
<td>--</td>
</tr>
<tr>
<td><strong>Support Structure</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Confined Space &amp; Rescue System</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Anchorage</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Coatings, Linings and Metal Condition</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Accessories</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Exterior coating system replacement required</strong></td>
<td>--</td>
<td></td>
</tr>
<tr>
<td><strong>Internal lining system replacement required</strong></td>
<td>--</td>
<td></td>
</tr>
<tr>
<td><strong>Clean and remove tank sediment</strong></td>
<td>109 - 112</td>
<td></td>
</tr>
<tr>
<td><strong>Remote Inspection &amp; Report</strong></td>
<td>2019</td>
<td><em>3 yrs after CIR</em></td>
</tr>
</tbody>
</table>

Thank you for allowing Landmark Municipal Services to assist you in the maintenance of your water storage facility. To maintain the integrity of your facility we recommend that you schedule your next:
### SITEWORKS

<table>
<thead>
<tr>
<th></th>
<th>None</th>
<th>1-3</th>
<th>31-32</th>
</tr>
</thead>
<tbody>
<tr>
<td>EXTERIOR VALVE CHAMBER</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DRIVEWAY / WALKWAYS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OVERFLOW SPILLWAY</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### SECURITY

<table>
<thead>
<tr>
<th></th>
<th>None</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>FENCE &amp; GATES</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LADDER / LADDER CAGE</td>
<td>Good</td>
<td>40-42</td>
<td></td>
</tr>
<tr>
<td>HATCH LOCKS</td>
<td>Good</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### VALVE CHAMGER

<table>
<thead>
<tr>
<th></th>
<th>N/A - Catchbasin</th>
<th>8-10</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONDITION OF VALVE CHAMBER</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CONDITION OF PIPING</td>
<td>N/A</td>
<td>--</td>
</tr>
<tr>
<td>CONDITION OF VALVES</td>
<td>N/A</td>
<td>--</td>
</tr>
<tr>
<td>ARE THERE ANY INDICATIONS OF SETTLEMENT (Exterior)?</td>
<td>No</td>
<td>8-10</td>
</tr>
<tr>
<td>IS THE CONCRETE IN THE SEWER PIT CRACKED, SPALLED OR LEAKING?</td>
<td>No</td>
<td>8-10</td>
</tr>
<tr>
<td>IS THERE ANY INDICATION OF PIPE MOVEMENT?</td>
<td>No</td>
<td>8-10</td>
</tr>
</tbody>
</table>

### FOUNDATIONS

<table>
<thead>
<tr>
<th></th>
<th>No</th>
<th>33-39</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARE THERE ANY INDICATIONS OF FOUNDATION SETTLEMENT?</td>
<td>No</td>
<td>33-39</td>
</tr>
<tr>
<td>IS CONCRETE CHIPPED OR CRACKED</td>
<td>No</td>
<td>33-39</td>
</tr>
<tr>
<td>IS THE SOIL AT THE BASE SATURATED OR IS THERE PONDED WATER?</td>
<td>No</td>
<td>33-39</td>
</tr>
<tr>
<td>IS THERE ANY INDICATION OF UNDERGROUND PIPE LEAKAGE?</td>
<td>No</td>
<td>33-39</td>
</tr>
<tr>
<td>IS SOIL AT BASE ERODED?</td>
<td>No</td>
<td>33-39</td>
</tr>
<tr>
<td>HOW FAR DOES THE FOUNDATION EXTEND OUT OF GROUND?</td>
<td>0&quot; - 10&quot;</td>
<td>33-39</td>
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</tbody>
</table>

### SUPPORT STRUCTURE

<table>
<thead>
<tr>
<th></th>
<th>109 - 112</th>
<th>33-39</th>
<th>11-16</th>
<th>72-77</th>
</tr>
</thead>
<tbody>
<tr>
<td>TANK FLOOR</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TANK CHIME</td>
<td>Heavily Corroded - clean, prep and paint required</td>
<td>33-39</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IS CYLINDER STRAIGHT?</td>
<td>Yes; No verticality test required</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ROOF CONDITION</td>
<td>Structurally sound</td>
<td>72-77</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### ANCHORAGE

<table>
<thead>
<tr>
<th></th>
<th>N/A</th>
<th>25, 33-39</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARE ANCHOR BOLTS &amp; NUTS DETERIORATED OR IN POOR CONDITION?</td>
<td>N/A</td>
<td>--</td>
</tr>
<tr>
<td>ARE ANCHOR BOLT CHAIRS DETERIORATED OR IN POOR CONDITION?</td>
<td>N/A</td>
<td>--</td>
</tr>
<tr>
<td>ARE ANCHOR BOLTS TIGHT?</td>
<td>N/A</td>
<td>--</td>
</tr>
<tr>
<td>CONDITION OF STRAP ANCHORS?</td>
<td>Clean, prep and paint required</td>
<td>25, 33-39</td>
</tr>
</tbody>
</table>
### ACCESSORIES

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
<th>Photo No.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>LADDERS</strong></td>
<td>* To Roof Fair - grip tape required on ladder rungs</td>
<td>43-52</td>
</tr>
<tr>
<td></td>
<td>* On roof N/A</td>
<td>--</td>
</tr>
<tr>
<td><strong>REST SEATS</strong></td>
<td>Good - 2pc</td>
<td>47-49</td>
</tr>
<tr>
<td><strong>LANDING(s)</strong></td>
<td>Good</td>
<td>50, 53-54</td>
</tr>
<tr>
<td><strong>ROOF HATCHES</strong></td>
<td>* Size 30” dia steel hatch cover</td>
<td>79-80</td>
</tr>
<tr>
<td></td>
<td>* Condition Fair - Prep and Paint steel curb</td>
<td>79-80</td>
</tr>
<tr>
<td><strong>VENT</strong></td>
<td>* Type 16” Frost proof combination vent / vacuum relief unit</td>
<td>61-64</td>
</tr>
<tr>
<td></td>
<td>* Condition Good, screens in-tact (re-paint vent base)</td>
<td>61-63</td>
</tr>
<tr>
<td><strong>VACUUM RELIEF</strong></td>
<td>* Type 16” Frost proof combination vent / vacuum relief unit</td>
<td>61-64</td>
</tr>
<tr>
<td></td>
<td>* Condition Good</td>
<td>61-63</td>
</tr>
<tr>
<td><strong>PAINT RAIL ACCESS</strong></td>
<td>Fair - Couplings installed on tank roof</td>
<td>72 - 77</td>
</tr>
<tr>
<td><strong>SWINGSTAGE COUPLINGS</strong></td>
<td>Fair - must be inspected / certified prior to each use</td>
<td>72 - 77</td>
</tr>
<tr>
<td><strong>ROOF HANDRAIL</strong></td>
<td>Fair - Prep and Re-paint</td>
<td>59-60, 78</td>
</tr>
<tr>
<td><strong>GROUND LEVEL TANK ACCESS</strong></td>
<td>Fair - 2pc 36” dia manways - New Boltset &amp; Gasket Required</td>
<td>25-29</td>
</tr>
<tr>
<td><strong>INSULATION &amp; CLADDING</strong></td>
<td>N/A</td>
<td>--</td>
</tr>
<tr>
<td><strong>OVERFLOW PIPING</strong></td>
<td>Fair - surface corrosion on overflow pipe</td>
<td>15, 31-32</td>
</tr>
<tr>
<td><strong>FILL / DRAIN PIPE</strong></td>
<td>Re-connect silt stop during next shutdown</td>
<td>113, 114</td>
</tr>
<tr>
<td><strong>TELEMETRY</strong></td>
<td>N/A</td>
<td>--</td>
</tr>
<tr>
<td><strong>CATHODIC PROTECTION</strong></td>
<td>* Type N/A</td>
<td>--</td>
</tr>
<tr>
<td></td>
<td>* Manufacturer --</td>
<td>--</td>
</tr>
<tr>
<td><strong>AIRCRAFT WARNING LIGHTS</strong></td>
<td>Good, bulbs replaced during inspection</td>
<td>66-68</td>
</tr>
<tr>
<td><strong>ANTENNAE</strong></td>
<td>* Anchorage / Mounting Fair</td>
<td>70</td>
</tr>
<tr>
<td></td>
<td>* Cable Routing Fair</td>
<td>70</td>
</tr>
<tr>
<td></td>
<td>* Surveys / Warning Signage as per Safety Code 6: Health Canada N/A</td>
<td>--</td>
</tr>
<tr>
<td><strong>LIGHTNING PROTECTION</strong></td>
<td>Good</td>
<td>69</td>
</tr>
<tr>
<td><strong>TANK GROUNDING</strong></td>
<td>(2) bonding plates with ground wire</td>
<td>35, 38</td>
</tr>
<tr>
<td><strong>CHLORINE ANALYSIS / DEAD ZONE TESTING</strong></td>
<td>Recommended</td>
<td>--</td>
</tr>
<tr>
<td><strong>MIXING SYSTEM</strong></td>
<td>Recommended</td>
<td>--</td>
</tr>
</tbody>
</table>

### REPAIRS OR MAINTENANCE REQUIRED

- Apply grip tape to ladder rungs
- 2pc - Gasket & Bolt sets required for manways
- Re-connect silt stop during next shutdown
The Ontario Ministry of Labour issued a Fixed Rail Ladder (FRL) Alert on May 20, 2014. A copy of this Alert has been included with the report.

Alternate fall protection suggestions - Double clip ladder side rails with CSA Certified Double Leg 'Y' Lanyard with shock pack OR Install 5/8” Safety rope to 'D' rings and use with CSA certified rope grab. Either option should be used in conjunction with the existing FRL system.

Please contact us should you wish to discuss this item further

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Replace bolt set and gasket
***Refer to Enclosed M01 Alert Prior to Climbing Ladder***
Rescue Port Base required beneath top landing grating

Replace ‘D’ ring with S. S. type
Surface prep & paint roof handrail as required
Bulbs replaced during inspection
Surface prep & paint roof handrail as required

Replace ‘D’ rings with S. S. type

Surface prep & paint steel curb hatch to tank interior

Rescue Port Base required
Internal Lining Replacement Required
Internal lining replacement required
Clean and remove tank sediment

Re-connect silt stop during next drained inspection
July 7, 2015

Haldimand County
Dunnville Water & Waste Water
206 Alder St. E,
Dunnville, ON N1A 1E1

Att:  Mr. Brandon Hedges
     Supervisor, Water & Wastewater
     Environmental Services Division

LM5076 – Cayuga Welded Steel Standpipe
     Coatings and Linings Report

Dear Brandon:

An ROV underwater camera tank inspection was performed at the above mentioned potable water storage facility on June 19, 2015. The ROV unit and tether cable were disinfected in accordance with AWWA-C652-11 Method #2 guidelines (200ppm solution) prior to entry into the tank interior. Landmark's ROV equipment is designated for potable water use only.

Exterior

The exterior of this tank is coated with an alkyd type of paint system which is in poor condition. The lowest 3 rings are splattered with stone chips which have become larger as the corrosion undercuts the coating. There are also large areas of de-lamination on the sides just under the roof and the roof itself has chalked so badly that the original blast profile is exposed and rusting. Coating repairs are required to all roof appurtenances (handrail, hatch curbs, etc). The exterior paint has exceeded its expected service live by several years and is no longer protecting the structure.

Interior

The interior of this tank is lined with an epoxy type of system which is in poor condition. Almost every weld seam is corroding badly, and there is severe ice damage throughout the tank. There are numerous areas of osmotic blistering and de-lamination both on the sides and around the bolted manway. The ceiling plate seams are only welded from the top, which is typical of tanks built to AWWA D100 guidelines, so there is substantial crevice corrosion at the open seams on the bottom of the roof plates which could cause structural issues and has likely weakened the dome roof structure substantially. Sediment levels are about 1 cm deep, so the floor could not be observed.

Recommendations

The exterior of this tank will need to be abrasive blasted to SSPC-SP10 Near-White Metal clean, then re-painted with an AWWA D-102 OCS-3 or OCS-4 type of system. A Blastrac or ‘Teepee’ system may be utilized in lieu of a rigid scaffold containment structure. A containment structure for this tank would be in excess of $200,000.
The interior of this tank will need to be abrasive blasted to SSPC-SP10 Near-White Metal clean, any steel pit repairs should then be completed and the roof seams should be seam welded at this time. The tank should be re-lined with an AWWA D-102 ICS-3 or ICS-5 type of system. All welds should be stripe coated after the application of the prime coat.

Yours Sincerely,

Landmark Municipal Services

[Signature]

David Baker,
NACE Certified Coating Inspector –Level 2, CIP #329173
Fixed Rail Ladder (FRL) Fall Protection System

Issued: May 20, 2014
Content last reviewed: May 2014

Disclaimer: This resource has been prepared to help the workplace parties understand some of their obligations under the Occupational Health and Safety Act (OHSA) and regulations. It is not legal advice. It is not intended to replace the OHSA or the regulations. FOR FURTHER INFORMATION PLEASE SEE FULL DISCLAIMER

Hazard summary

A worker descending a vertical ladder on a water tower in 2014 was critically injured after falling five metres while properly using a Class Frontal-Fixed Rail Ladder (Class FRL) Fall Protection System. A Class FRL Fall Protection System is a type of vertical fall protection using a permanently installed metal rail anchoring system with an automatic fall arresting device called the "trolley" or "carriage".

The investigation revealed a weakness in the design of some Class FRL Fall Protection Systems, which may not adequately protect workers who fall backward or who squat and roll backwards into a fall while connected by a body harness to the trolley which slides along the vertical rail. If a worker leans back, the trolley’s internal braking system can be pulled off the rail, allowing the trolley to slide down the rail. If a worker falls backwards or squats and rolls backward into a fall (as opposed to falling straight down or inwards towards the ladder) the trolley may not lock, allowing a worker to fall freely. In the 2014 incident, the worker fell from a water tower ladder as shown in Figure 1.

A. The worker is descending properly using the fall protection system.
B. The worker bends at the waist.
C. The worker’s legs fold into a squat position while the worker’s hands catch the next rung. The squat position allows the trolley to travel below the height of the worker’s knees.
D. As the worker begins to roll backward their hands release from rung, and the tension in the trolley connection increases enough to remove all the slack out of the full body harness and slide the chest D-ring towards the waist.
E. This tension in the connection to the trolley forces the worker into a tight squatting position while rotating around the rung that the worker’s feet are on.
F. The trolley connection remains in tension as the trolley travels below the rung that the worker’s feet are on.
G. The connection to the trolley, now in tension between the worker’s legs prevents the engagement of the braking mechanism that would stop the workers motion.
H. The worker, with back to the ladder, continues to fall head first while still attached to the fall protection system.

In 2010, the Ministry of Labour published a similar Alert, Class Frontal Fixed Rail Ladder (FRL) Fall Protection System, Alert #26/0510, after a worker was injured after falling back, then down 20 metres from a ladder attached to a tower while using a Class FRL Fall Protection System. In 2010, the investigation determined that the Class FRL Fall Protection System might not adequately protect workers who fall backward in a standing position.

Locations and sectors
Class FRL Fall Protection Systems are used on vertical access ladders which normally do not have a cage, such as the ladders on communication towers, chimneys and water tanks (towers).

**Precautions**

Even though a Class FRL Fall Protection System may be currently certified to CSA standards and/or have a CSA standards stamp on the side of the trolley unit, this should not be interpreted to guarantee worker safety and employers should not rely on such a stamp. Further investigations into the system are needed to ensure the system protects against a squatting position/rollback fall or a fall backwards.

Class FRL Fall Protection Systems whose design characteristics require the connection between the worker and the trolley to be in tension and where the trolley remains disengaged regardless of the tension force applied should not be used. Employers must take reasonable precautions to protect workers in these circumstances. This may include using alternative fall protection or access systems, as appropriate, for the adequate protection of the health and safety of workers using vertical access ladders.

Employers who own or rent structures which have a Class FRL Fall Protection System installed must ensure that the Class FRL Fall Protection System is capable of protecting a worker in the case of a squatting position/rollback fall or a fall backwards. The Ministry recommends that employers contact the manufacturer to ensure that the particular Class FRL Fall Protection System is capable of protecting a worker from any type of fall (including a backward fall and falling from a squatting position) before it is used.

**Note:** This Alert replaces the Class FRL Fall Protection System, Alert #26/0510 published in 2010 by the Ministry of Labour.

**Resources**

For more information contact:

Infrastructure Health and Safety Association
www.ihsa.ca

Or contact the Ministry of Labour Health & Safety Contact Centre toll-free at 1-877-202-0008.

For further reference see also:

Ministry of Labour
Ontario.ca/labour

ServiceOntario e-laws
www.e-laws.gov.on.ca

Remember that while complying with occupational health and safety laws, you are also required to comply with applicable environmental laws.

Please photocopy Ministry of Labour Alerts, distribute them widely and post them where people will see them.
8MM (1/4") UMBRELLA ROOF
SEE STD. A-154.1, B-154.1

ROOF/SHELL DETAIL
SEE STD. 253, 254, 260

SHELL BUTT JOINTS
SEE STD. 260

SHELL PLATE
SEE STD. 151

SKETCH/SHELL DETAIL
SEE STD. 260, L-A

SKETCH PLATE
SEE STD. B152.1
CAYUGA STANDPIPE FOUNDATION PLAN

24'-7" dia. Standpipe

26'-5" dia. slab - see F2

All caissons-2'-6" dia. With 5'-4" dia. bells - see F2
4 Inner caissons @ 90 deg.
8 outer caissons @ 45 deg.
CAYUGA STANDPIPE FOUNDATION SECTION

Cazaly Associates Ltd. | Landmark Structures (Ontario) Ltd.
TOP

25M @ 9" c/c E.W. TOP

2001 @ 4" c/c E.W.

25M @ 13½" c/c E.W. BOTTOM

SECTION
ANCHORS - 20 PCS. REQ'D.
@ 18° SEE STD 251

EL. 2
T/O SKE

EL. 2
T/O

GRO
PLAN

SILT STOP
SEE DWG M-2

REINFORCING R.
SEE STD 257

12" FILL
SEE DWG. M-2

REINFORCE RISER PILASTER W/20M@6" E.W.
AROUND PIPE.

CONC. ENCASE TO LIMIT OF BASE SLAB.

EL. 201.010

610  289

300  25

EL. 200.095

915

EL. 198.515

6" HIN.

1580
MK 1. - 1 PC REQ'D

COAT PIPE WITH COAL TAR EXPOXY.

12" STD WALL CARBON STEEL PIPE.

12"-90° SR ELBOW

8 = 4 1/2"

7 = A 1/2"

12"

12"

4'-11 1/2"

5'-11 1/2"
NOTES:
1. ○ indicates placing order.
2. Radius is bott. shell O.R. + Ext. fillet + 1" (min.)
3. Plate lap is 1½".
PLATE THICKNESS: $\frac{5}{16}$

PCS. REQ'D.: 1

CAYUGA 811

LANDMARK STRUCTURES (ONT. LTD.)
PLATE THICKNESS: \( \frac{5}{16}\)"

PCS. REQ'D.: 4
3.10.6 SELF-SUPPORTING\(^1\) DOME AND UMBRELLA ROOFS

3.10.6.1 Self-supporting dome and umbrella roofs shall conform to the following requirements:

- Minimum radius = \(0.8D\) unless otherwise specified by the purchaser.
- Maximum radius = \(1.2D\).
- Minimum thickness = \(\frac{\text{Roof Radius} (\text{in feet})}{200}\), but not less than \(\frac{7}{32}\) inch.
- Maximum thickness = \(\frac{3}{16}\) inch.

\(^1\) Self-supporting roofs having the roof plates stiffened by sections welded to the plates and not conformed to the minimum thickness requirements but should be not less than \(\frac{7}{32}\) inch when so designed by the manufacturer, subject to the approval of the purchaser.

\(^2\) When the sum of the live and dead loads exceeds 45 pounds per square foot, the minimum thickness shall be increased by the following ratio:

\[ \frac{\text{live, dead load}}{45} \]

3.10.6.2 The cross-sectional area of the top angle, in square inches, plus the cross-sectional areas of the shell and roof plates within a distance of \(6\) times their thicknesses, measured from their most remote point of attachment to the top angle, shall equal or exceed:

\( (D) (\text{Roof radius in feet}) \)

1.500

RAADIUS:
- Min. = .8 Dia.
- Max. = 1.2 Dia.
- Usual = 1.0 Dla.

LOADING (DEAD + LIVE)
\( D + L = 60 = 1.155 \times \text{Thick.} \)
\( = 75 = 1.291 \times \text{Thick.} \)
Bar - 1" x 1"

1/4"

1/4"

Bar - 5/8" x 3"

1 1/2"

8"

MATERIAL: - 44 W

PCS. REQ'D.: - 20

CAYUGA

LANDMARK STRUCTURES
(ONT. LTD.)

Date SEPT 15/86
Dwn. REU
Alloc. 8 - 5
Chk.

Dwg. 251.

Rev.
1/4" Plate

Grind Corner and Edges. Round - 2 Sides

PCS. REQ'D: 26
NOTES:
1. Material: A.S.T.M. A 36
2. Grind edge if necessary to remove rolling distortion.
3. Round one edge as shown.
4. Shop jig to check roll and fit.
5. Radius cut ends or remove end rolling flats if required.
6. Fabrication to be in stock lengths (20'-0"
with one make up length to suit circumference. Allow 1'-0" extra on make up length for field fit.

**SHIP 5 PCS.**

**TOTAL L.F. REQ'D: EACH 20'-0" LG**

**BAR SIZE: 5" x 3/8"**

<table>
<thead>
<tr>
<th>Job</th>
<th>No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAYUGA</td>
<td>811</td>
</tr>
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</table>

**STIFFENER RING**

**LANDMARK STRUCTURES (ONT. LTD.)**

<table>
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<th>Date</th>
<th>Dwn. RSU</th>
<th>Dwg.</th>
<th>Rev.</th>
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<tr>
<td>8/5/88</td>
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<td></td>
<td>254.</td>
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</table>
Threaded Cap

1\(\frac{1}{2}\)" I.D. Steel Pipe

Roof Plate

Stiffener Ring

Drill Roof Pl.x 1\(\frac{1}{4}\)" - Typical

NOTE:
1. Cut cable sleeves from standard 1\(\frac{1}{2}\)" x 6" steel pipe nipple.

PCS. REQ'D: __8__
1/4" Plate

Inner Dia. = 1 3/4"

Outer Dia. = 2 1/4"

1 PC. REQ'D.
**ELEVATION**

3/4" x 21" bolt c/w 5" Thread

<table>
<thead>
<tr>
<th>MH DIA</th>
<th>BOLT</th>
<th>Y</th>
</tr>
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<tbody>
<tr>
<td>24&quot;</td>
<td>16&quot;</td>
<td>12&quot;</td>
</tr>
<tr>
<td>30&quot;</td>
<td>20&quot;</td>
<td>16&quot;</td>
</tr>
<tr>
<td>36&quot;</td>
<td>21&quot;</td>
<td>16&quot;</td>
</tr>
</tbody>
</table>

**HINGE**

1/4" Bevel edge prep

2" x 3/4" Flat bar

**SECTION: 'A'**

1/4" Bevel to be L & R Hand

**SECTION: 'B'**

2 HINGES REQ'D

**SECTION: 'C'**

Typ.

Cover Pl.

Typ.
NOTE:

1/2" x 2" S.S. Bolts c/w nuts and washers required for ea. mount bracket hole.

LOCATION: LOWER

MATERIAL: GALV. STEEL

SIDERAILS: 3/8" x 2"

PCS. REQ'D: 1

---

**LADDER SECTION**

<table>
<thead>
<tr>
<th>Job</th>
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</tr>
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<tr>
<td>CAYUGA</td>
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**LANDMARK STRUCTURES (ONT. LTD.)**

<table>
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<tr>
<td>SEPT 18</td>
<td>19-3</td>
<td></td>
<td></td>
<td></td>
<td>A-351</td>
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</table>
NOTE:
1/2" x 2" S.S. Bolts c/w nuts and washers required for ea. mount bracket hole.
LOCATION: LADDER

MATERIAL: GALV.

PCS. REQ'D.: 36

LANDMARK STRUCTURES (ONT. LTD.)
## CERTIFICATE OF ANALYSIS

**MAXXAM JOB #: B7J8042**  
**Received: 2017/09/12, 15:15**  
**Sample Matrix: Paint**  
**# Samples Received: 1**

<table>
<thead>
<tr>
<th>Analyses</th>
<th>Quantity</th>
<th>Date Extracted</th>
<th>Date Analyzed</th>
<th>Laboratory Method</th>
<th>Reference</th>
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<tr>
<td>Metals in Paint</td>
<td>1</td>
<td>2017/09/15</td>
<td>2017/09/15</td>
<td>CAM SOP-00408</td>
<td>EPA 6010D m</td>
</tr>
</tbody>
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### Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported: unless indicated otherwise, associated sample data are not blank corrected.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
Your P.O. #: K.TURNEY
Site Location: ON SITE
Your C.O.C. #: na

Attention: Keith Turney
MISCO - Mulders Inspection Service Company Ltd
383B County Rd 4
RR8
Picton, ON
CANADA K0K 2T0

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B7J8042
Received: 2017/09/12, 15:15

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Gina Baybayan, Project Manager
Email: GBaybayan@maxxam.ca
Phone# (905)817-5766
====================================================================
This report has been generated and distributed using a secure automated process.
Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.
<table>
<thead>
<tr>
<th>Maxxam ID</th>
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<tr>
<td>Sampling Date</td>
<td>2017/08/31 16:00</td>
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<tr>
<td>COC Number</td>
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<tr>
<td>UNITS</td>
<td>CAYUGA STANPIPE (EXTERIOR COATING)</td>
</tr>
<tr>
<td>RDL</td>
<td></td>
</tr>
<tr>
<td>QC Batch</td>
<td></td>
</tr>
<tr>
<td>Metals</td>
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</tr>
<tr>
<td>Chromium (Cr)</td>
<td>37</td>
</tr>
<tr>
<td>Lead (Pb)</td>
<td>29000</td>
</tr>
<tr>
<td>mg/kg</td>
<td>10</td>
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<tr>
<td>mg/kg</td>
<td>100</td>
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<tr>
<td>RDL = Reportable Detection Limit</td>
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<tr>
<td>QC Batch = Quality Control Batch</td>
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</table>

QC Batch = Quality Control Batch

RDL = Reportable Detection Limit
GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

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<tr>
<th>Package</th>
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<tr>
<td>1</td>
<td>21.0°C</td>
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Sample FCK306 [CAYUGA STANDPIPE (EXTERIOR COATING)] : Metals: Due to the sample matrix, sample required dilution. Detection limits were adjusted accordingly.

Results relate only to the items tested.
# QUALITY ASSURANCE REPORT

<table>
<thead>
<tr>
<th>QA/QC Batch</th>
<th>Init</th>
<th>QC Type</th>
<th>Parameter</th>
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<th>Value</th>
<th>Recovery</th>
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<tr>
<td>S165591</td>
<td>APT</td>
<td>Matrix Spike</td>
<td>Chromium (Cr)</td>
<td>2017/09/15</td>
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<td>%</td>
<td>75 - 125</td>
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<tr>
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<td></td>
<td></td>
<td>Lead (Pb)</td>
<td>2017/09/15</td>
<td>NC</td>
<td>%</td>
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<td>QC Standard</td>
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<td></td>
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<td>Lead (Pb)</td>
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<td>Method Blank</td>
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<td>mg/kg</td>
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<td></td>
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<tr>
<td>S165591</td>
<td>APT</td>
<td>RPD</td>
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<td>2017/09/15</td>
<td>19</td>
<td>%</td>
<td>35</td>
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</tr>
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</table>

**Duplicate**: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

**Matrix Spike**: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

**QC Standard**: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

**Method Blank**: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

**NC (Matrix Spike)**: The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration).
VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Cristina Carriere, Scientific Service Specialist

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