Water License Annual Report - Executive Summary

The City of Iqaluit provides its residents with drinking water, wastewater management and solid waste management. These services are governed by the City of Iqaluit's Water License 3AM-IQA0611, which was issued by the Nunavut Water Board in 2006. In accordance with Schedule B of the Water License, this Annual Water License Report summarizes the activities conducted by the City in 2009.

The Water Treatment Plant (WTP) receives raw water from Lake Geraldine and provides the residents of Iqaluit with potable water. In 2009, the City used 899,640 m^3 of water from the Lake Geraldine, this is approximately 200,000 m^3 less than the allowed usage of 1,100,000 m^3. In 2009, there were no major problems with the WTP or the water distribution system. In October, there was a Dam Safety Inspection (DSI) Report prepared on the Lake Geraldine Dam, which recommended that the City: 1) implement a grouting program to fix the leaks in the dam, 2) complete an underwater survey of the dam, and 3) prepare an Emergency Preparedness Plan. The City plans to complete this recommended work in the summer of 2010.

The Wastewater Treatment Plant (WWTP) provides the City with primary sewage treatment. In 2009, there was some minor maintenance work done on the WWTP, including the replacement of the filter in the Salsnes Filter. Along with the DSI Report that was prepared for the Lake Geraldine Dam, a DSI Report was prepared for the Sewage Lagoon berms; no problems were identified with the berms.

The City provides the residents of Iqaluit with solid waste management services at the West 40 landfill. In September of 2009, it was noticed that landfill run-off was leaching through the perimeter berm into the outside drainage ditch. Immediate measures were taken to prevent the run-off from draining to the ocean and a report was prepared to identify the water management improvements required to address this problem. These water management improvements are planned to be carried out in the summer of 2010. Furthermore, in 2010, the City of Iqaluit plans to undertake the development of a Solid Waste Management Plan.

ᐃᒥᖏᒧᑦ ᓯᐃᓴᖅᓂᖏᒧᑦ ᐊᖏᔪᕐᓯᑦ ᐅᓂᒃᓕᐊᖅ - ᐊᖅᓱᖅᑲᐅᑎᑦ ᓇᓗᓇᐃᓕᑎᖏᑦ

ᓄᓇᓕᕐᕆᐃᑲᒃᑯᑦ ᐃᓄᖅᑎᓄᑦ ᐃᒥᖅᑎᑎᕐᔨᐅᒪᒪᑕ, ᑭᓱᓕᓐᓄᑦ ᐊᐅᓪᓚᕐᔪᓕᑎᒃ ᐊᒪᒪᓗ ᑕᖅᑭᓕᓐᓂᒃ ᒥᐊᓂᔪᓕᓕᑎᒃ. ᑕᒪᒃᑯᐊ ᐱᔨᑦᔪᐅᑎᑦ ᐊᐅᓪᓚᕐᒪᒪᑕ ᓄᓇᓕᕐᕆᐅᒃᑯᓐᓂᑦ ᐃᒥᖏᒧᑦ ᓯᐃᓴᖅᓂᒃᑯᑦ 3AM-IQA0611, ᐱᕙᓪᓇᐅᑎᓕᐊᔪᖅ ᓄᓇᕘᑦ ᐃᒥᓕᓵᔨᑯᓐᓂᑦ 2006ᖓᔪᑎᓪᓗᒍ. ᒪᓕᑦᑐᓕᑦ ᐋᖅᑭᔪᓕᒪᔾᔪᑦ ᐱ ᐃᒥᖏᒧᑦ ᓯᐃᓴᖅᓂᖏᒧᑦ, ᑑᓪᓗ ᐃᒥᖏᒧᑦ ᓯᐃᓴᖅᓂᖏᒧᑦ ᐅᓂᒃᑲᓕᐊᖅ ᓇᓗᓇᐃᕐᐃᕐᓂᑦ ᖃᓄᐃᓕᓵᕆᔨᓕᓕᖅᓱᒋᑦ ᓄᓇᕘᑦᐸᐅᑯᑦ 2009ᖓᔪᑎᓪᓗᒍ.

ᐃᒥᖏᒧᑦ ᑲᒪᒋᐅᐃᓕᐅ ᐃᒥᖏᒥᒃ ᓴᓗᒫᓕᖅᖃᓕᖅᑎᑦᑐᒥᒃ ᐃᒥᖅᑎᖏᓕᒪᑦ ᑕᔪᓗᒫᑦ ᐃᒥᓚᐅᐅᓪᓗᓂ ᐃᓄᖅᑎᓂᑦ. 2009ᖓᔪᑎᓪᓗᒍ, ᓄᓇᓕᕐᕆᐅᒃᑯᑦ ᐊᑐᔅᓀᐃᓱᑦ 899,640 ᒥᔅᑐᓚᒃ ᑕᖅᒥᒃ ᐃᒥᖏᒥᒃ ᑕᔪᓗᒫᑦ ᓕᐃᒃ ᐅᓪᑎᖅᒥᑦ, ᒥᖓᕆᐅᓴᓪᓗᒍ 200,000ᒥᒃ ᐊᑦᑕᔪᓗᐊᖏᒪᑦ ᐱᕐᓚᐊᖏᖏᑕᖓᓂᑦ 1,100,000ᖓᔾᔪᓚᐊᓕᒪᒥᑦ. 2009ᖓᔪᑎᓪᓗᒍ, ᐃᓗᐊᖏᕐᔨᒋᑎᖅᑲᐊᓕᐅᕐᖏᑕᖅ ᐃᒥᖅᑎᖏᒃ ᐅᕙᓪᓕᐅᓂᑦ ᐊᑐᓚᐊᖏᑦᓄᓐᓂᑦ ᐃᒪᓐᓂ. ᐅᑐᐱᓚᐅᓕᖅᑎᓪᓗᒍ, ᓴᕐᔪᕐᒪᓕᔨᐊ ᑯᑦ ᖃᐅᓵᓴᖅᑕᐅᓕᐅᕐᔪᒪᓕᒪᓂᑦ ᖃᐅᓵᓴᖅᑎᒍᓂᑦ ᐅᓂᒃᑲᓕᐊᖏᑕᒧᑦ, ᐊᑐᓕᖏᓵᔨᐊᓂᑦ ᓄᓇᓕᕐᕆᐅᒃᐃᑦ 1) ᐋᖅᑭᒃᔪᕐᖏᓵᓪᓗᑎᒃ ᓱᒥᐅᑐᖅᑕᐅᔨᔨᒋᑎᖅᓴᖅᓂᑦ ᓴᓕᔪᕐᒪᔨᔭᒪᑦ ᐃᖅᓱᖓᓕᒫᒍ 2) ᐃᒪᐅᑦ ᐊᑕᒍᑦ ᖃᐅᓵᓴᖅᑕᐅᔪᓂ ᓴᓕᑎᓕᐊᓕᕐᖏᖅ, ᐊᒪᒪ 3) ᕿᖅᓴᐅᑎᓕᐅᖅᓯᓗᓂᒃ ᑐᐊᐃᖅᓴᓐᓂᑦᑐᑦ ᐅᕿᓗᐃᐅᓕᖅᖃᓕᖅᑐᑦ. ᓄᓇᓕᕐᕆᐅᒃᑯᑦ ᕿᖅᓴᐃᓕᒪᔨᑦ ᐊᑐᓚᐊᖏᑦᓄᓐᓂᒃ ᐊᐅᓪᓚᕐᒪᒪᑕ 2010.

ᐃᒥᖅᑎᖏᒃ ᐊᑐᖅᑕᐅᓴᖓᖅ ᓄᓇᓕᕐᕆᐅᒃᑐᑦ ᐃᒥᖅᑎᓕᑦ ᑭᓱᓗᐃᑦ ᑯᐃᓕᐊᕐᓂᖏᓐᓄᑦ. 2009ᖓᔪᑎᓪᓗᒍ, ᒥᑭᔨᓗᐊᒥᒃ ᓴᓇᔨᓴᐃᖅᑕᐅᓂᖅ ᐃᒥᖅᑐᑎᖅᖃᖏᑦ, ᐱᖅᓯᐅᑎᓪᓗᓕᑦ ᑭᖓᔾᔪᖏᑎᑦᓴᖓ ᓴᕐᐃᐃᐅᑎᖓᓕ ᐊᑯᓂᖓᓂᓄ. ᑲᑎᓕᐅᑎᓕᒫᓪᓗᒍ ᐅᓂᒃᑲᓕᐊᖏᓂᑦ ᐃᒪᐃᓴᖅᓂᖓᓄᑦ, ᐱᖅᓯᐅᑎᓂᒃᑲᓐᓂᑦ ᐅᓪᓚᕐᔪᓕᓕᖅᑐᑦ ᑭᓱᓗᐃᑦ ᓴᓇᔨᓴᐃᖅᑕᐅᓂᖅ ᐃᒪᐃᓴᖅᓂᖓᓄᑦ ᑐᓴᐃᓚᐅᖅᓯᒪᓕᒫᑦ ᓴᓇᔨᓴᐃᖅᑕᐅᓂᖅ ᐃᒪᐃᓴᖅᓂᖓᓄᑦ ᐊᑐᓚᐊᖏᑦᓄᓐᓂᑦ ᐊᐅᓪᓚᕐᒪᒪᑕ 2010ᒥ. ᓯᓚᑦᑲᓂᖓ, 2010ᒥ, ᓄᓇᓕᕐᕆᐅᒃᑯᑦ ᐃᓄᖅᑎᓄᑦ ᕿᖅᓴᐃᓕᓐᓂᑦ ᓴᓇᔨᐅᓂᓴᖓᓂᓕᑦ ᑕᖅᑭᓕᑦ ᑲᒪᒋᐅᐃᓕᐅᕐᖏᓐᓄᑦ ᕿᖅᓴᐅᑎᒃᑯᑦ.

Water License No. 3AM-IQA0611
2009 Annual Report
City of Iqaluit

In July of 2006, the City of Iqaluit was issued Water License number 3AM-IQA0611 by the Nunavut Water Board. This license was issued for a five year period commencing on May 15, 2006. A requirement of the license is an annual report due March 31 of each year summarizing activities governed by the license for the previous calendar year. In accordance with Schedule B of the Water License, this Annual Water License Report summarizes the activities conducted by the City of Iqaluit in 2009.

A. The monthly and annual quantities in cubic meters of water obtained from Lake Geraldine

Table 1 summarizes the monthly and annual quantities of water drawn from Lake Geraldine, the City of Iqaluit's raw water source. The total water usage for 2009 was 899,640 m^3, which is well within the allowed usage of 1,100,000 m^3.

Table 1. Raw Water Drawn from Lake Geraldine Reservoir (2009)

Month	Volume (m^3)
January	70,830
February	69,900
March	80,420
April	82,560
May	80,460
June	75,270
July	73,620
August	73,070
September	73,070
October	74,980
November	69,210
December	76,250
Total	**899,640**

B. The monthly and annual quantities in cubic meters of discharge from the Wastewater Treatment Facility

Table 2 summarizes the monthly and annual quantities of discharge from the City of Iqaluit's Wastewater Treatment Plant (WWTP) during 2009.

Table 2. Discharge from the Wastewater Treatment Plant (2009)

Month	Volume (m^3)
January	62,557
February	66,130
March	71,749
April	71,001
May	74,449
June	75,390
July	74,699
August	75,399
September	71,676
October	72,259
November	69,931
December	65,953
Total	**851,194**

During shutdowns of the WWTP, raw sewage was diverted to the backup sewage lagoon. The knife gate valve that diverts the sewage to the sewage lagoon is not equipped with a monitoring device; therefore, there was no measurements taken to determine the amount of discharge for the days that the WWTP is not operational. As a result, the amount of discharge for the duration of each shutdown was calculated using average daily discharge rates. The average daily total was determined by dividing the total volume of discharge from the WWTP recorded for the month that the shutdown occurred by the number of days the WWTP was operational that month. The dates of each shutdown can be found in Section F.

C. The monthly and annual quantities in cubic meters of sludge removed from the Wastewater Treatment Facility

Table 3 summarizes an estimate of the monthly and annual quantities of sewage sludge removed from the City of Iqaluit's WWTP and deposited at a designated area within the West 40 Landfill.

Table 3. Sewage Sludge Removed from the Wastewater Treatment Facility and Deposited at the West 40 Landfill (2009)

Month	Volume (m^3)
January	18.5
February	23.5
March	25.2
April	25.2
May	26.9
June	25.2
July	25.2
August	23.5
September	16.8
October	21.8
November	21.8
December	26.9
Total	**280.6**

The sludge that is removed by the Salsnes Filter in the WWTP falls into a trailer in a room below the primary treatment room. The trailer that is used to catch the sludge from the Salsnes Filter has 3.4 cubic meters of storage and is approximately 50% full each time it is unloaded. The trailer is unloaded at the West 40 Landfill every second day including weekends and holidays. The difference in volume from month to month is due to two different factors: 1) every month doesn't have the same number of days, and 2) during the shutdowns there is no sludge produced because the raw sewage was diverted to the lagoon.

D. A summary report which includes all data and information generated under the Monitoring Program, including the QA/QC program, in an electronic and printed format acceptable to the Board

Due to the high turnover rate in the Engineering Department the Monitoring Program was not applied in 2009.

E. A summary of construction activities conducted

Utilidor

In the fall of 2009, work began to extend the utilidor system to Pitsi Lane and Mattaaq Cr. This work includes the installation of a sewer line, water line and a recirculation line as well as two fire hydrants. It is expected that this addition to the utilidor system will be commissioned by June 30, 2010.

Paving Project

In 2009, work on the City's paving project continued, including work to improve drainage issues and prevent water from eroding the newly paved roads. The most common drainage issues were caused by improperly sized culverts, ditches with improper grading and the absence of ditches/trenches to direct the flow of water. As-built drawings identifying new ditches/trenches and existing ditches that were regraded to provide improved water flow have been provided in Appendix A. As-built drawings identifying all culvert replacements associated with this project can be found in Appendix B.

F. A summary of any modification and/or major maintenance work and/or demolition work carried out and any associated structures

West 40 Landfill

The following work was carried out at the West 40 Landfill in 2009:

June 4, 2009:	A breach in the landfill's southwest berm was repaired by the Landfill Foreman.
September 9, 2009:	A pipe was permanently installed beneath the road to the retention pond so water could be pumped from the perimeter ditch to the off-site retention pond without laying a pipe across the road.

Wastewater Treatment Plant

The following maintenance work was carried out at the WWTP in 2009:

January 11 – 21, 2009:	The filter in the Salsnes Filter at WWTP was replaced.
August 18 – 28, 2009:	The filter in the Salsnes Filter at WWTP was replaced.

Sept. 21 – Oct. 6, 2009: The Utilidor staff cleaned grit build up on the Salsnes Filter's auger and spray nozzles. At this time, they also replaced the spray nozzles as needed and blasted all sewer line inside the WWTP to ensure the grit was removed.

November 23- 27, 2009: The auger motor in the Salsnes Filter was replaced after an old seal allowed grease pass into the motor.

During the above listed maintenance work, the WWTP was shut down and the sewage was diverted to the sewage lagoon.

Sewage Lagoon

The following maintenance work was carried out on the Sewage Lagoon in 2009:

October 6, 2009: Two valves were replaced in the access vault that controls the flow from the sewage lagoon to the Koojesse Inlet.

G. A summary of all work carried out under the Managements Plans in accordance with this License

Dam Safety Inspections

In October 2009, a Dam Safety Inspection (DSI) was performed on both, Lake Geraldine Dam and Sewage Lagoon. Reports were prepared for each DSI and submitted to the Nunavut Water Board on January 6, 2010. A copy of these reports can be found in Appendix C of this report.

Solid Waste Management Plan

The City of Iqaluit is currently drafting an RFP for the development of a Solid Waste Management Plan. An executive summary summarizing the key components of the plan is provided in both English and Inuktitut in Appendix D.

H. A progress report and revisions to any studies requested by the Board that relate to waste management, water use or reclamation and a brief description of any future studies planned by the Licensee including, an executive summary in terms understandable to the general public, translated into Inuktitut

See comments in Section G.

I. Any addendums to the approved Contingency Plans and the approved Operation and Maintenance Manuals

In 2009, no addendums were made to the approved Contingency Plans and Operation and Maintenance Manuals

J. A list and description of all spills and un-authorized discharges, including volumes, Spill Report Line Identification Number and summaries of follow-up action taken

Table 4 below provides a summary of all spills and un-authorized discharges that occurred in 2009, including volumes, Spill Report Line Identification Number and summaries of the follow-up actions taken. Copies of the spill reports can be found in Appendix E.

Table 4. Summary of all spills and un-authorized discharges that occurred in 2009

Spill Report ID No.	Date	Location	Description	Volume (m^3)	Cause	Follow up Actions
09-071	15/02/2009	House 459	Sewage spill	0.1	Sewage truck was overfilled	The impacted snow and ice was excavated and deposited at the landfill.
09-082	26/02/2009	House 5135	Sewage spill	0.4	Sewage backup in the access vault	Once the spill was recognized, three sewage vacuum trucks were called to the site to minimize the size of the spill. At the start of the summer, the impacted soil was excavated and removed to the landfill.
09-174	30/04/2009	A.V. 500	Sewage spill	2	Partial collapse of sewer main	The City of Iqaluit's Public Works Department was called to the site immediately to perform a cleanup. Since this incident, the sewer line is blasted three times a week to prevent further spills.
09-264	05/4/2009	West 40 Landfill	Uncontrolled discharge of landfill runoff	Unknown	Breach in the berm on the metals side	A pump was setup to draw down the level of run-off in the on-site control pond inside the landfill by moving the run-off to the off-site retention pond. This reduced the pressure on the berm. The breach was repaired by the landfill foreman with pit run material.
09-431	09/09/2009	West 40 Landfill	Uncontrolled discharge of landfill runoff from the on-site control pond	80	Failure of an old discharge culvert in the south berm	A culvert in a ditch outside the landfill was previously blocked and the majority of the spill was contained. A pump and sewage vacuum trucks were used to pump the landfill run-off from the perimiter ditch to the off-site retention pond.
09-444	18/09/2009	West 40	Fuel spill	0.12	Crushing a home heating tank	Nunatta Environmental was called in to do a cleanup. This was a previously contaminated site.

K. Any revisions to approved Closure and Reclamation Plans

In 2009, no revisions were made to approved Closure and Reclamation Plans.

L. A summary of any closure and reclamation work undertaken and an outline of any work anticipated for the next year, including and changes to implementation and scheduling.

No closure and reclamation work was undertaken in 2009.

M. A summary of actions taken to address concerns or deficiencies listed in the inspection reports and/or compliance reports filed by an Inspector

Lake Geraldine Dam

As requested in our October 13, 2009 inspection report, the City of Iqaluit had a Dam Inspection Report (DSI) completed. The DSI report recommended that the City: 1) implement a grouting program to fix a leak in the dam, 2) prepare an Emergency Preparedness Plan, 3) conduct an underwater survey, and 4) update the Operation & Safety Manual Logbook, and Permanent File. The City plans to carryout the first three recommendations in 2010. The City expects to complete the updates in 2011.

West 40 Landfill

On a routine inspection with the INAC Water Inspector, it was noticed that there was run-off from the landfill leaching through the perimeter berms. The Inspector asked the City to identify the actions necessary to prevent uncontrolled discharges of landfill runoff from occurring in the future. The City retained the services of AECOM to prepare the necessary report, which identifies the required on-site runoff storage and conveyance system upgrades. This report was submitted to the NWB on November 6, 2010. The City plans to complete the recommended upgrades, which include the construction of a new impermeable perimeter berm, in 2010.

N. Update on implementation of recommendations from any Dam Safety Inspection and/or Review

See Section M.

O. A brief update on the implementation plan of all facilities within the scope of this License including projected implementation and status of Phase II of the Wastewater Treatment Plant

Solid Waste Management Facilities

See Section G and Appendix D.

Wastewater Treatment Facility

In 2010, the City of Iqaluit will be preparing a detailed Capital Plan. This will address the upgrades required at the WWTP and will provide the Department of Engineering with a timeline and implementation plan for proceeding with Phase II of the WWTP.

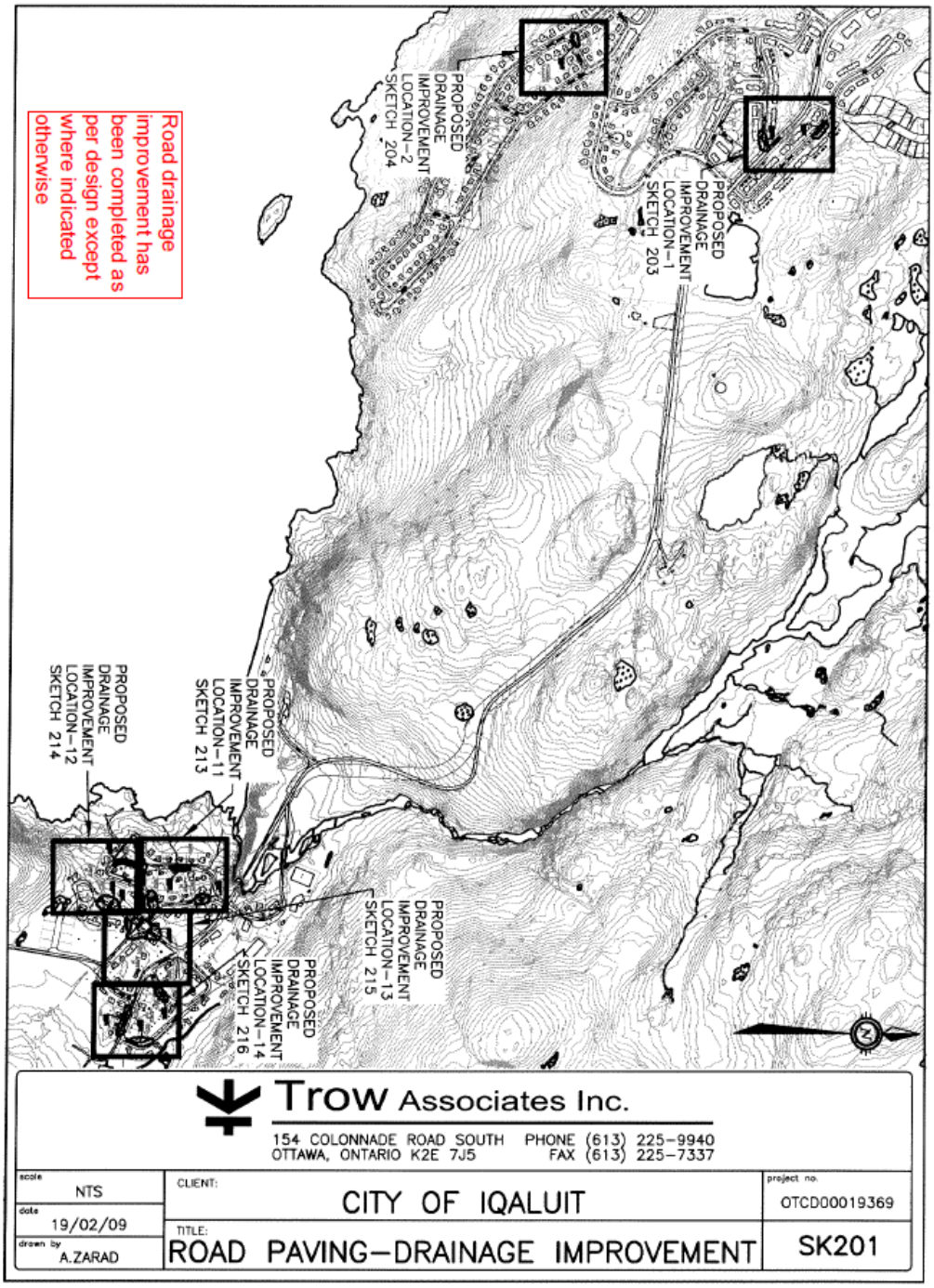
P. Any details on water use or waste disposal requested by the Board by November 1st of the year being reported

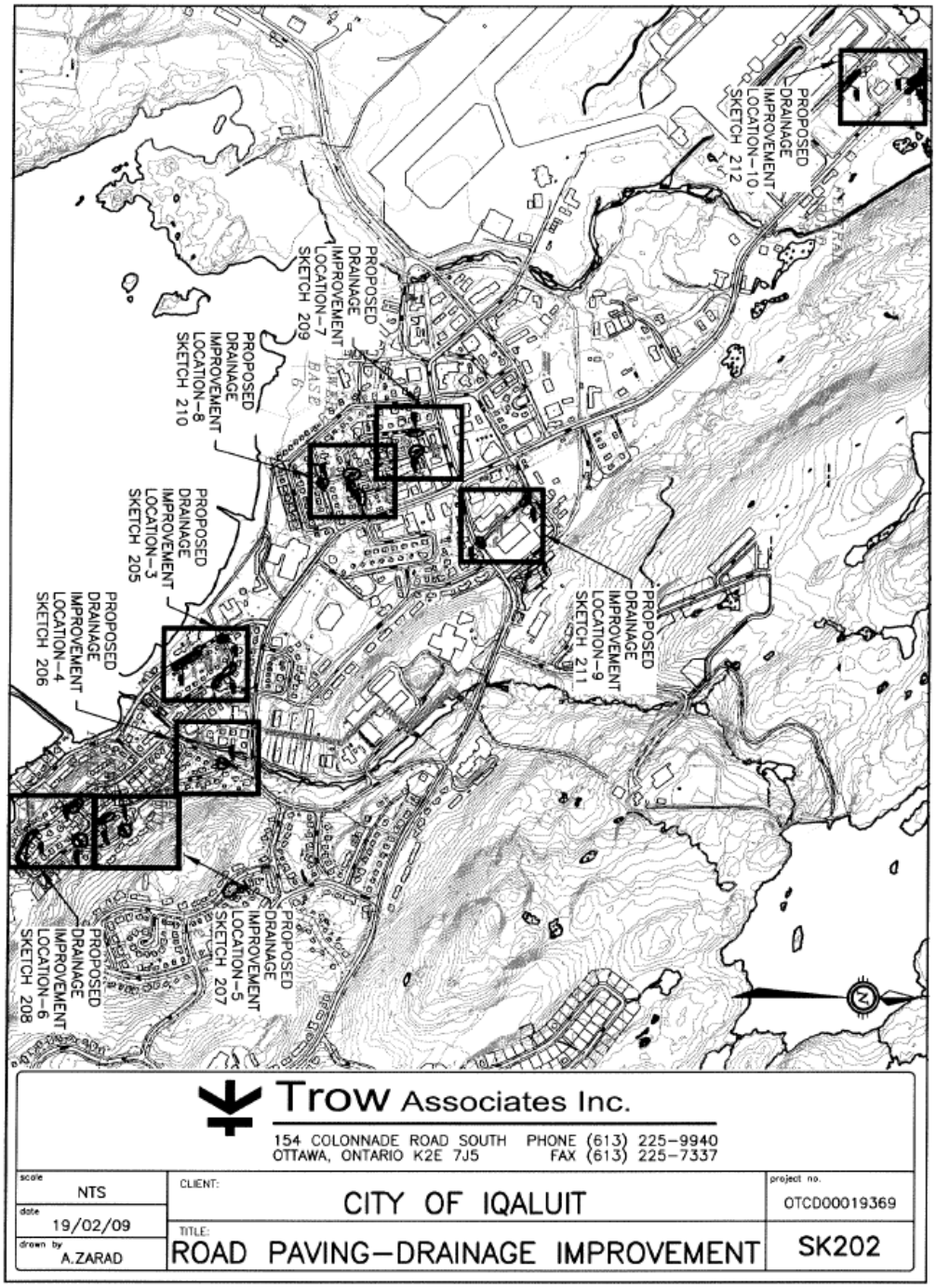
Water License Amendments

The City received letters dated May 20, 2009 and January 7, 2010 asking for the outstanding information items outlined in the Municipal Status Report Summary (up to April 20, 2009). On February 5, 2010, the City notified the Nunavut Water Board that it plans to submit this information by May 15, 2010.

Appendix A

As-built Drawings of Drainage Improvements


Road drainage improvement has been completed as per design except where indicated otherwise
PROPOSED DRAINAGE IMPROVEMENT LOCATION-2 SKETCH 204
PROPOSED DRAINAGE IMPROVEMENT LOCATION-1 SKETCH 203
PROPOSED DRAINAGE IMPROVEMENT LOCATION-12 SKETCH 214
PROPOSED DRAINAGE IMPROVEMENT LOCATION-11 SKETCH 213
PROPOSED DRAINAGE IMPROVEMENT LOCATION-13 SKETCH 215
PROPOSED DRAINAGE IMPROVEMENT LOCATION-14 SKETCH 216
N
Trow Associates Inc.
154 COLONNADE ROAD SOUTH PHONE (613) 225-9940
OTTAWA, ONTARIO K2E 7J5 FAX (613) 225-7337
scale NTS
date 19/02/09
drawn by A.ZARAD
CLIENT: CITY OF IQALUIT
project no. OTCD00019369
TITLE: ROAD PAVING-DRAINAGE IMPROVEMENT
SK201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PROPOSED DRAINAGE IMPROVEMENT LOCATION-7 SKETCH 209
PROPOSED DRAINAGE IMPROVEMENT LOCATION-8 SKETCH 210
PROPOSED DRAINAGE IMPROVEMENT LOCATION-3 SKETCH 205
PROPOSED DRAINAGE IMPROVEMENT LOCATION-4 SKETCH 206
PROPOSED DRAINAGE IMPROVEMENT LOCATION-9 SKETCH 211
PROPOSED DRAINAGE IMPROVEMENT LOCATION-5 SKETCH 207
PROPOSED DRAINAGE IMPROVEMENT LOCATION-6 SKETCH 208
BASE
N
Trow Associates Inc.
154 COLONNADE ROAD SOUTH PHONE (613) 225-9940
OTTAWA, ONTARIO K2E 7J5 FAX (613) 225-7337
scale NTS
date 19/02/09
drawn by A.ZARAD
CLIENT: CITY OF IQALUIT
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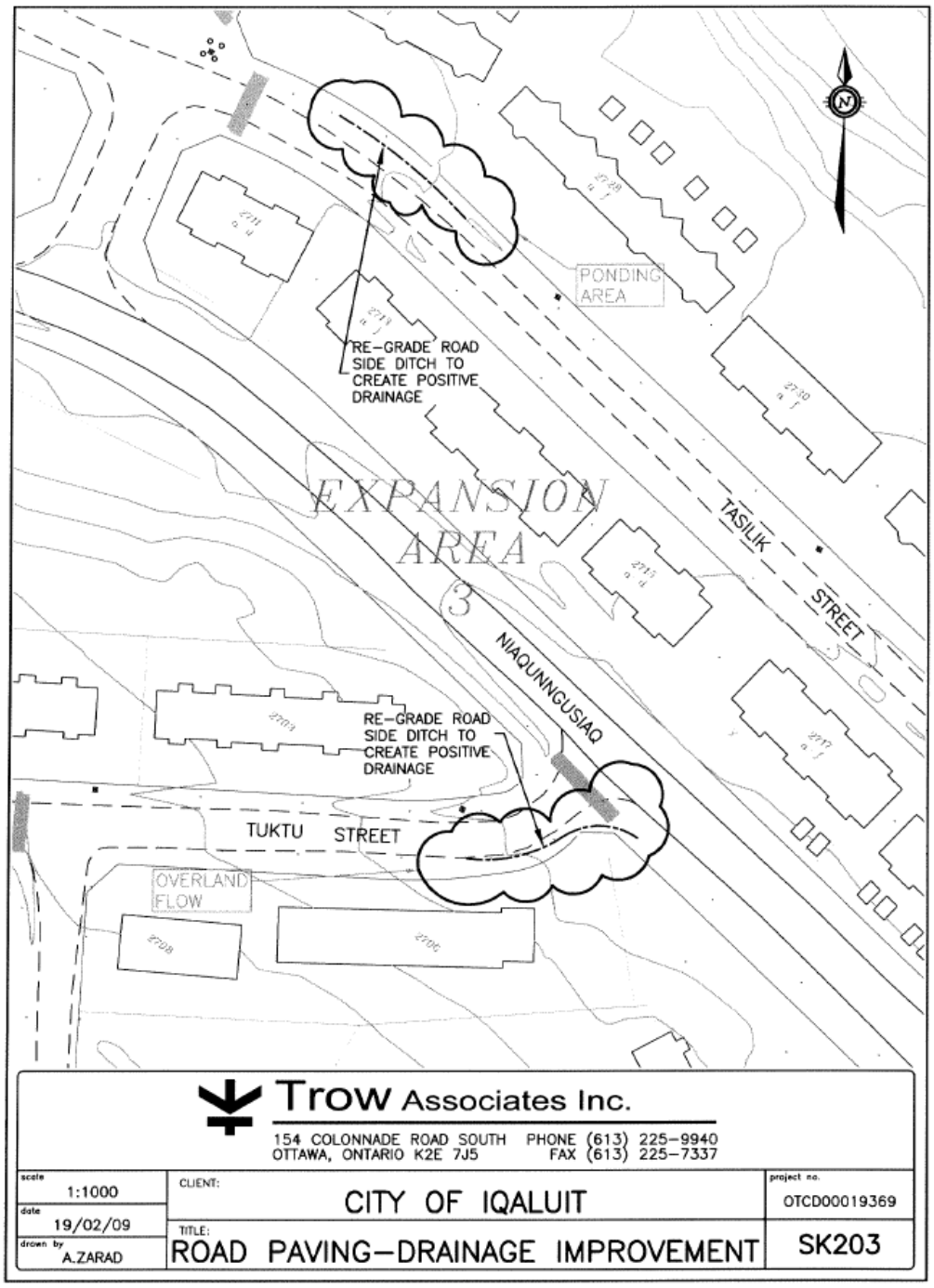
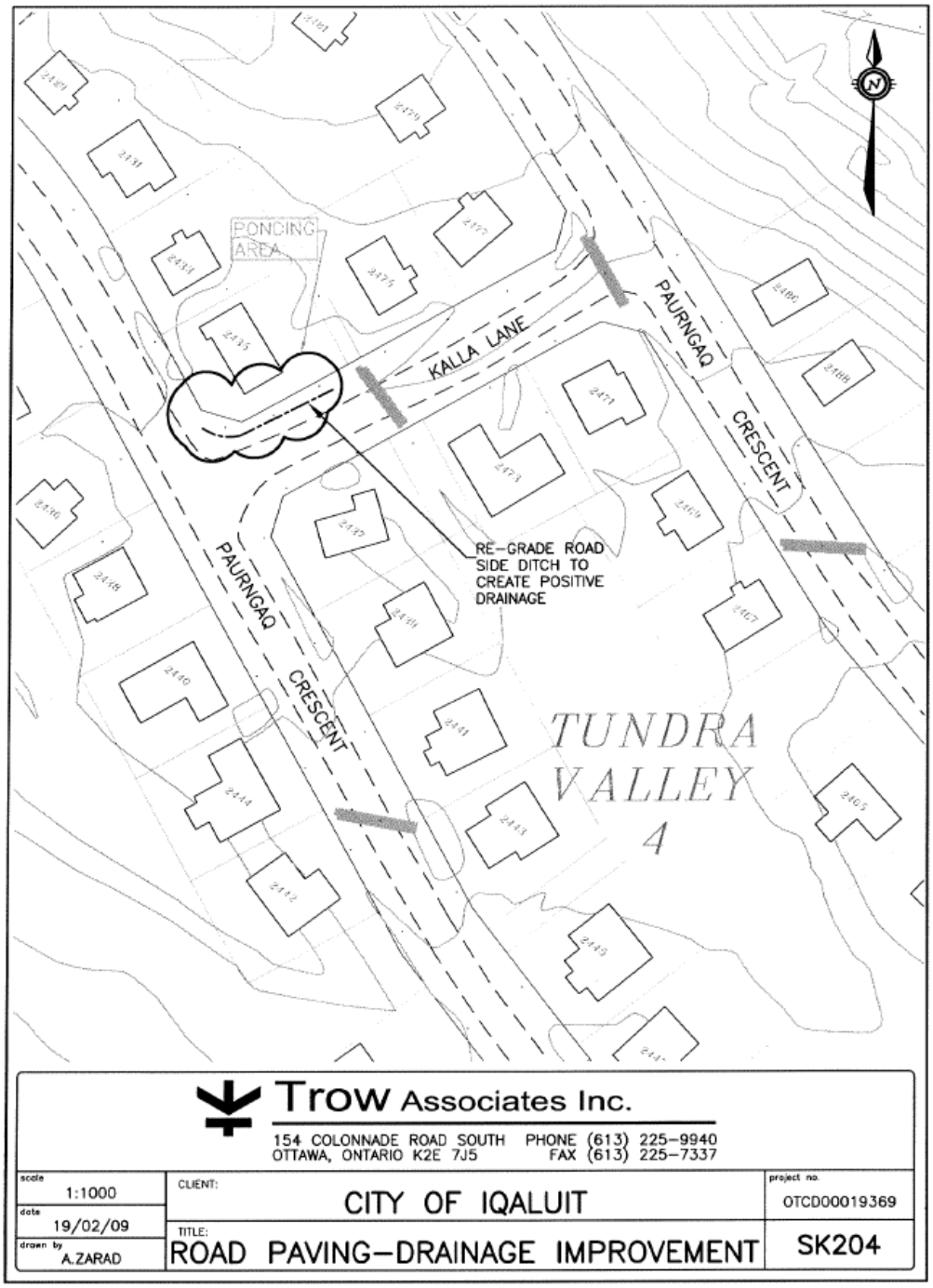
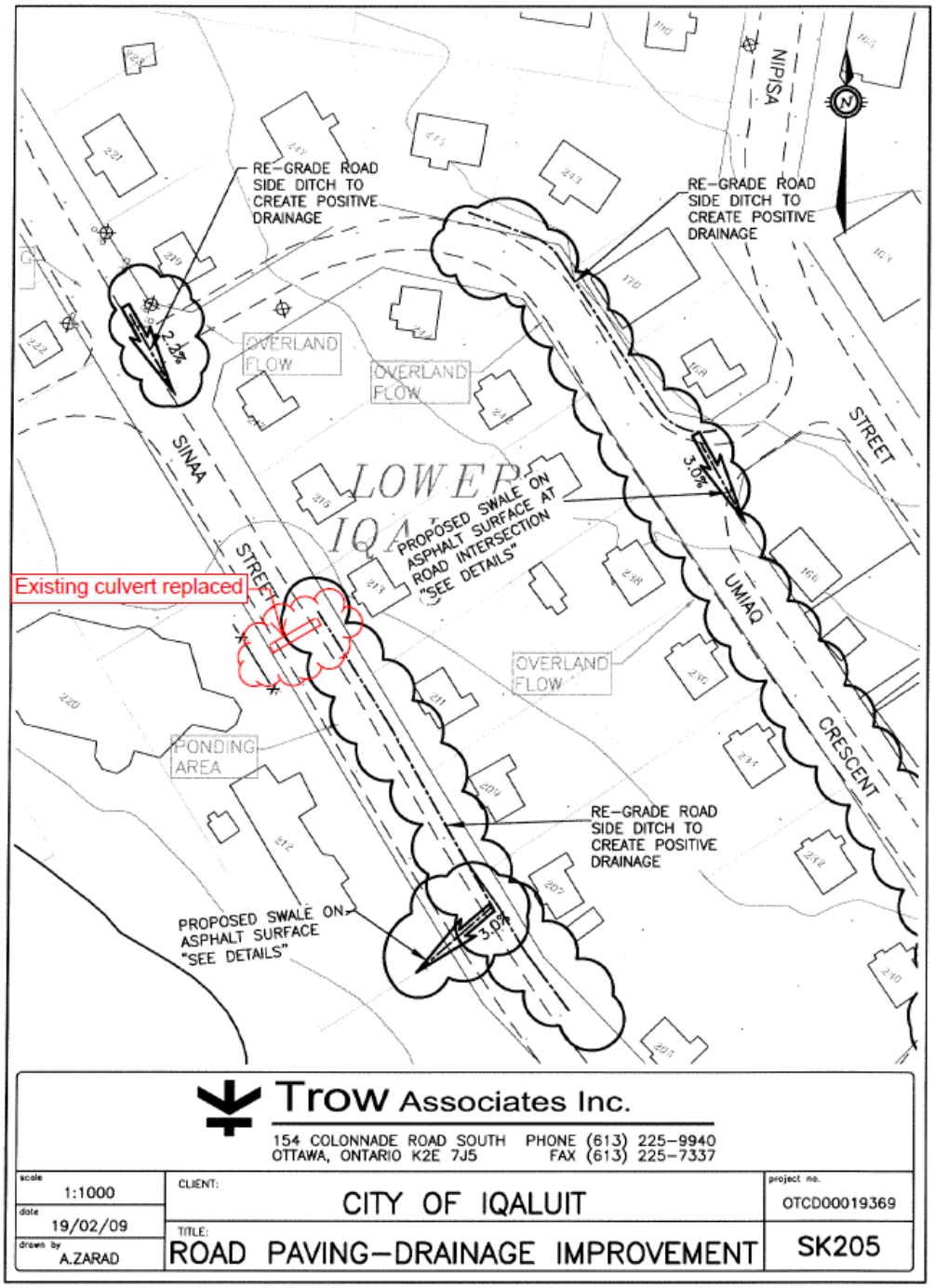
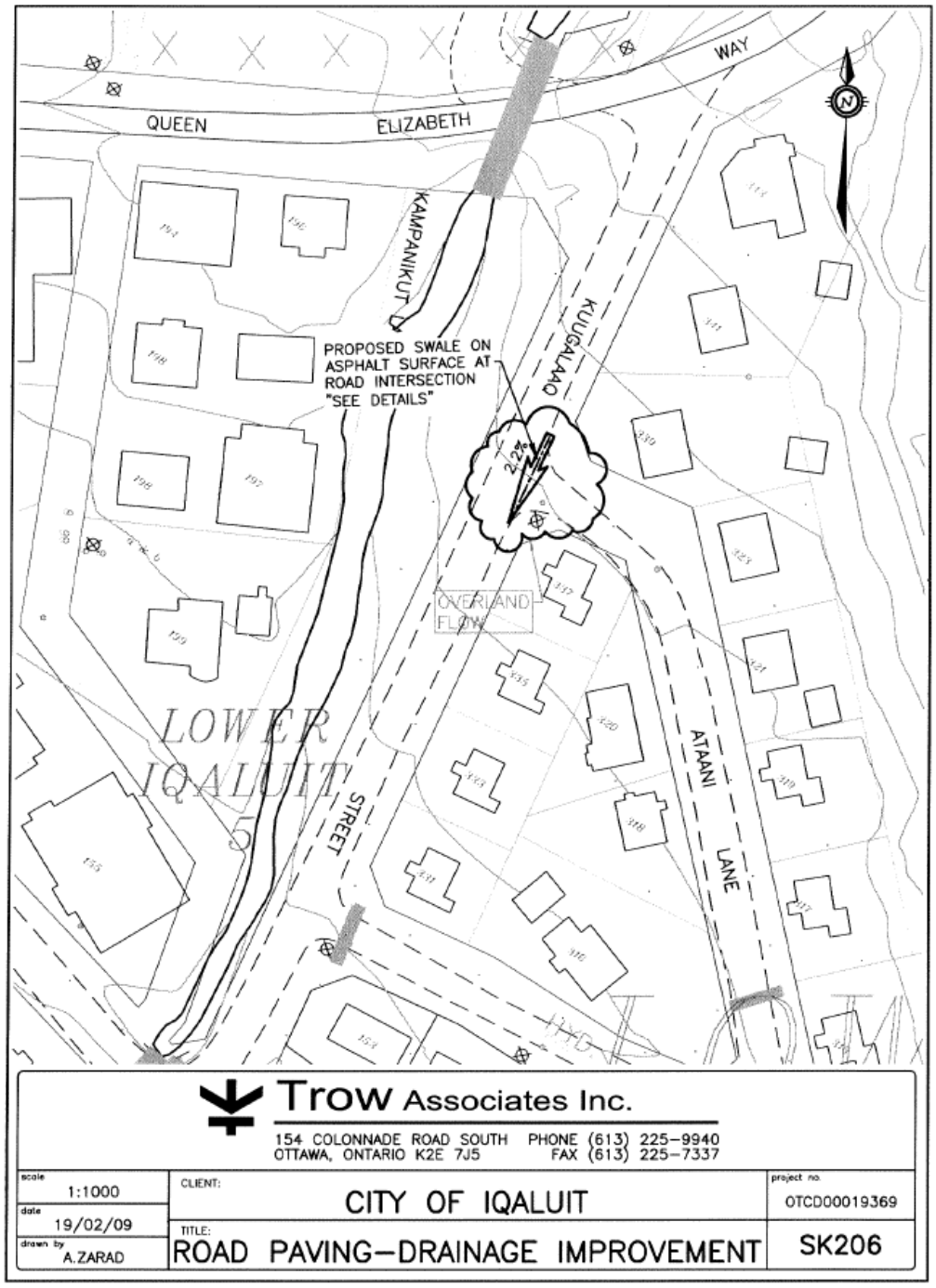
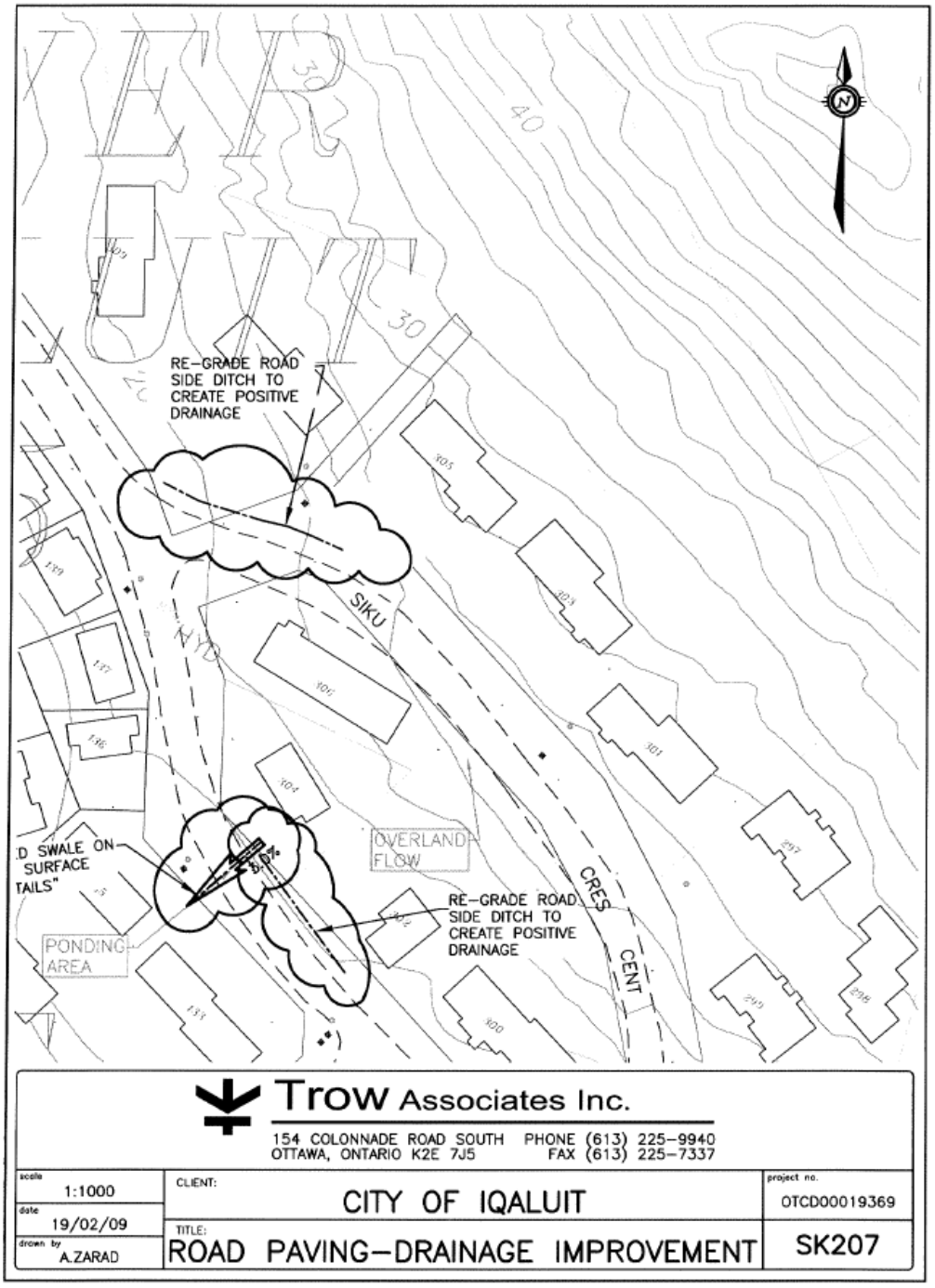
project no. OTCD00019369
SK202

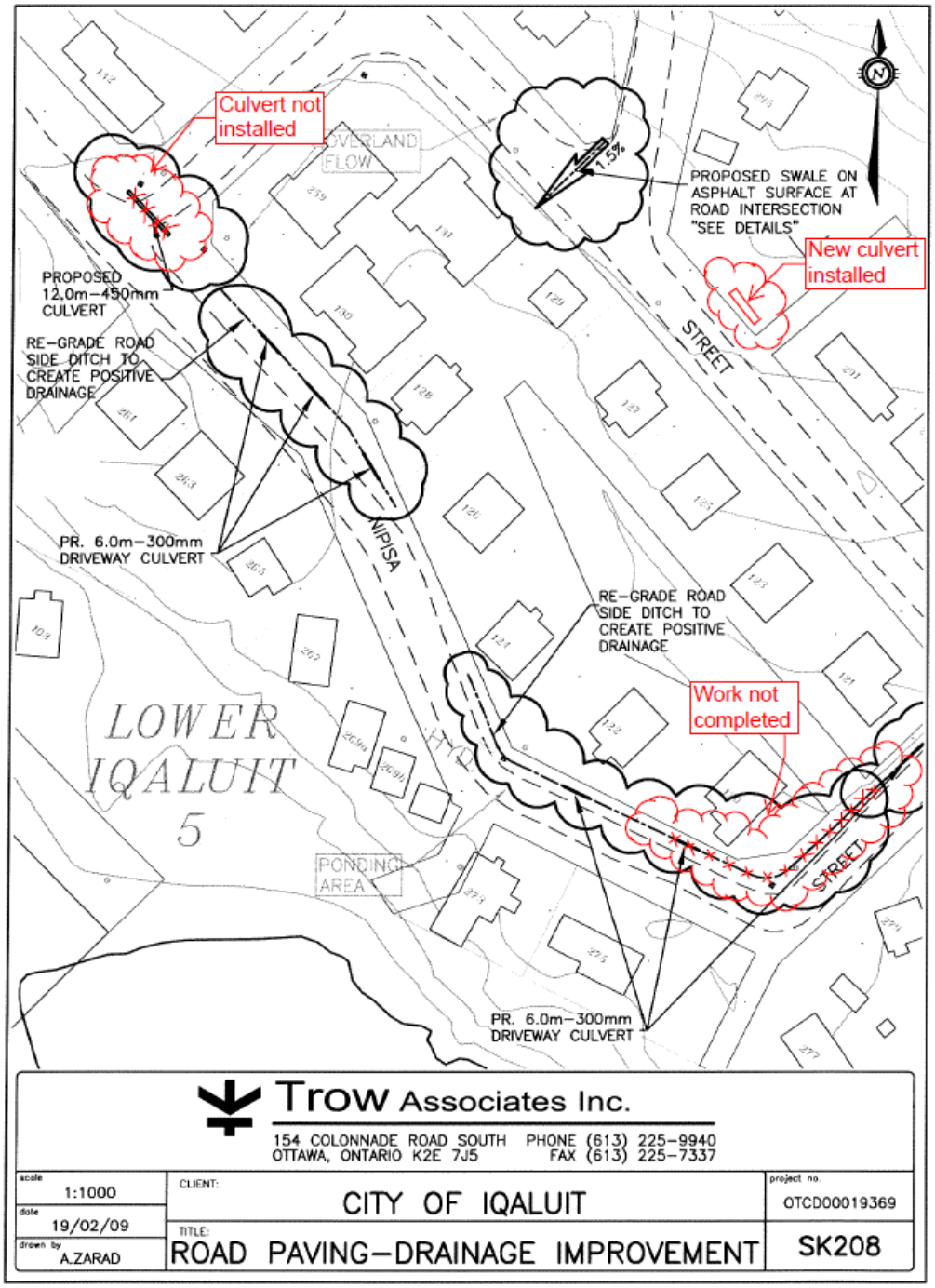

PONDING AREA
RE-GRADE ROAD SIDE DITCH TO CREATE POSITIVE DRAINAGE
EXPANSION AREA
TASILIK STREET
NIAQUNNGUSIAQ
RE-GRADE ROAD SIDE DITCH TO CREATE POSITIVE DRAINAGE
TUKTU STREET
OVERLAND FLOW
Trow Associates Inc.
154 COLONNADE ROAD SOUTH PHONE (613) 225-9940
OTTAWA, ONTARIO K2E 7J5 FAX (613) 225-7337
scale 1:1000
date 19/02/09
drawn by A.ZARAD
CLIENT: CITY OF IQALUIT
project no. OTCD00019369
TITLE: ROAD PAVING-DRAINAGE IMPROVEMENT
SK203

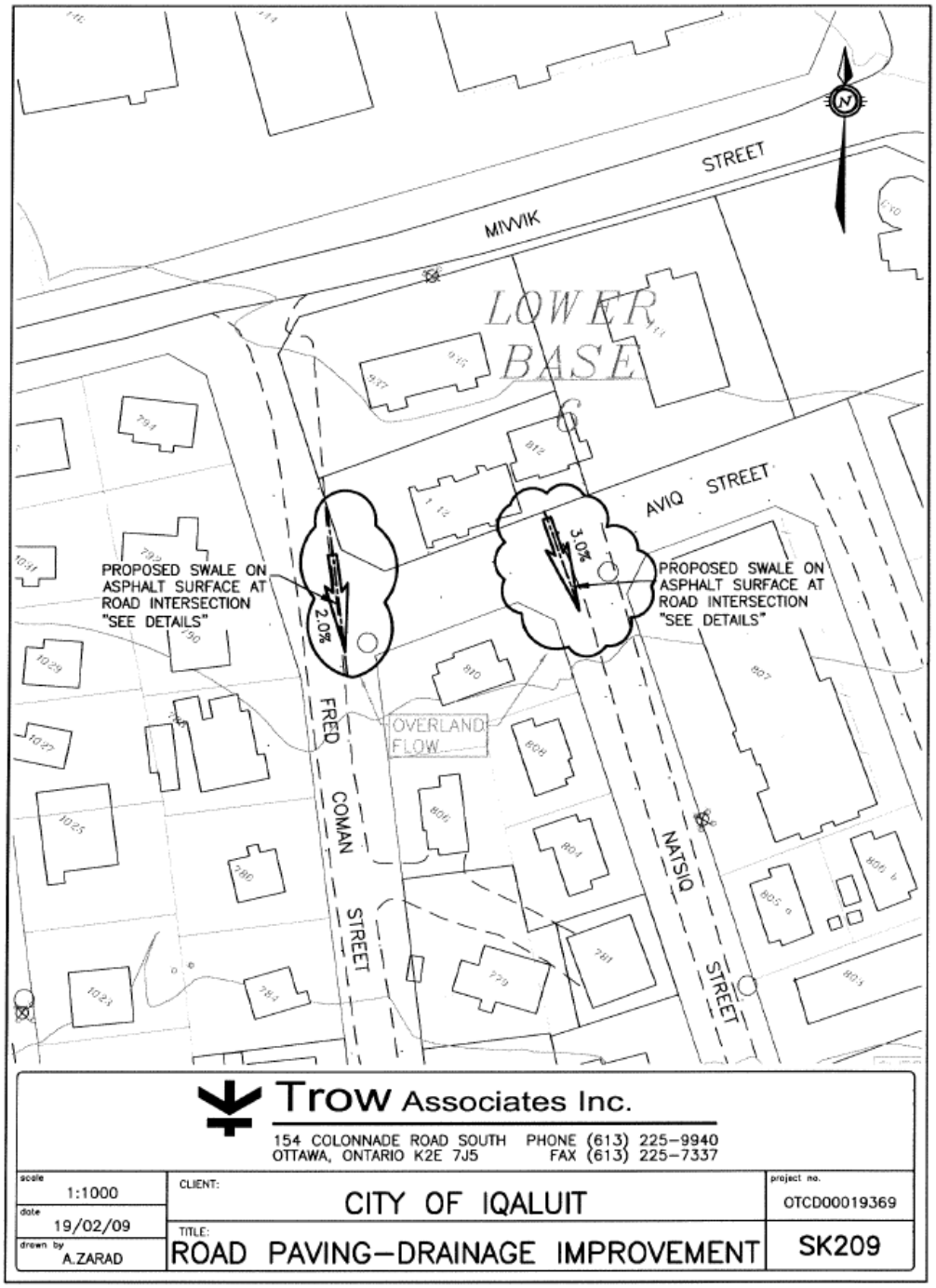

PONDING AREA
KALLA LANE
PAURNGAQ CRESCENT
PAURNGAQ CRESCENT
RE-GRADE ROAD SIDE DITCH TO CREATE POSITIVE DRAINAGE
TUNDRA VALLEY 4
N
Trow Associates Inc.
154 COLONNADE ROAD SOUTH PHONE (613) 225-9940
OTTAWA, ONTARIO K2E 7J5 FAX (613) 225-7337
scale 1:1000
date 19/02/09
drawn by A.ZARAD
CLIENT: CITY OF IQALUIT
project no. OTCD00019369
TITLE: ROAD PAVING-DRAINAGE IMPROVEMENT
SK204

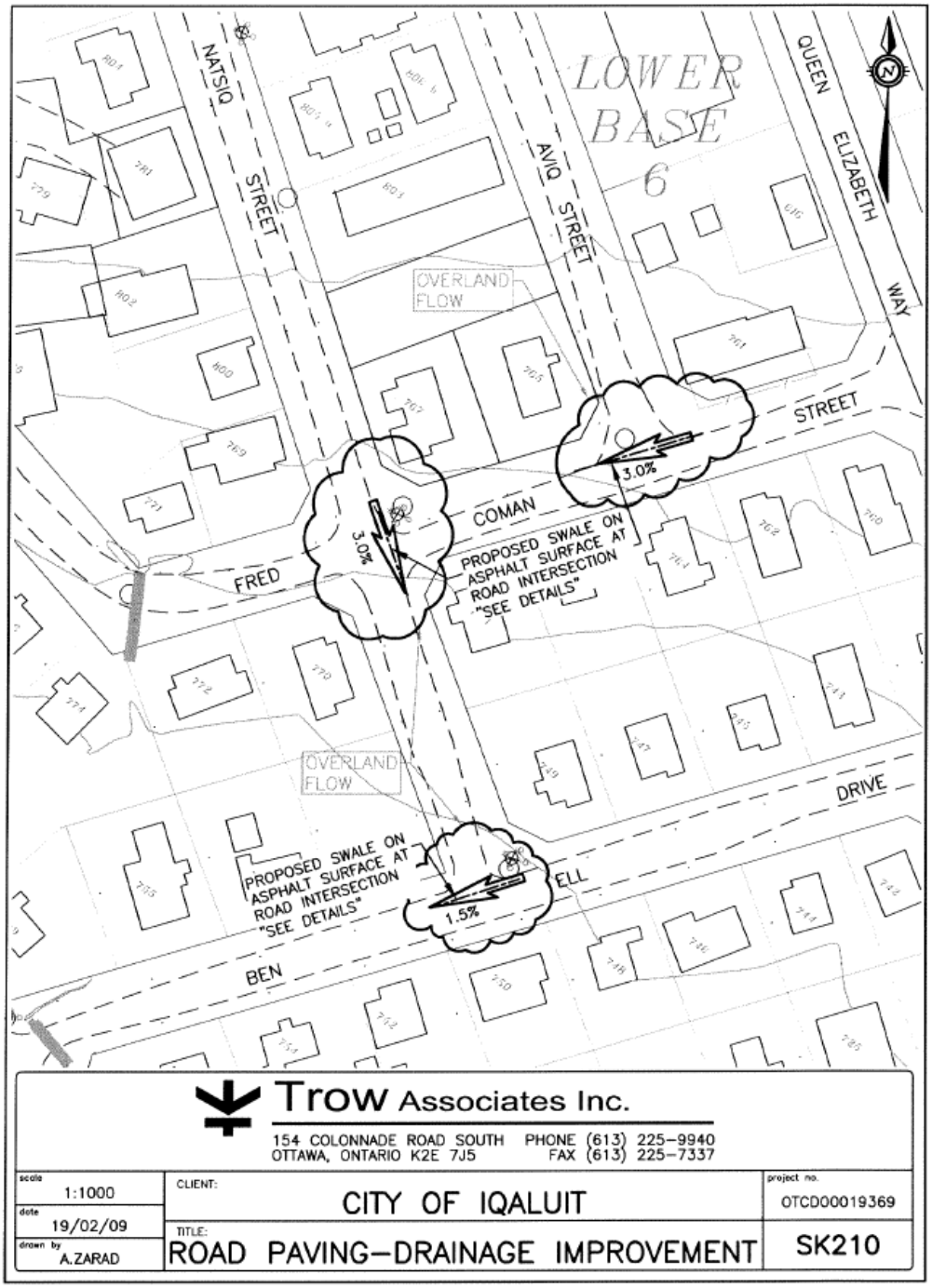

NIPISA
RE-GRADE ROAD SIDE DITCH TO CREATE POSITIVE DRAINAGE
RE-GRADE ROAD SIDE DITCH TO CREATE POSITIVE DRAINAGE
OVERLAND FLOW
OVERLAND FLOW
OVERLAND FLOW
LOWER IQALUIT
SINAA STREET
STREET
UMIAQ CRESCENT
PROPOSED SWALE ON ASPHALT SURFACE AT ROAD INTERSECTION "SEE DETAILS"
Existing culvert replaced
PONDING AREA
RE-GRADE ROAD SIDE DITCH TO CREATE POSITIVE DRAINAGE
PROPOSED SWALE ON ASPHALT SURFACE "SEE DETAILS"
2.0%
3.0%
3.0%
Trow Associates Inc.
154 COLONNADE ROAD SOUTH PHONE (613) 225-9940
OTTAWA, ONTARIO K2E 7J5 FAX (613) 225-7337
scale 1:1000
date 19/02/09
drawn by A.ZARAD
CLIENT: CITY OF IQALUIT
TITLE: ROAD PAVING-DRAINAGE IMPROVEMENT
project no. OTCD00019369
SK205

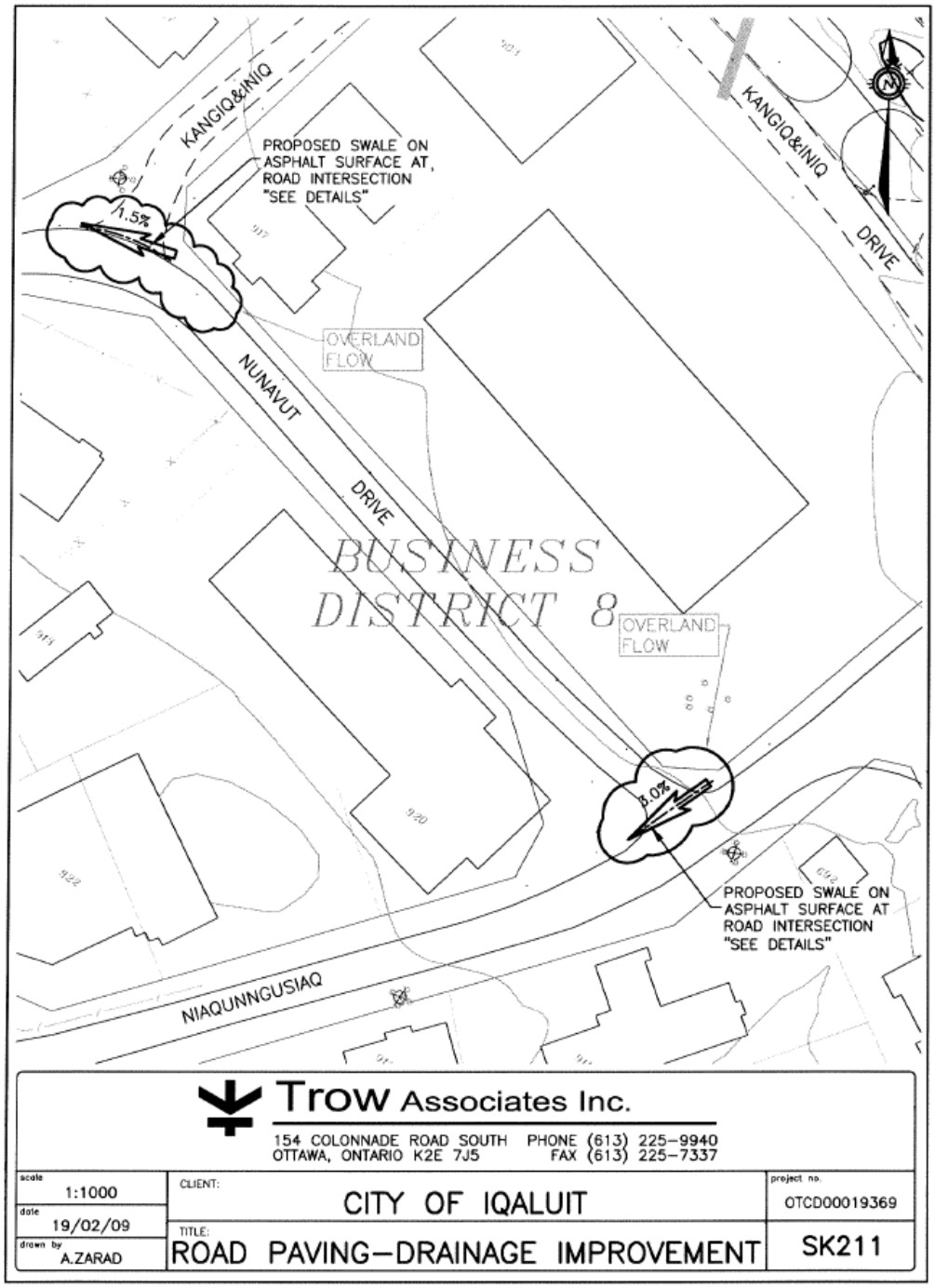

QUEEN ELIZABETH WAY
KAMPANIKUT
KUGALAAQ
PROPOSED SWALE ON ASPHALT SURFACE AT ROAD INTERSECTION "SEE DETAILS"
OVERLAND FLOW
LOWER IQALUIT
STREET
ATAANI LANE
Trow Associates Inc.
154 COLONNADE ROAD SOUTH PHONE (613) 225-9940
OTTAWA, ONTARIO K2E 7J5 FAX (613) 225-7337
scale 1:1000
date 19/02/09
drawn by A.ZARAD
CLIENT: CITY OF IQALUIT
project no. OTCD00019369
TITLE: ROAD PAVING-DRAINAGE IMPROVEMENT
SK206

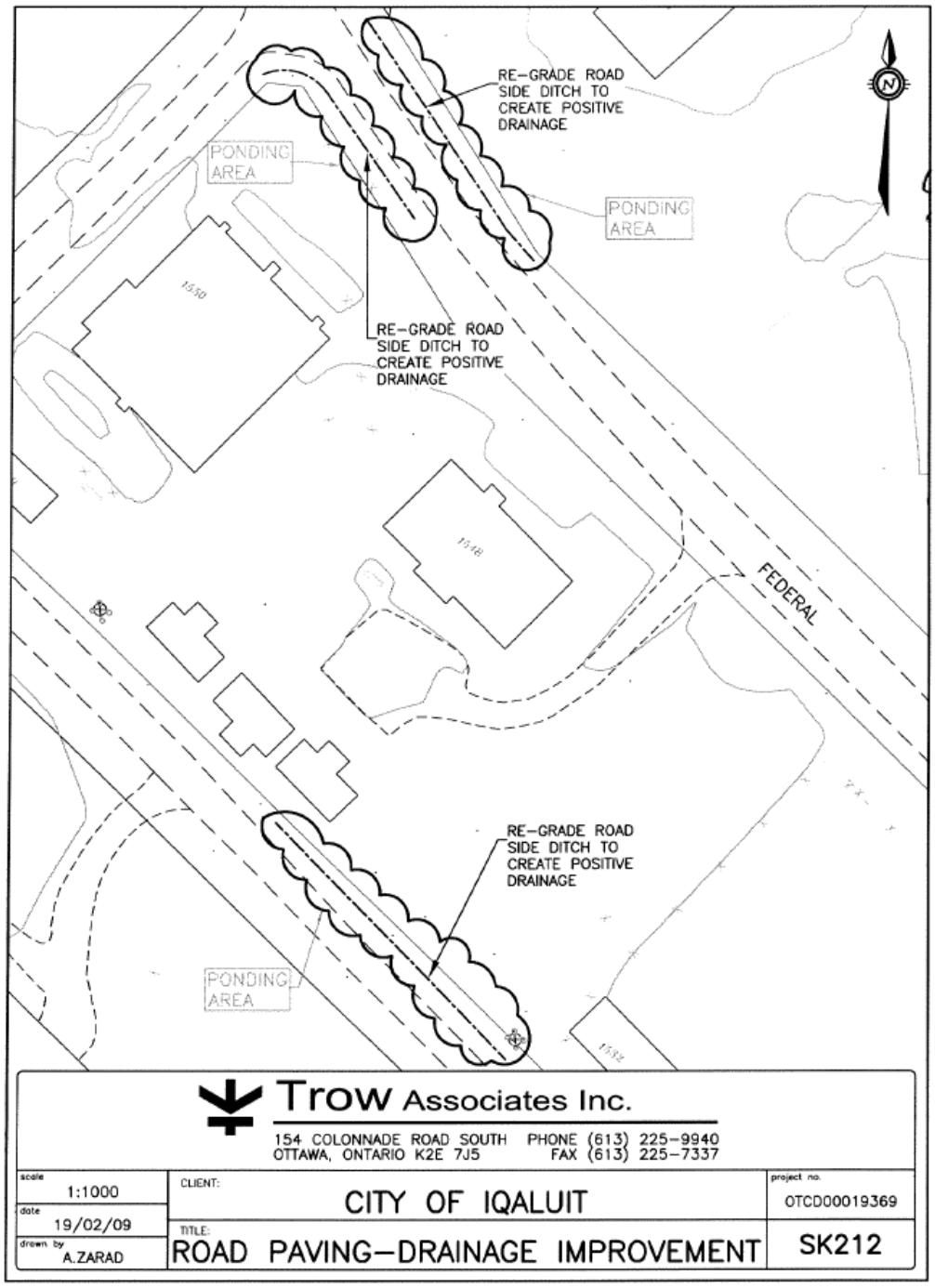

RE-GRADE ROAD SIDE DITCH TO CREATE POSITIVE DRAINAGE
SIKU
OVERLAND FLOW
RE-GRADE ROAD SIDE DITCH TO CREATE POSITIVE DRAINAGE
PONDING AREA
CRES
CENT
Trow Associates Inc.
154 COLONNADE ROAD SOUTH PHONE (613) 225-9940
OTTAWA, ONTARIO K2E 7J5 FAX (613) 225-7337
scale 1:1000
date 19/02/09
drawn by A.ZARAD
CLIENT: CITY OF IQALUIT
project no. OTCD00019369
TITLE: ROAD PAVING-DRAINAGE IMPROVEMENT
SK207

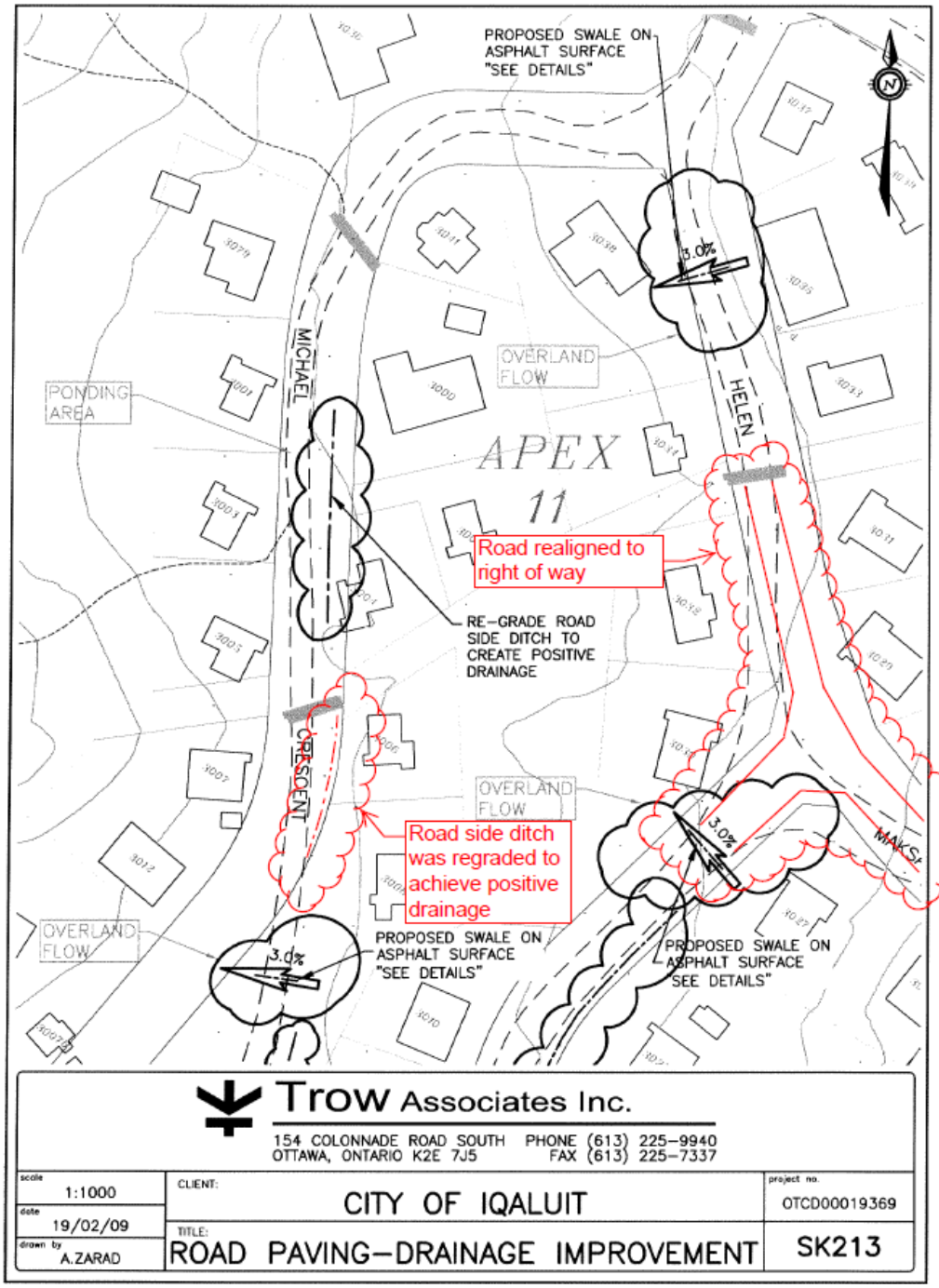

Culvert not installed
OVERLAND FLOW
1.5%
PROPOSED SWALE ON ASPHALT SURFACE AT ROAD INTERSECTION "SEE DETAILS"
New culvert installed
PROPOSED 12.0m–450mm CULVERT
RE–GRADE ROAD SIDE DITCH TO CREATE POSITIVE DRAINAGE
STREET
PR. 6.0m–300mm DRIVEWAY CULVERT
NIPISA
RE–GRADE ROAD SIDE DITCH TO CREATE POSITIVE DRAINAGE
Work not completed
LOWER IQALUIT 5
POND INC AREA
STREET
PR. 6.0m–300mm DRIVEWAY CULVERT
Trow Associates Inc.
154 COLONNADE ROAD SOUTH PHONE (613) 225–9940
OTTAWA, ONTARIO K2E 7J5 FAX (613) 225–7337
scale 1:1000
date 19/02/09
drawn by A.ZARAD
CLIENT: CITY OF IQALUIT
project no. OTCD00019369
TITLE: ROAD PAVING–DRAINAGE IMPROVEMENT
SK208

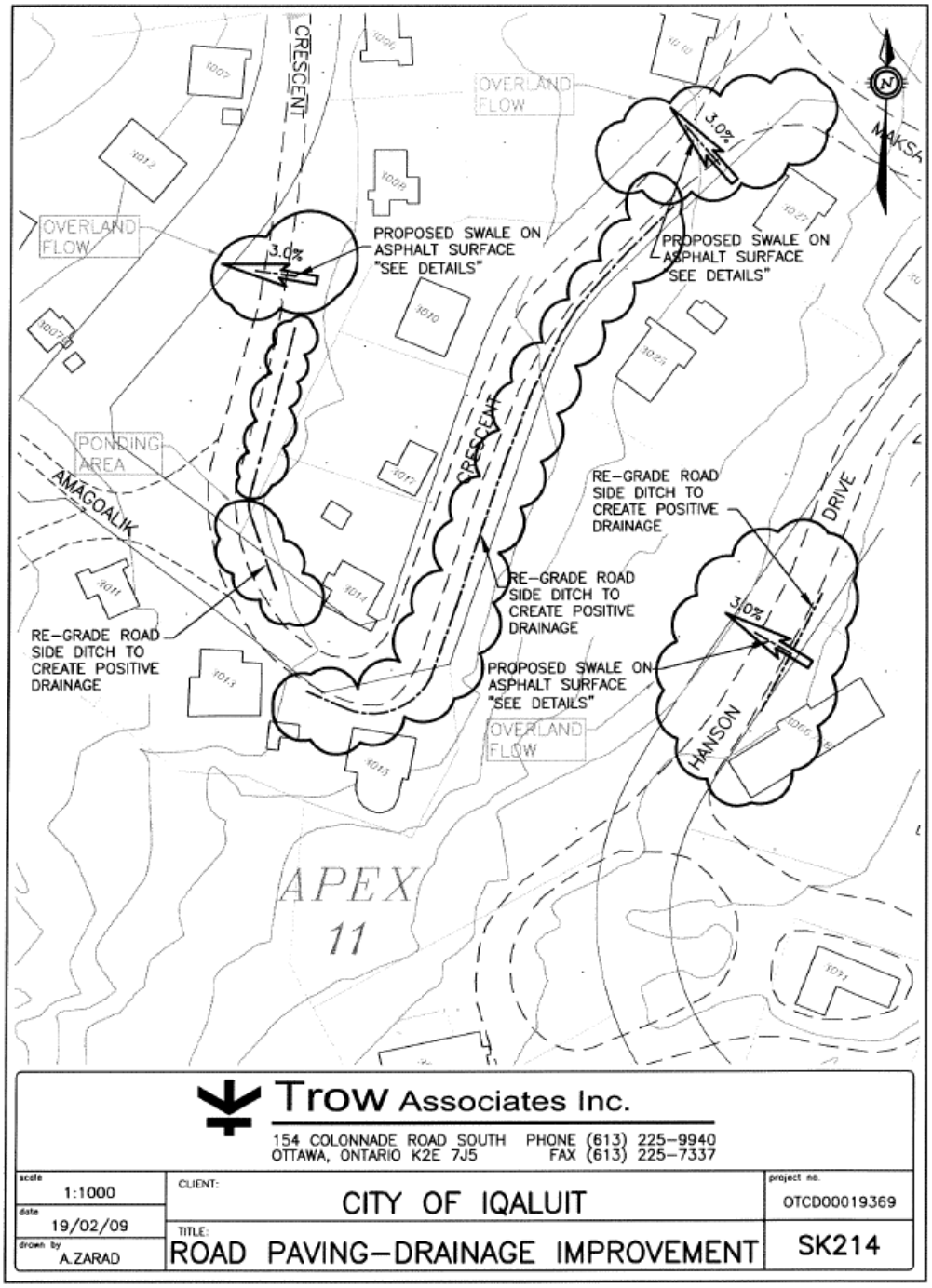

STREET
MIVVIK
LOWER
BASE
AVIQ STREET
PROPOSED SWALE ON ASPHALT SURFACE AT ROAD INTERSECTION "SEE DETAILS"
2.0%
3.0%
PROPOSED SWALE ON ASPHALT SURFACE AT ROAD INTERSECTION "SEE DETAILS"
OVERLAND FLOW
FRED COMAN STREET
NATSIQ STREET
Trow Associates Inc.
154 COLONNADE ROAD SOUTH PHONE (613) 225-9940
OTTAWA, ONTARIO K2E 7J5 FAX (613) 225-7337
scale 1:1000
date 19/02/09
drawn by A.ZARAD
CLIENT: CITY OF IQALUIT
project no. OTCD00019369
TITLE: ROAD PAVING-DRAINAGE IMPROVEMENT
SK209

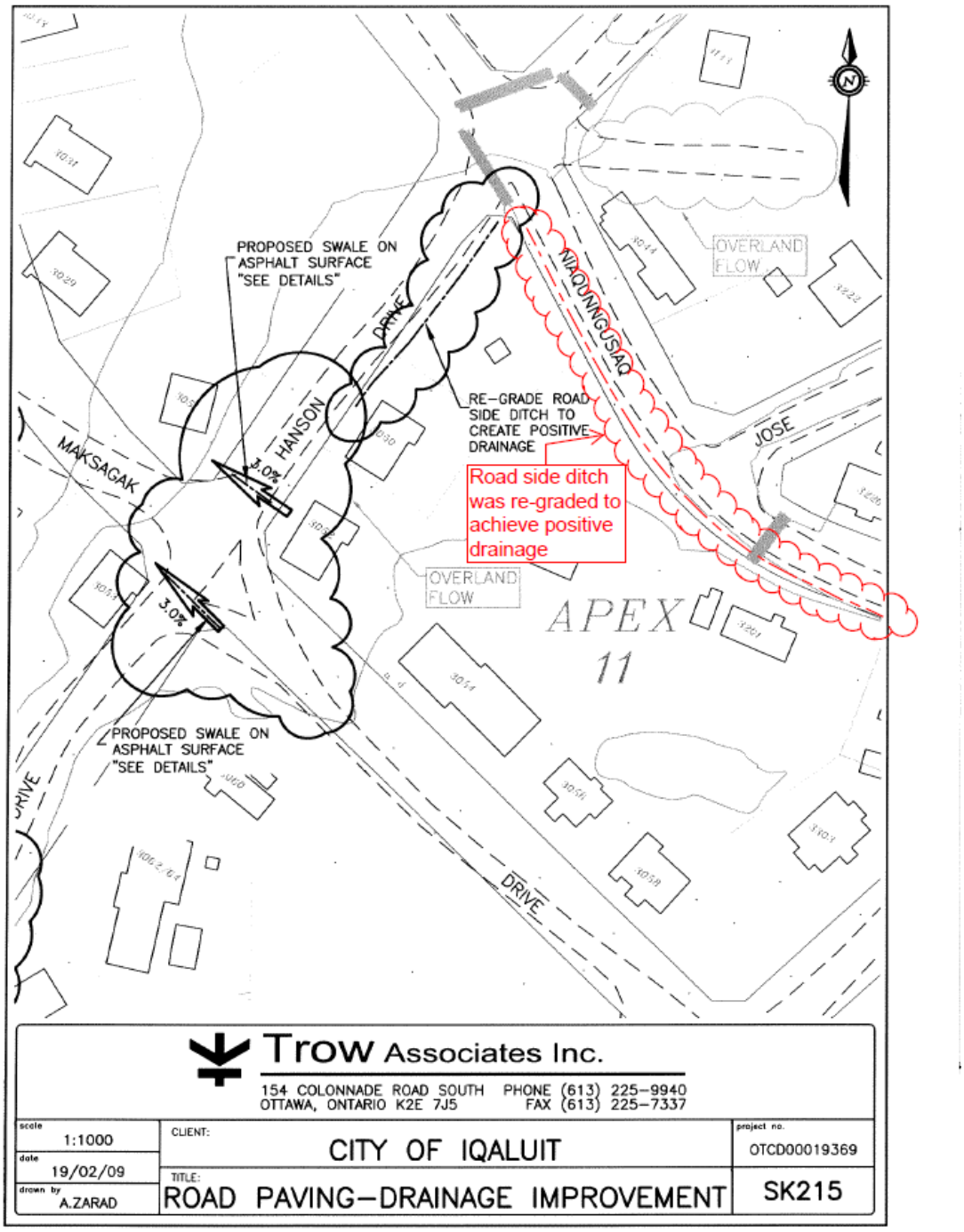

LOWER BASE
NATSIQ STREET
AVIQ STREET
QUEEN ELIZABETH WAY
OVERLAND FLOW
OVERLAND FLOW
COMAN STREET
FRED
BEN
ELL DRIVE
3.0%
3.0%
1.5%
PROPOSED SWALE ON ASPHALT SURFACE AT ROAD INTERSECTION "SEE DETAILS"
PROPOSED SWALE ON ASPHALT SURFACE AT ROAD INTERSECTION "SEE DETAILS"
Trow Associates Inc.
154 COLONNADE ROAD SOUTH PHONE (613) 225-9940
OTTAWA, ONTARIO K2E 7J5 FAX (613) 225-7337
scale 1:1000
date 19/02/09
drawn by A.ZARAD
CLIENT: CITY OF IQALUIT
TITLE: ROAD PAVING-DRAINAGE IMPROVEMENT
project no. OTCD00019369
SK210

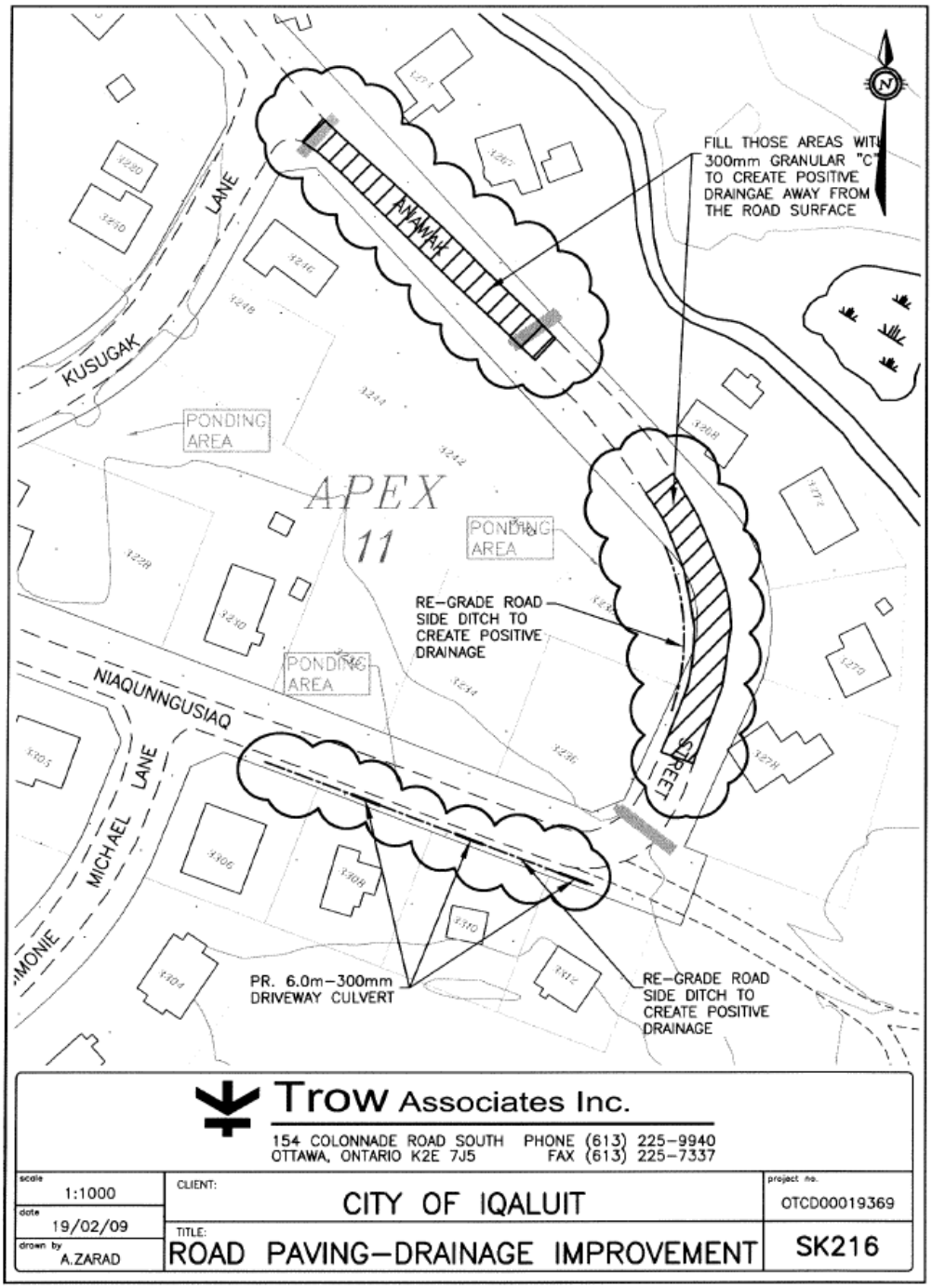

KANGIQ&INIQ
PROPOSED SWALE ON ASPHALT SURFACE AT, ROAD INTERSECTION "SEE DETAILS"
1.5%
KANGIQ&INIQ
DRIVE
OVERLAND FLOW
NUNAVUT
DRIVE
BUSINESS DISTRICT 8
OVERLAND FLOW
3.0%
PROPOSED SWALE ON ASPHALT SURFACE AT ROAD INTERSECTION "SEE DETAILS"
NIAQUNNGUSIAQ
Trow Associates Inc.
154 COLONNADE ROAD SOUTH PHONE (613) 225-9940
OTTAWA, ONTARIO K2E 7J5 FAX (613) 225-7337
scale 1:1000
date 19/02/09
drawn by A.ZARAD
CLIENT: CITY OF IQALUIT
project no. OTCD00019369
TITLE: ROAD PAVING-DRAINAGE IMPROVEMENT
SK211

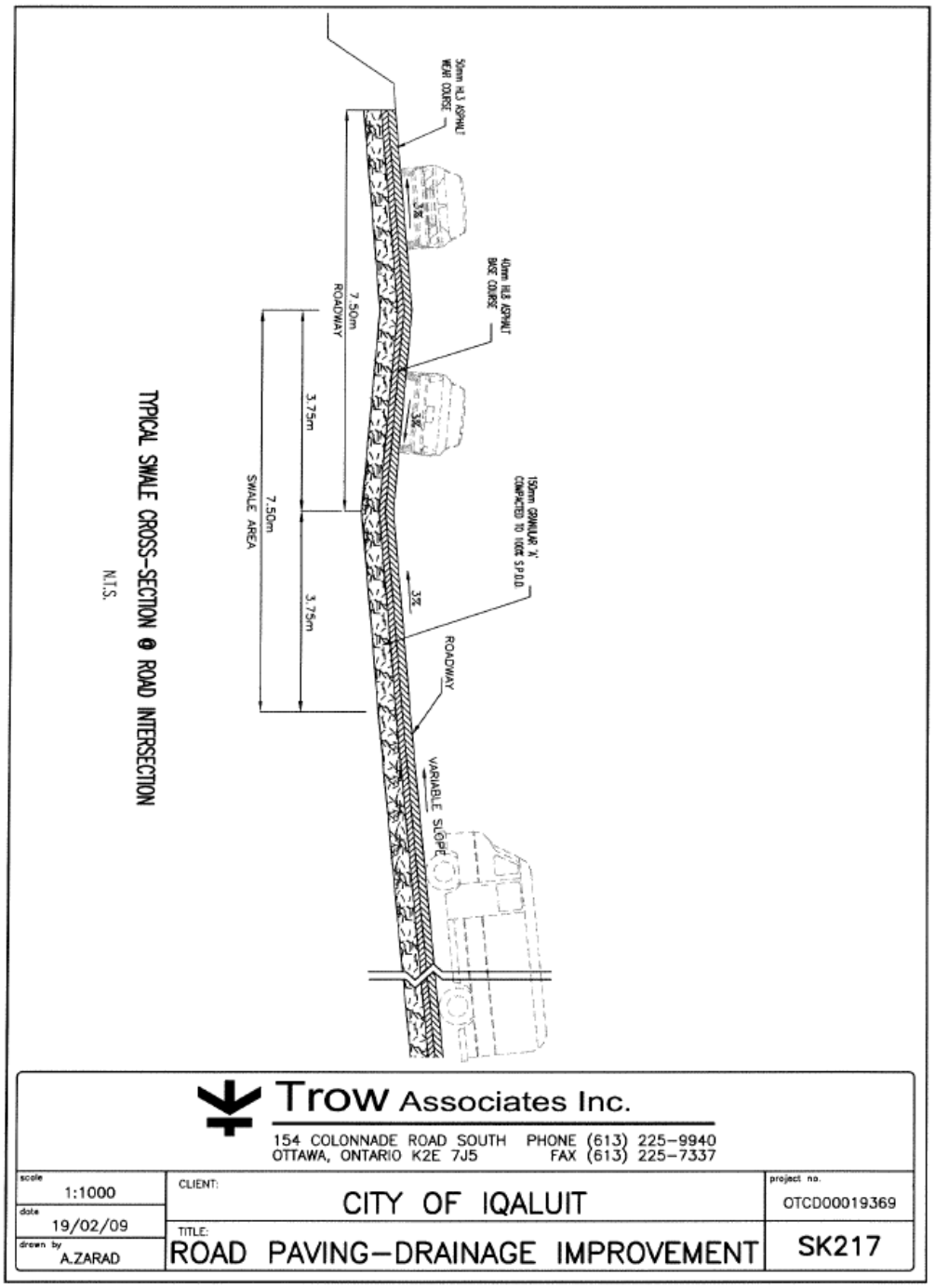

RE-GRADE ROAD SIDE DITCH TO CREATE POSITIVE DRAINAGE
PONDING AREA
PONDING AREA
1550
RE-GRADE ROAD SIDE DITCH TO CREATE POSITIVE DRAINAGE
1548
FEDERAL
RE-GRADE ROAD SIDE DITCH TO CREATE POSITIVE DRAINAGE
PONDING AREA
1552
Trow Associates Inc.
154 COLONNADE ROAD SOUTH PHONE (613) 225-9940
OTTAWA, ONTARIO K2E 7J5 FAX (613) 225-7337
scale 1:1000
date 19/02/09
drawn by A.ZARAD
CLIENT: CITY OF IQALUIT
project no. OTCD00019369
TITLE: ROAD PAVING-DRAINAGE IMPROVEMENT
SK212

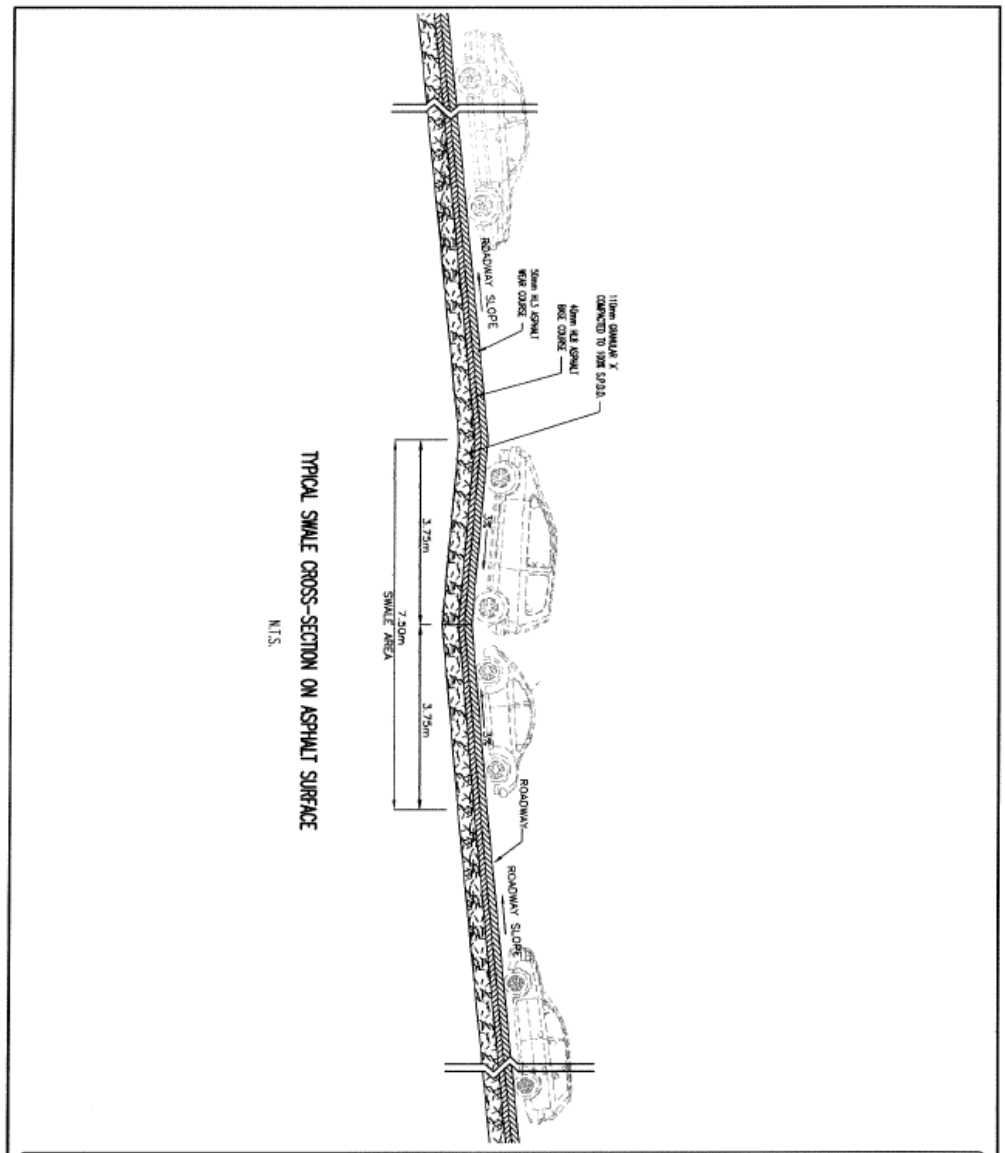

PROPOSED SWALE ON ASPHALT SURFACE "SEE DETAILS"
MICHAEL
HELEN
CRESCENT
MAKSI
APEX
11
PONDING AREA
OVERLAND FLOW
OVERLAND FLOW
OVERLAND FLOW
3.0%
3.0%
3.0%
Road realigned to right of way
RE-GRADE ROAD SIDE DITCH TO CREATE POSITIVE DRAINAGE
Road side ditch was regraded to achieve positive drainage
PROPOSED SWALE ON ASPHALT SURFACE "SEE DETAILS"
PROPOSED SWALE ON ASPHALT SURFACE SEE DETAILS"
Trow Associates Inc.
154 COLONNADE ROAD SOUTH OTTAWA, ONTARIO K2E 7J5
PHONE (613) 225-9940 FAX (613) 225-7337
scale 1:1000
date 19/02/09
drawn by A.ZARAD
CLIENT: CITY OF IQALUIT
project no. OTCD00019369
TITLE: ROAD PAVING-DRAINAGE IMPROVEMENT
SK213


CRESCENT
OVERLAND FLOW
3.0%
PROPOSED SWALE ON ASPHALT SURFACE "SEE DETAILS"
OVERLAND FLOW
PROPOSED SWALE ON ASPHALT SURFACE SEE DETAILS"
PONDING AREA
AMAGOALIK
CRESCENT
RE-GRADE ROAD SIDE DITCH TO CREATE POSITIVE DRAINAGE
DRIVE
RE-GRADE ROAD SIDE DITCH TO CREATE POSITIVE DRAINAGE
3.0%
RE-GRADE ROAD SIDE DITCH TO CREATE POSITIVE DRAINAGE
PROPOSED SWALE ON ASPHALT SURFACE "SEE DETAILS"
OVERLAND FLOW
HANSON
APEX
11
Trow Associates Inc.
154 COLONNADE ROAD SOUTH PHONE (613) 225-9940
OTTAWA, ONTARIO K2E 7J5 FAX (613) 225-7337
scale 1:1000
date 19/02/09
drawn by A.ZARAD
CLIENT: CITY OF IQALUIT
project no. OTCD00019369
TITLE: ROAD PAVING-DRAINAGE IMPROVEMENT
SK214


PROPOSED SWALE ON ASPHALT SURFACE "SEE DETAILS"
DRIVE
HANSON
MAKSAGAK
3.0%
3.0%
NIAQUNNGUSIAQ
RE-GRADE ROAD SIDE DITCH TO CREATE POSITIVE DRAINAGE
Road side ditch was re-graded to achieve positive drainage
OVERLAND FLOW
OVERLAND FLOW
JOSE
APEX
11
PROPOSED SWALE ON ASPHALT SURFACE "SEE DETAILS"
DRIVE
DRIVE
Trow Associates Inc.
154 COLONNADE ROAD SOUTH PHONE (613) 225-9940
OTTAWA, ONTARIO K2E 7J5 FAX (613) 225-7337
scale 1:1000
date 19/02/09
drawn by A.ZARAD
CLIENT: CITY OF IQALUIT
project no. OTCD00019369
TITLE: ROAD PAVING-DRAINAGE IMPROVEMENT
SK215

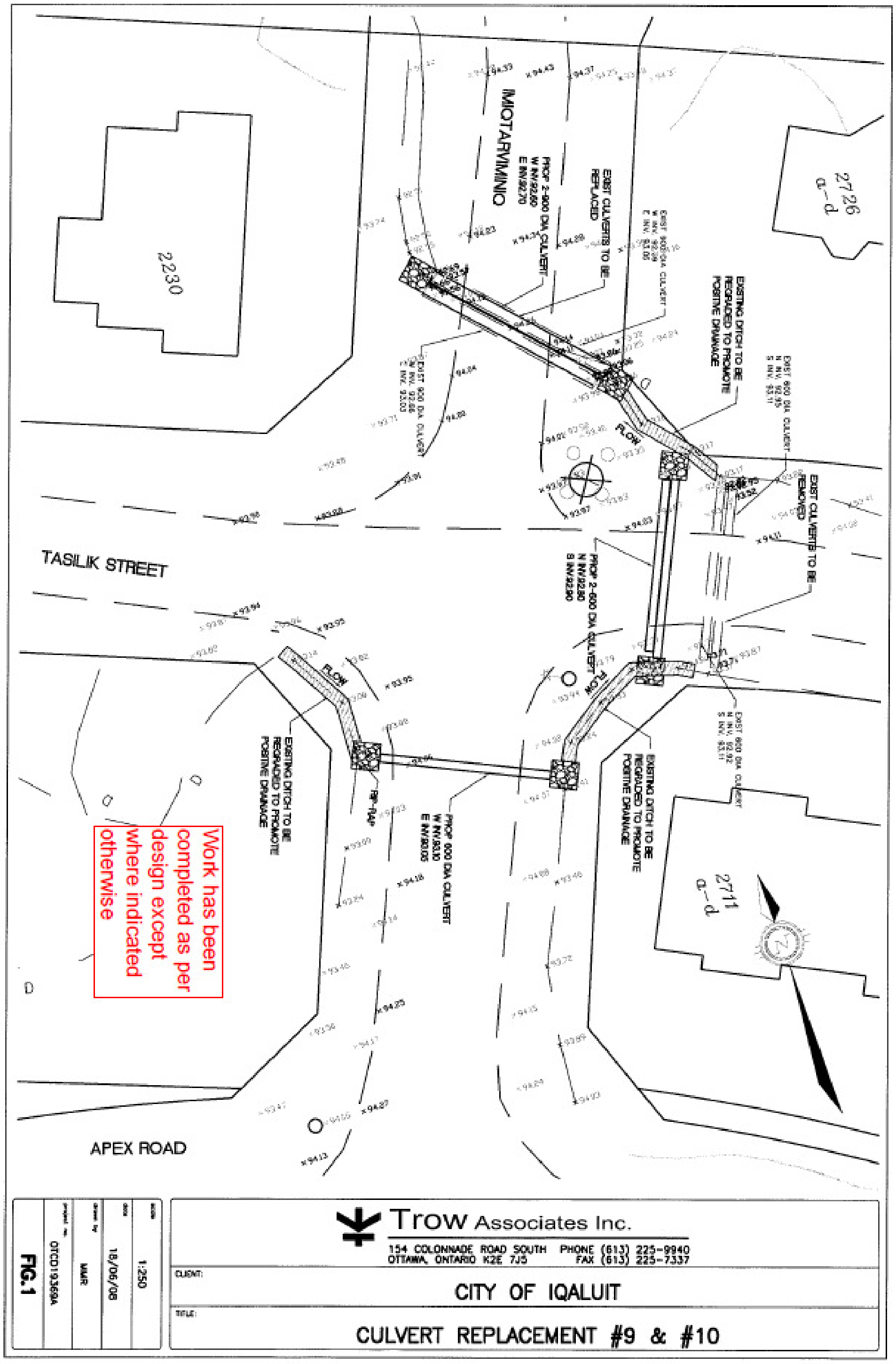

FILL THOSE AREAS WITH
300mm GRANULAR "C"
TO CREATE POSITIVE
DRAINGAE AWAY FROM
THE ROAD SURFACE
KUSUGAK LANE
ATAWAH
PONDING AREA
APEX
11
RE-GRADE ROAD
SIDE DITCH TO
CREATE POSITIVE
DRAINAGE
NIAQUNNGUSIAQ
MICHAEL LANE
-MONIE
PR. 6.0m-300mm
DRIVEWAY CULVERT
RE-GRADE ROAD
SIDE DITCH TO
CREATE POSITIVE
DRAINAGE
Trow Associates Inc.
154 COLONNADE ROAD SOUTH PHONE (613) 225-9940
OTTAWA, ONTARIO K2E 7J5 FAX (613) 225-7337
scale 1:1000
date 19/02/09
drawn by A.ZARAD
CLIENT: CITY OF IQALUIT
project no. OTCD00019369
TITLE: ROAD PAVING-DRAINAGE IMPROVEMENT
SK216


TYPICAL SWALE CROSS-SECTION @ ROAD INTERSECTION
N.T.S.
50mm HL3 ASPHALT WEAR COURSE
3%
7.50m ROADWAY
3.75m
40mm HL8 ASPHALT BASE COURSE
3%
SWALE AREA
7.50m
3.75m
150mm GRANULAR 'A' COMPACTED TO 100% S.P.D.D.
3%
ROADWAY
VARIABLE SLOPE
Trow Associates Inc.
154 COLONNADE ROAD SOUTH PHONE (613) 225-9940
OTTAWA, ONTARIO K2E 7J5 FAX (613) 225-7337
scale 1:1000
date 19/02/09
drawn by A.ZARAD
CLIENT: CITY OF IQALUIT
TITLE: ROAD PAVING-DRAINAGE IMPROVEMENT
project no. OTCD00019369
SK217

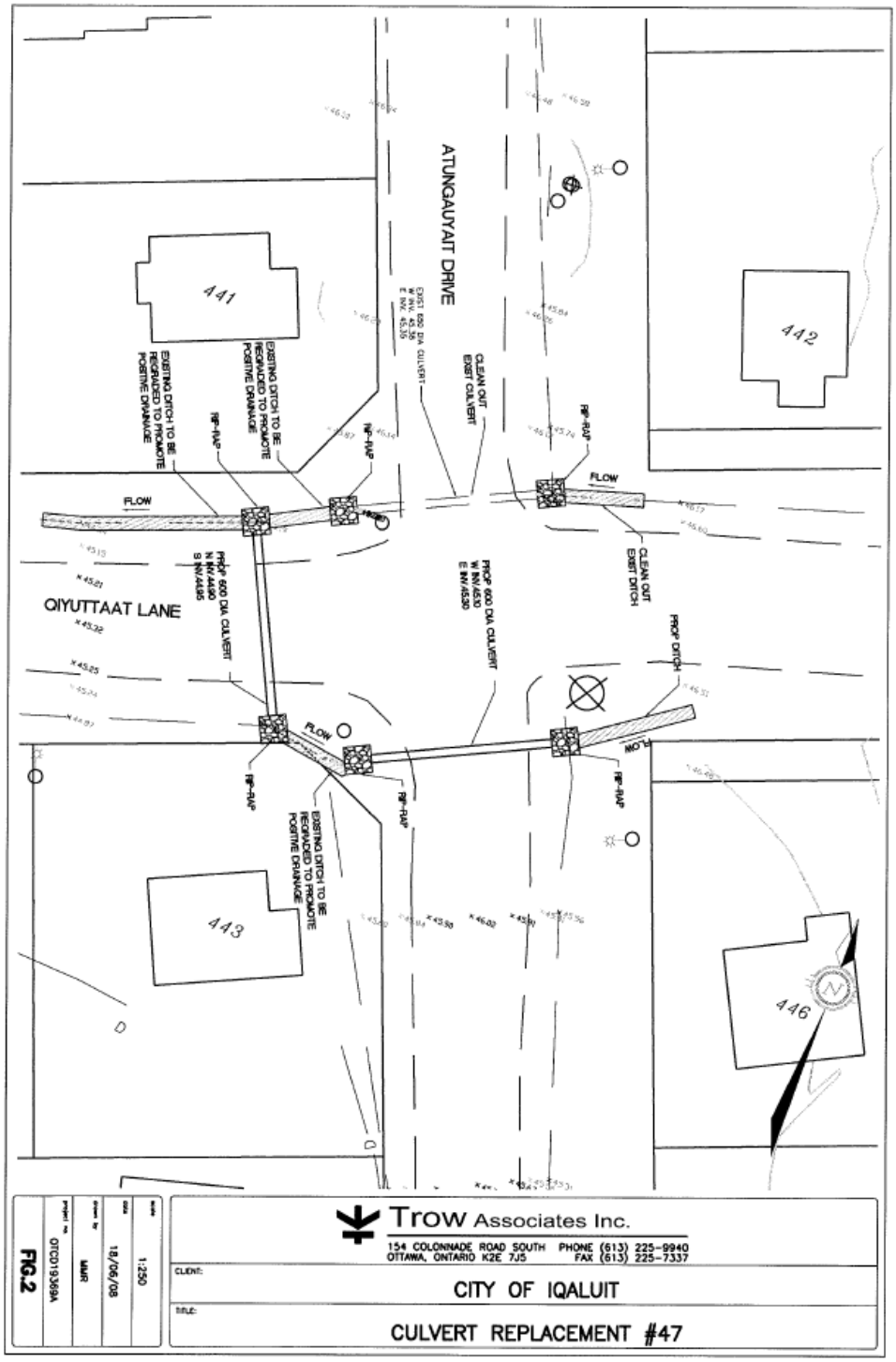

TYPICAL SWALE CROSS-SECTION ON ASPHALT SURFACE
N.T.S.
ROADWAY SLOPE
50mm HL3 ASPHALT WEAR COURSE
40mm HL8 ASPHALT BASE COURSE
110mm GRANULAR 'A' COMPACTED TO 100% S.P.D.
3.75m
7.50m SWALE AREA
3.75m
ROADWAY
ROADWAY SLOPE
Trow Associates Inc.
154 COLONNADE ROAD SOUTH PHONE (613) 225-9940
OTTAWA, ONTARIO K2E 7J5 FAX (613) 225-7337
scale 1:1000
date 19/02/09
drawn by A.ZARAD
CLIENT:
CITY OF IQALUIT
project no.
OTCD00019369
TITLE:
ROAD PAVING-DRAINAGE IMPROVEMENT
SK218

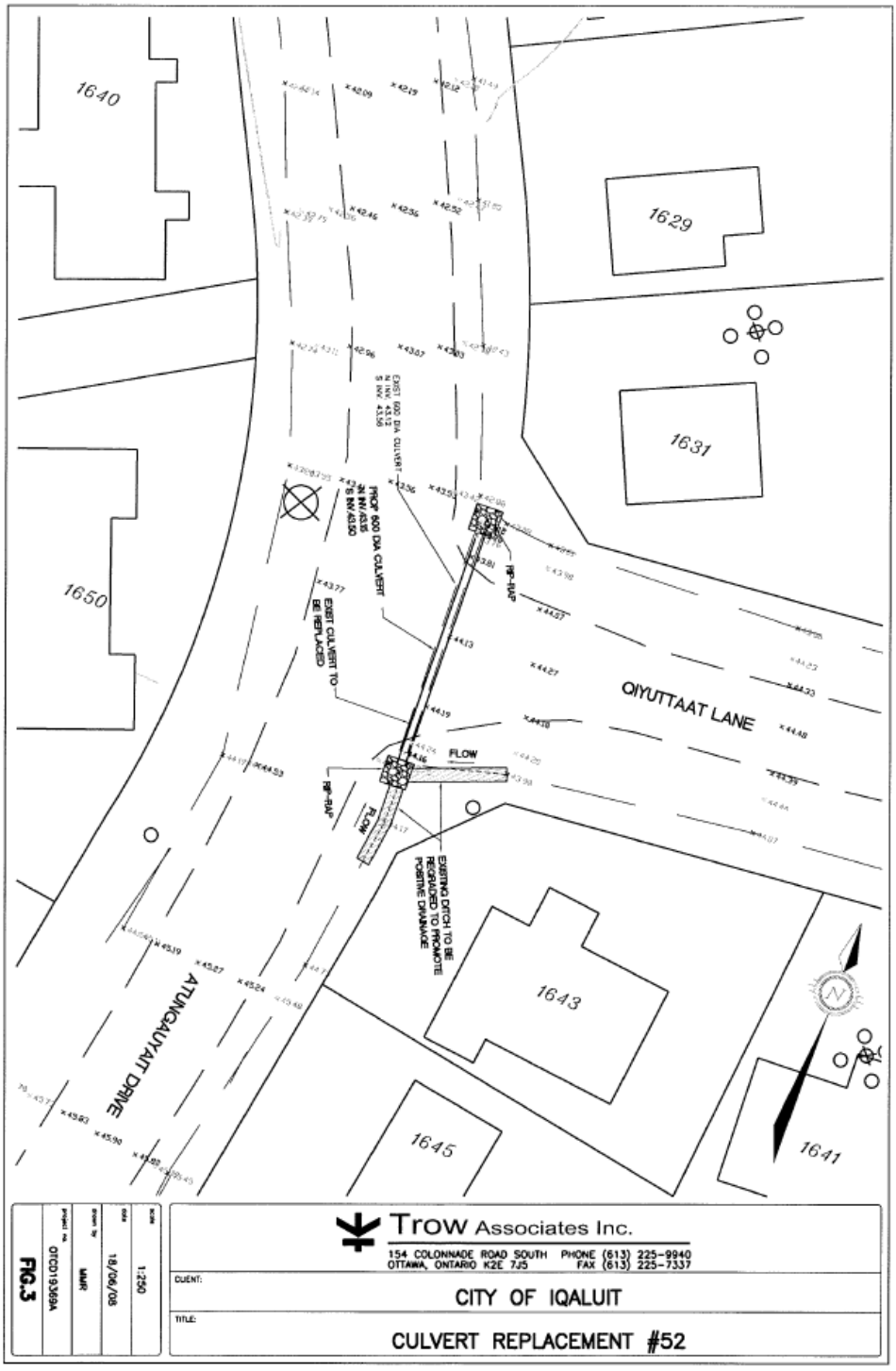
Appendix B

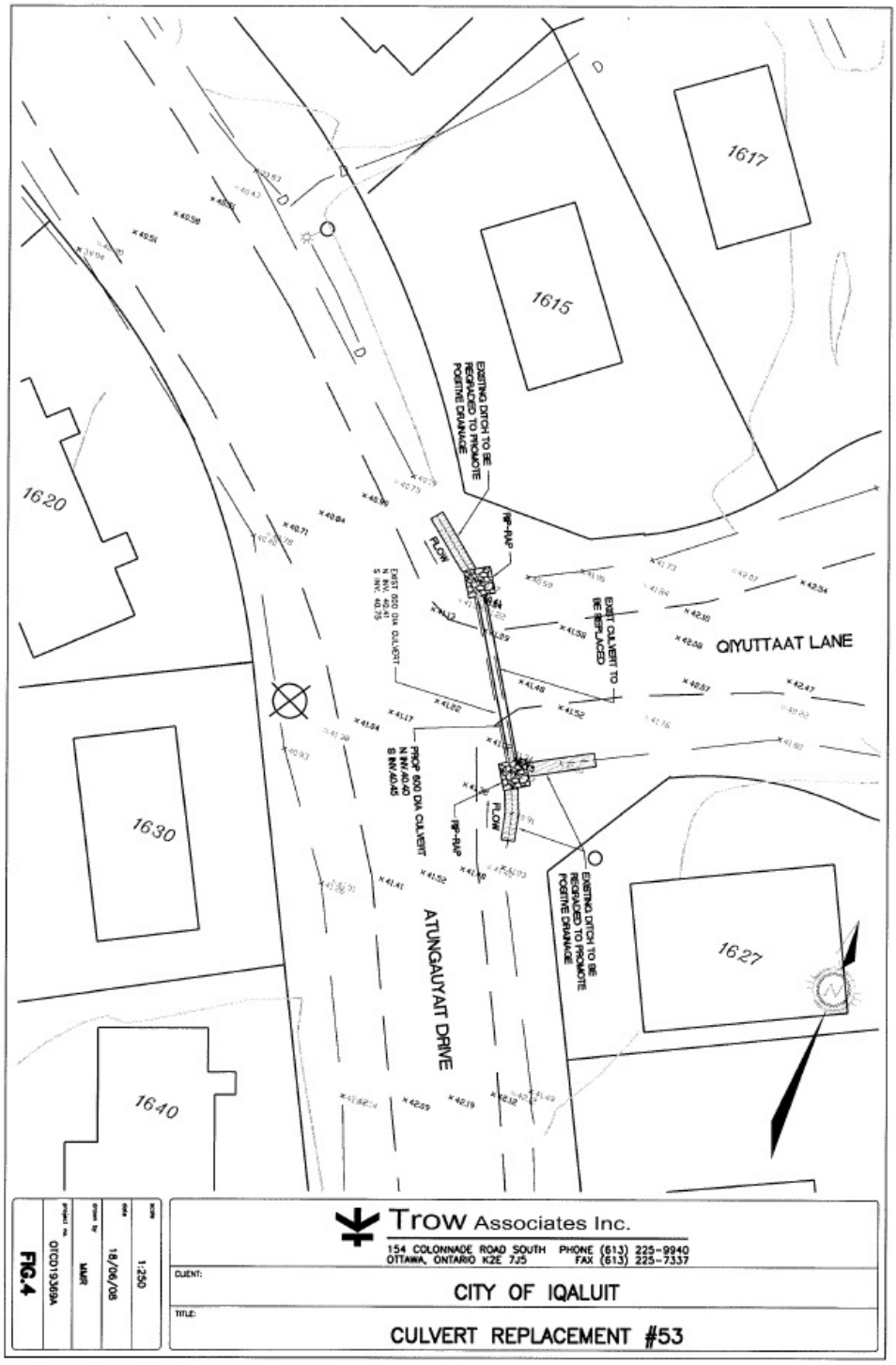
As-built Drawings of Culvert Replacements

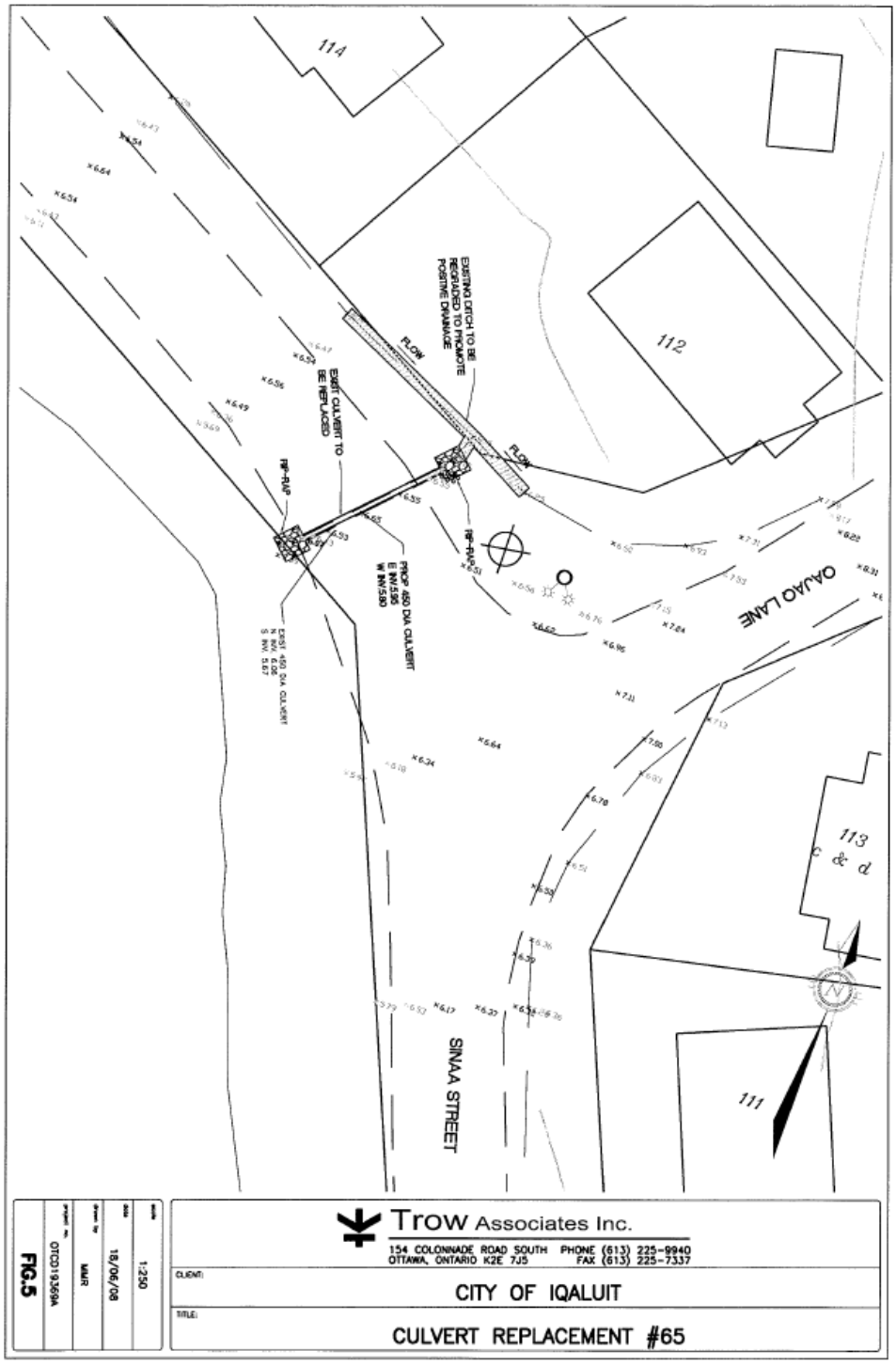


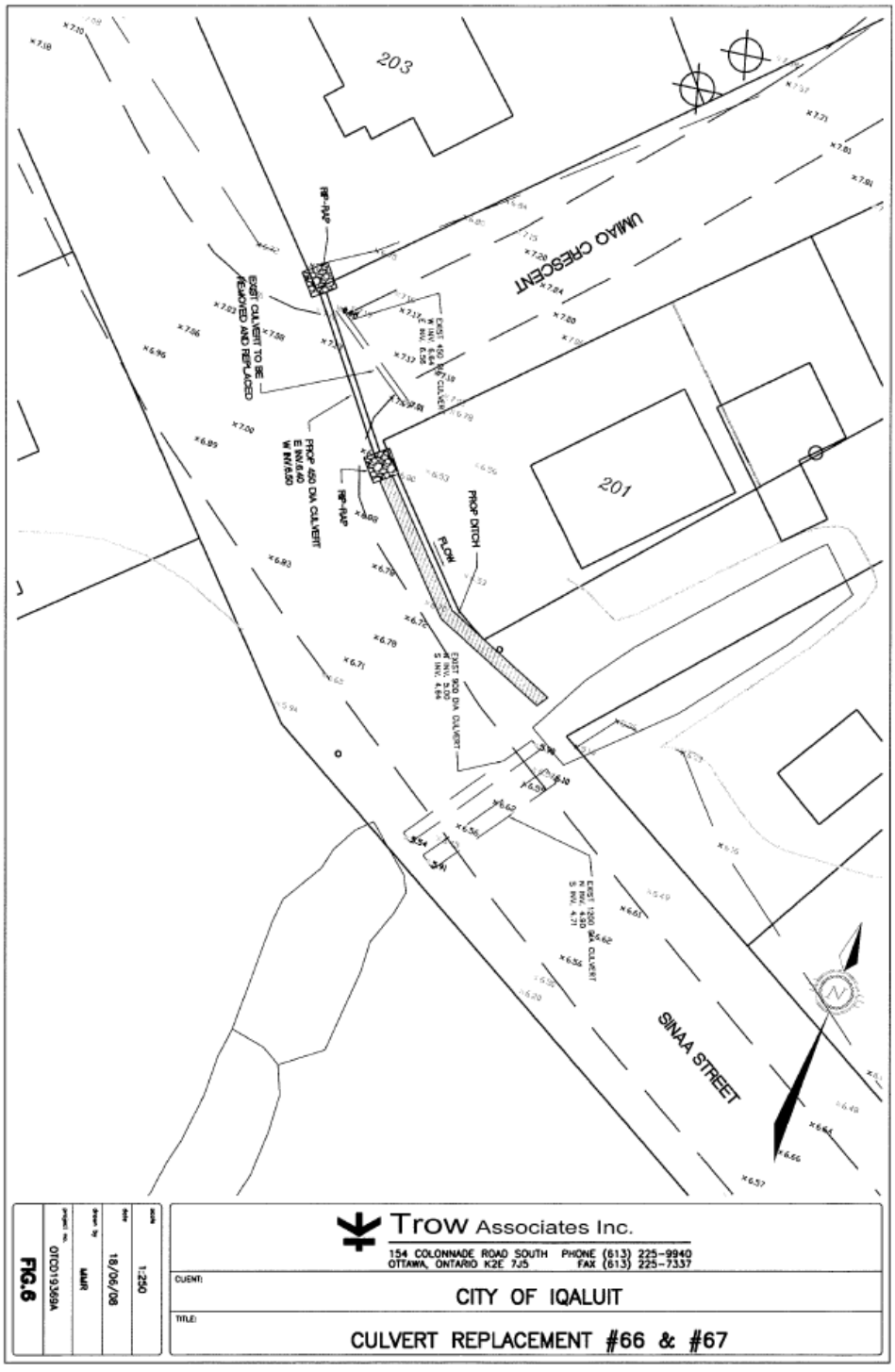
TASILIK STREET
APEX ROAD
2230
2726 a-d
2711 a-d
Work has been completed as per design except where indicated otherwise
Trow Associates Inc.
154 COLONNADE ROAD SOUTH OTTAWA, ONTARIO K2E 7J5 PHONE (613) 225-9940 FAX (613) 225-7337
CLIENT:
CITY OF IQALUIT
TITLE:
CULVERT REPLACEMENT #9 & #10
1:250
18/06/08
FIG.1


ATUNGAUYAIT DRIVE
QIYUTTAAT LANE
441
442
443
446
EXISTING DITCH TO BE REGRADED TO PROMOTE POSITIVE DRAINAGE
RIP-RAP
FLOW
CLEAN OUT EXIST CULVERT
CLEAN OUT EXIST DITCH
PROP 600 DIA CULVERT
PROP DITCH
FIG.2
OTC019369A
MMR
18/06/08
1:250
Trow Associates Inc.
154 COLONNADE ROAD SOUTH PHONE (613) 225-9940
OTTAWA, ONTARIO K2E 7J5 FAX (613) 225-7337
CLIENT:
CITY OF IQALUIT
TITLE:
CULVERT REPLACEMENT #47

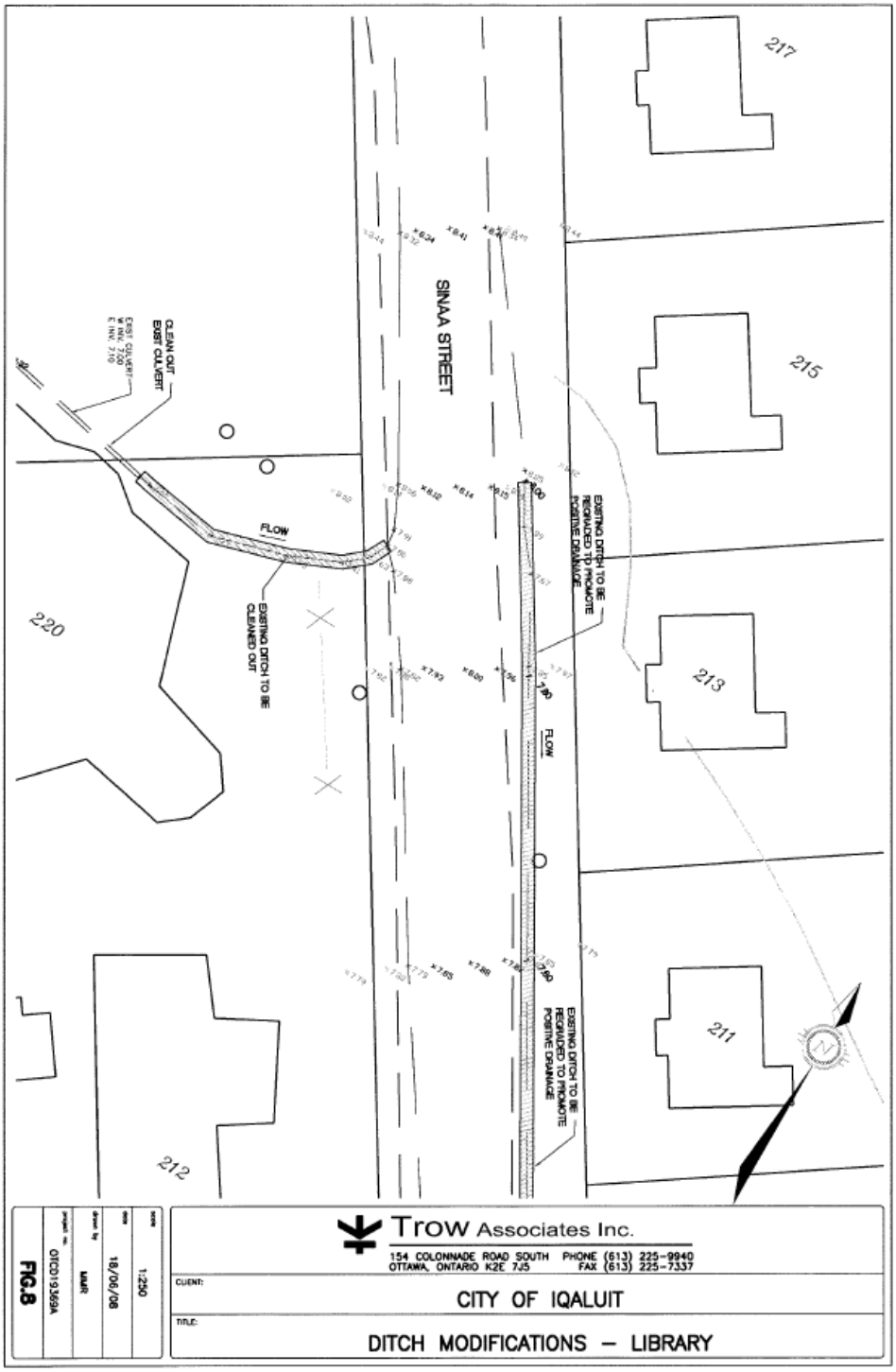

1640
1629
1631
1650
1643
1645
1641
QIYUTTAAT LANE
ATUNGAUVAT DRIVE
EXIST 600 DIA CULVERT
N INV. 43.12
S INV. 43.06
PROP 600 DIA CULVERT
N INV.43.35
S INV.43.30
EXIST CULVERT TO BE REPLACED
RIP-RAP
FLOW
EXISTING DITCH TO BE REGRADED TO PROMOTE POSITIVE DRAINAGE
Trow Associates Inc.
154 COLONNADE ROAD SOUTH PHONE (613) 225-9940
OTTAWA, ONTARIO K2E 7J5 FAX (613) 225-7337
CLIENT:
CITY OF IQALUIT
TITLE:
CULVERT REPLACEMENT #52
FIG.3
OTCD19369A
MMR
18/06/08
1:250

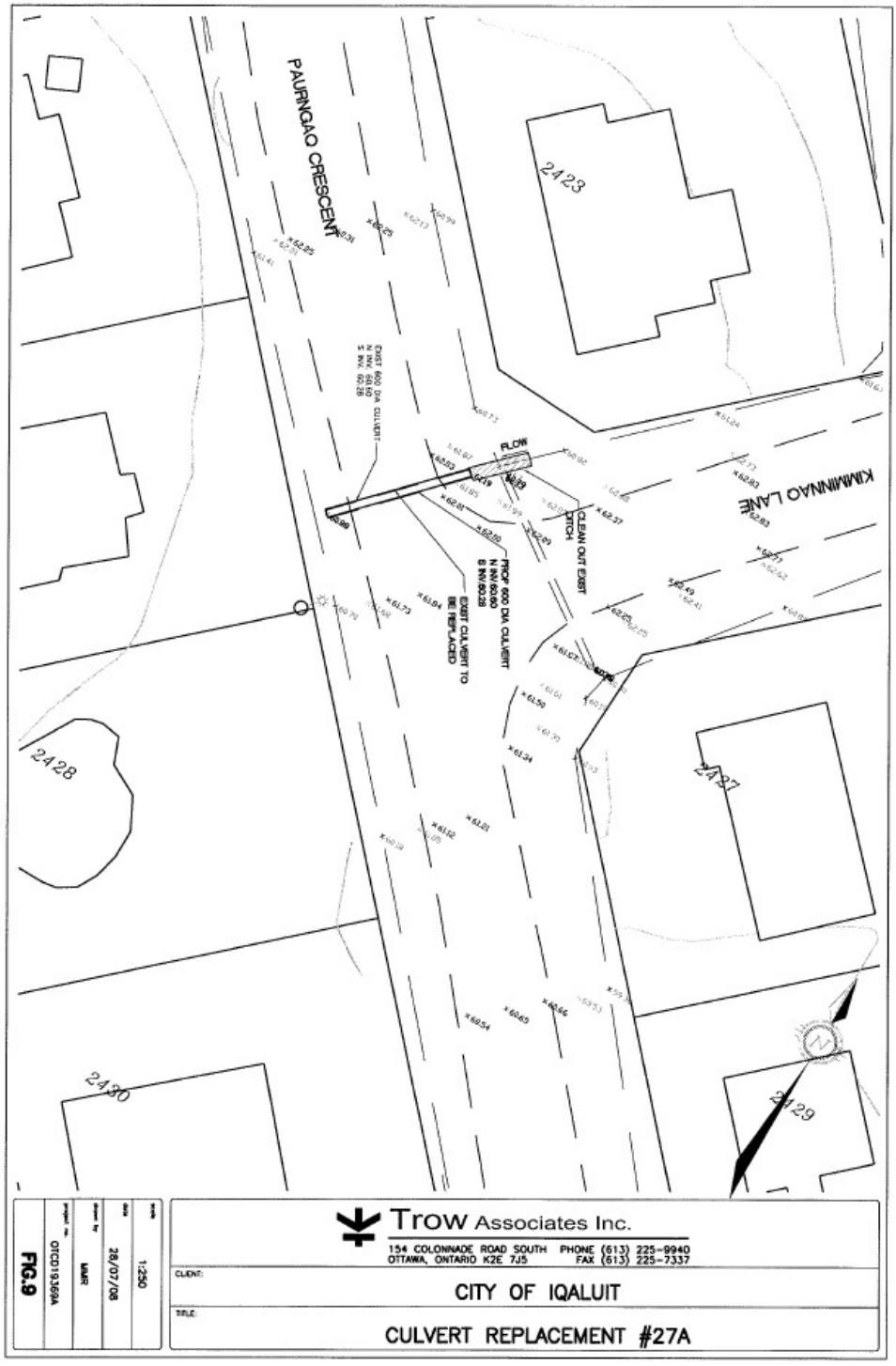

1617
1615
1620
1630
1640
1627
EXISTING DITCH TO BE REGRADED TO PROMOTE POSITIVE DRAINAGE
RIP-RAP
FLOW
EXIST 600 DIA CULVERT N INV. 40.75 S INV. 40.70
EXIST CULVERT TO BE REPLACED
QIYUTTAAT LANE
PROP 600 DIA CULVERT N INV.40.40 S INV.40.45
ATUNGAUYAIT DRIVE
EXISTING DITCH TO BE REGRADED TO PROMOTE POSITIVE DRAINAGE
Trow Associates Inc.
154 COLONNADE ROAD SOUTH PHONE (613) 225-9940
OTTAWA, ONTARIO K2E 7J5 FAX (613) 225-7337
CLIENT:
CITY OF IQALUIT
TITLE:
CULVERT REPLACEMENT #53
FIG.4
OTC019369A
MMR
18/06/08
1:250

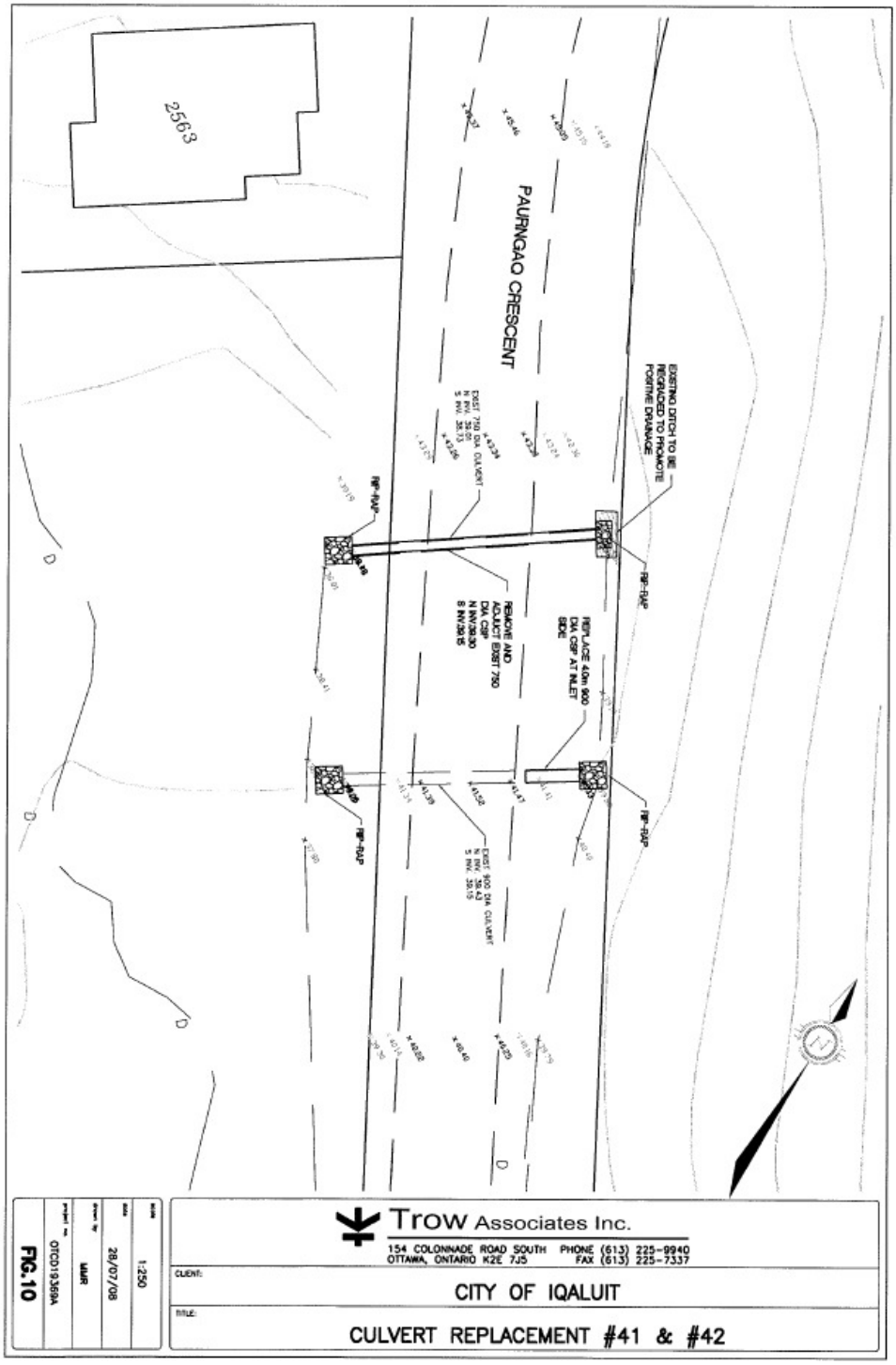

114
112
113
c & d
111
EXISTING DITCH TO BE REGRADED TO PROMOTE POSITIVE DRAINAGE
FLOW
FLOW
EXIST CULVERT TO BE REPLACED
RIP-RAP
RIP-RAP
PROP 450 DIA CULVERT E INV 5.95 W INV 5.80
EXIST 450 DIA CULVERT N INV 6.06 S INV 5.67
OAJAO LANE
SINAA STREET
Trow Associates Inc.
154 COLONNADE ROAD SOUTH PHONE (613) 225-9940
OTTAWA, ONTARIO K2E 7J5 FAX (613) 225-7337
CLIENT:
CITY OF IQALUIT
TITLE:
CULVERT REPLACEMENT #65
FIG.5
OTCD19369A
MAR
18/06/08
1:250

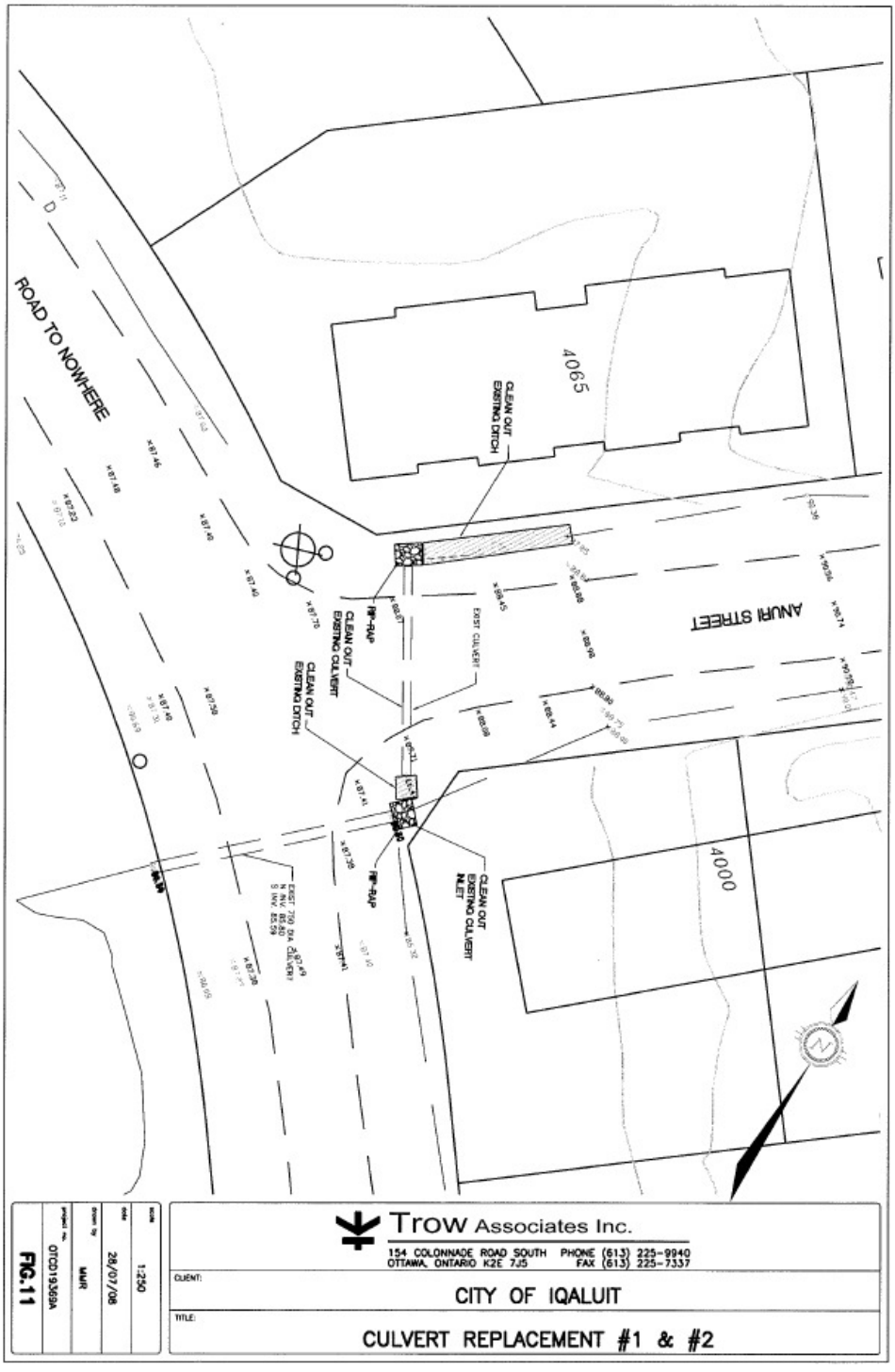

203
201
UMAO CRESCENT
SINAA STREET
RIP-RAP
EXIST CULVERT TO BE REMOVED AND REPLACED
PROP 450 DIA CULVERT E INV.6.40 W INV.6.50
PROP DITCH
FLOW
EXIST 900 DIA CULVERT N INV. 4.84 S INV. 4.84
EXIST 1050 DIA CULVERT N INV. 4.50 S INV. 4.71
Trow Associates Inc.
154 COLONNADE ROAD SOUTH PHONE (613) 225-9940
OTTAWA, ONTARIO K2E 7J5 FAX (613) 225-7337
CLIENT:
CITY OF IQALUIT
TITLE:
CULVERT REPLACEMENT #66 & #67
FIG.6
OTCD193698A
MMR
18/06/08
1:250


SINAA STREET
212
211
209
207
EXISTING DITCH TO BE REGRADED TO PROMOTE POSITIVE DRAINAGE
FLOW
RIP-RAP
PROP DITCH
PROP 600 DIA CULVERT W INV 730
Trow Associates Inc.
154 COLONNADE ROAD SOUTH PHONE (613) 225-9940
OTTAWA, ONTARIO K2E 7J5 FAX (613) 225-7337
CLIENT:
CITY OF IQALUIT
TITLE:
PROPOSED CULVERT
FIG.7
OTCD19369A
MMR
18/06/08
1:250


SINAA STREET
CLEAN OUT EXIST CULVERT
EXIST CULVERT INV. 710
FLOW
EXISTING DITCH TO BE CLEANED OUT
EXISTING DITCH TO BE REGRADED TO PROMOTE POSITIVE DRAINAGE
FLOW
EXISTING DITCH TO BE REGRADED TO PROMOTE POSITIVE DRAINAGE
217
215
213
211
220
212
FIG.8
OTCD193659A
MAIR
18/06/08
1:250
Trow Associates Inc.
154 COLONNADE ROAD SOUTH PHONE (613) 225-9940
OTTAWA, ONTARIO K2E 7J5 FAX (613) 225-7337
CLIENT:
CITY OF IQALUIT
TITLE:
DITCH MODIFICATIONS – LIBRARY


PAURNGAQ CRESCENT
KIMMINNAO LANE
2423
2428
2427
2430
2429
FLOW
CLEAN OUT EXIST DITCH
EXIST CULVERT TO BE REPLACED
PROP 600 DIA CULVERT
N INV 60.60
S INV 60.38
EXIST 600 DIA CULVERT
N INV 60.58
S INV 60.38
FIG.9
OTCD19369A
MMR
28/07/08
1:250
Trow Associates Inc.
154 COLONNADE ROAD SOUTH PHONE (613) 225-9940
OTTAWA, ONTARIO K2E 7J5 FAX (613) 225-7337
CLIENT:
CITY OF IQALUIT
TITLE:
CULVERT REPLACEMENT #27A


2563
PAURNGAQ CRESCENT
EXISTING DITCH TO BE REGRADED TO PROMOTE POSITIVE DRAINAGE
RIP-RAP
REMOVE AND ADJUCT EXIST 750 DIA CSP
N INV.38.30
S INV.38.15
REPLACE 40m 900 DIA CSP AT INLET SIDE
EXIST 750 DIA CULVERT
N INV. 38.01
S INV. 38.13
EXIST 900 DIA CULVERT
N INV. 38.43
S INV. 38.15
Trow Associates Inc.
154 COLONNADE ROAD SOUTH PHONE (613) 225-9940
OTTAWA, ONTARIO K2E 7J5 FAX (613) 225-7337
CLIENT:
CITY OF IQALUIT
TITLE:
CULVERT REPLACEMENT #41 & #42
FIG.10
OTCD19369A
MAR
28/07/08
1:250


ROAD TO NOWHERE
4065
4000
ANUKI STREET
CLEAN OUT EXISTING DITCH
CLEAN OUT EXISTING CULVERT
CLEAN OUT EXISTING CULVERT INLET
RIP-RAP
EXIST CULVERT
EXIST 700 DIA CULVERT
N INV 85.80
S INV 85.59
Trow Associates Inc.
154 COLONNADE ROAD SOUTH PHONE (613) 225-9940
OTTAWA, ONTARIO K2E 7J5 FAX (613) 225-7337
CLIENT:
CITY OF IQALUIT
TITLE:
CULVERT REPLACEMENT #1 & #2
FIG.11
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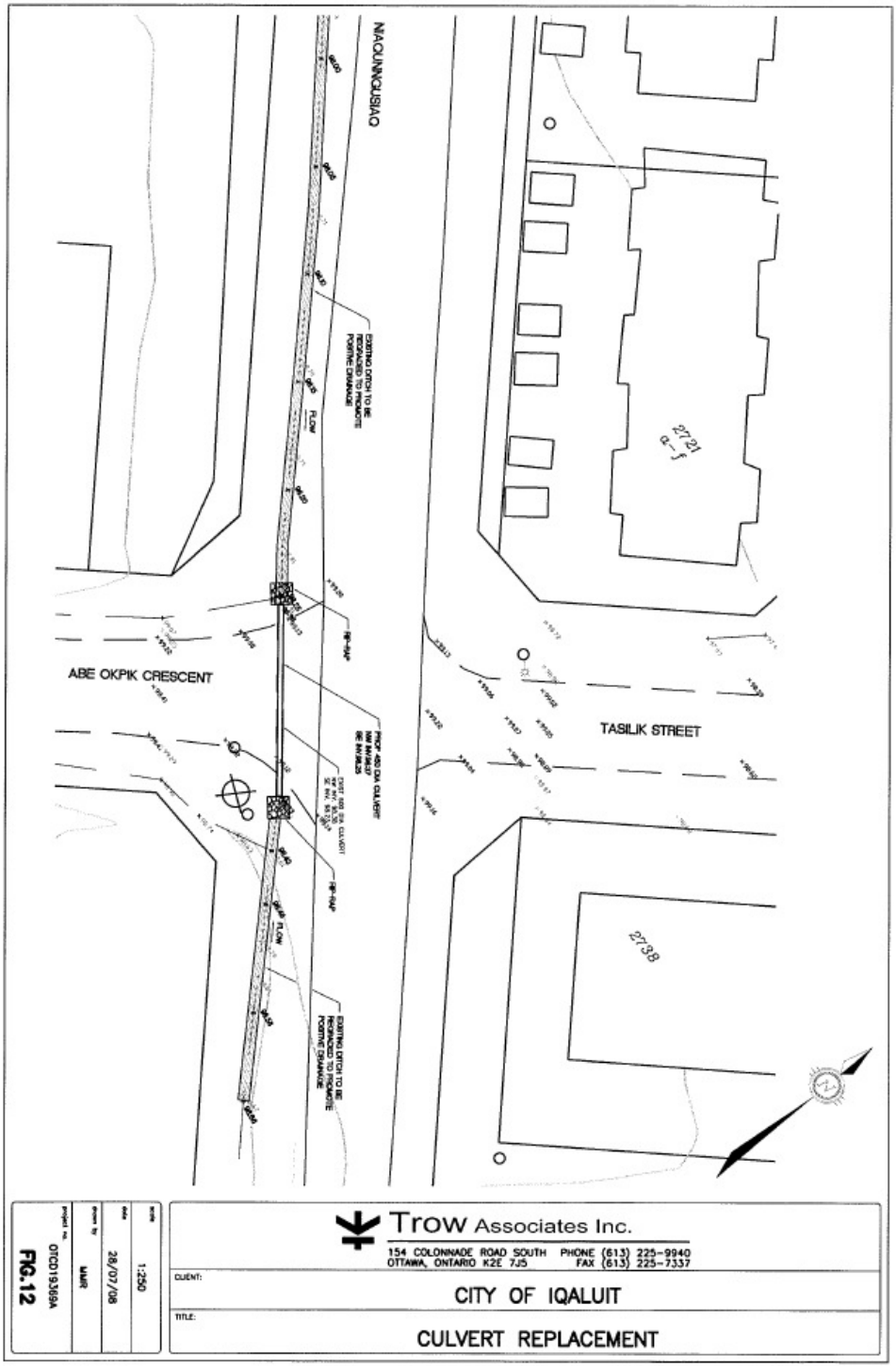
NIAQUNNGUSIAQ
ABE OKPIK CRESCENT
TASILIK STREET
2721
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FLOW
Trow Associates Inc.
154 COLONNADE ROAD SOUTH PHONE (613) 225-9940
OTTAWA, ONTARIO K2E 7J5 FAX (613) 225-7337
CLIENT:
CITY OF IQALUIT
TITLE:
CULVERT REPLACEMENT
FIG.12
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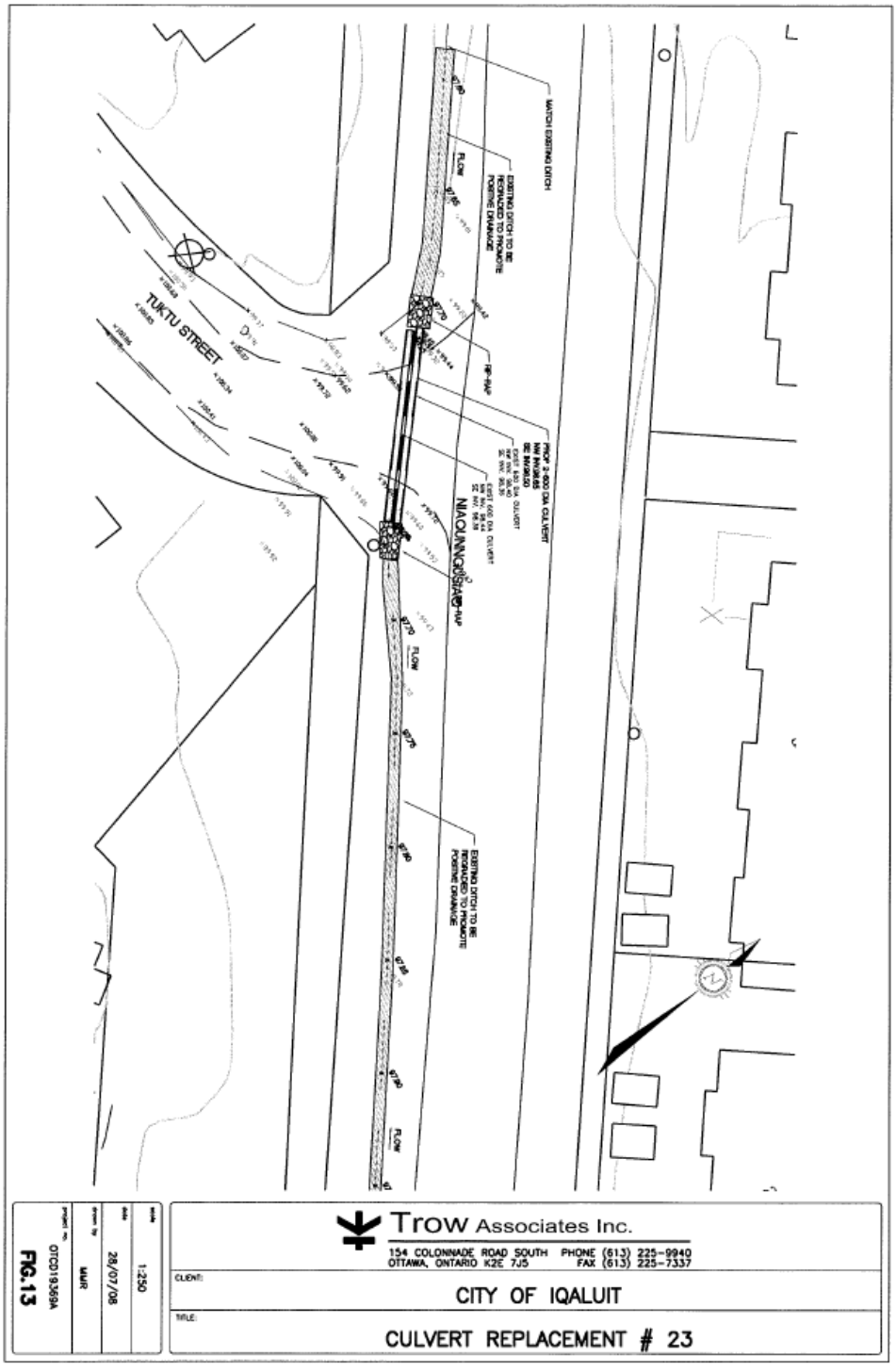
1:250


TUKTU STREET
MATCH EXISTING DITCH
EXISTING DITCH TO BE REGRADED TO PROMOTE POSITIVE DRAINAGE
PROP 2-600 DIA CULVERT
FLOW
Trow Associates Inc.
154 COLONNADE ROAD SOUTH PHONE (613) 225-9940
OTTAWA, ONTARIO K2E 7J5 FAX (613) 225-7337
CLIENT:
CITY OF IQALUIT
TITLE:
CULVERT REPLACEMENT # 23
FIG.13
OTCD193698A
MAIR
28/07/08
1:250

Appendix C

Lake Geraldine and Sewage Lagoon DSI's

Concentric Associates International Incorporated

Lake Geraldine Dam
Iqaluit, Nunavut
Dam Safety Inspection

October 29, 2009
REPORT

Produced For:
THE CITY OF IQALUIT
Produced By:
CONCENTRIC ASSOCIATES INTERNATIONAL INCORPORATED
Concentric Project Reference Number:
09-2922

Lake Geraldine Dam
Iqaluit, Nunavut
Dam Safety Inspection

CONTENTS

1. EXECUTIVE SUMMARY

Concentric Associates International Inc., (Concentric) was retained by the City of Iqaluit, to undertake a Dam Safety Inspection (DSI) of the Lake Geraldine Dam. The scope of work for the assignment has been undertaken in accordance with Concentric's proposal 09-2922 dated October 15 2009.

The site inspection was conducted on October 21, 2009, by Allan Murray, P.Eng., of Concentric.

It is recommended that the next DSI be conducted prior to October 2010.

OBSERVATIONS:

With the exception of the following items, no significant changes in condition of the concrete dam structure and retention berms were observed since the previous DSI, which was conducted in 2006.

- A significant leak has developed in the concrete dam structure south of the spillway section.
- Upwelling along the south concrete wing wall appears to have increased moderately since originally identified in 1997.

Representative existing conditions have been documented by photographs in Appendix A.

The required documentation (discussed further below) under the Canadian Dam Safety Guidelines is not up to date, and remains incomplete.

RECOMMENDATIONS:

1. A grouting program should be designed for implementation in 2010 to address observed leakage.
2. Preparation of the required Operation & Safety Manual, Logbook, and Permanent File was completed in 2007; however, the documents require updating.
3. The Emergency Preparedness Plan has not been completed. This is considered a high priority.
4. Remote and possibly site based monitoring equipment should be researched, design/specified, and installed.
5. An underwater survey should be conducted prior to August 2010.
6. Complete the next DSI prior to October 2010.

2. INTRODUCTION

Concentric Associates International Inc., (Concentric) was retained by the City of Iqaluit, to undertake a Dam Safety Inspection (DSI) of the Lake Geraldine Dam located in Iqaluit, Nunavut.

This assignment and the scope of work described herein has been undertaken in accordance with Concentric's proposal 09-2922 submitted on October 15, 2009.

The site visit was conducted on October 21, 2009.

Allan Murray, P.Eng., of Concentric, met with the following personnel at the City of Iqaluit:

- Paul Clow, Director of Engineering, City of Iqaluit

This report summarizes our terms of reference for the assignment, observations, conclusions and recommended action.

3. BACKGROUND

The Canadian Dam Safety Guidelines (DSG) requires that all structures exceeding prescribed height and volume minimums be subject to Dam Safety Reviews (DSR's) and Dam Safety Inspections (DSI's) at regular intervals.

A DSR is a comprehensive, formal review process that involves completion of checklist items in accordance with the Dam Safety Guidelines. The DSR forms a baseline of dam history, condition, repair requirements, and extensive documentation of monitoring, operating, safety and emergency procedures.

The Lake Geraldine Dam requires a DSR every seven (7) years. The last DSR was conducted in 2006 by Concentric.

It is required in the DSG document that in the interval between DSR's, a Dam Safety Inspection be performed on an annual basis. The DSI is a much less comprehensive review, comprising a visual inspection only to identify any changes in condition, or any observed concerns.

A detailed historical perspective may be referenced in the DSR on file with the City of Iqaluit.

4. SCOPE OF SERVICES

Our directive has been to undertake a Dam Safety Inspection (DSI) in accordance with the DSG, for the Lake Geraldine Dam. The inspection consisted of an on-site visual assessment, notation of any significant changes in condition since the last available DSI, preparation of a written report in a format compatible with the DSR, and a photographic record.

The following is a summary of the scope of work for this assignment. The DSI report is the primary deliverable, and has been prepared in accordance with the DSG document.

- Review available record documentation.
- Conduct a visual on-site assessment of the sewage lagoon
- Prepare a photographic record documenting general and representative conditions
- Identify, characterize, and risk-assess any actual or potential concerns
- Prepare a written report summarizing our observations, items of concern, and recommendations
- Indicate any recommended repairs
- Prioritize action items
- Submit final documents in electronic format and hard copy

Limitations

The DSI is based on visual assessment; no invasive inspection/assessment was done.

This report has been prepared for the sole use of The City of Iqaluit.

5. SUMMARY OF PREVIOUS DSI'S

The original DSR was conducted in 2001. In 2005, a major alteration to the dam was designed, and implemented over a two (2) year period. The major alteration triggered the requirement for a revised DSR. The DSR was prepared by Concentric in late 2006.

There has been no DSI undertaken since 2006.

This DSI should be read in conjunction with the current DSR, which contains the historical record, the bulk of which is not repeated here.

A summary of observed conditions and recommendations from the 2006 DSI (with updated information added as appropriate) is as follows:

- The visible portions of the concrete structures are generally in good condition.
- There was no evidence of distress or overstressing of any portion of the visible concrete structures.
- The embankments (berms) appeared to be in a stable condition. Slopes of 2H:1V were maintained on the downstream rip-rap and in the upstream rock fill.
- Most of the vertical extension had not been impacted by rising water levels.
- A leak was noted in the spillway portion of the dam; this leak was subsequently repaired in 2007.
- The required Operation & Safety Manual, Logbook, and Permanent File were prepared in 2007 however they have not been updated.
- The Emergency Preparedness Plan has not been done.
- An underwater survey has not been completed since 2002.

6. COMMENTARY ON DAM SAFETY GUIDELINES

The Canadian Dam Association publication, Dam Safety Guidelines (DSG), governs the nature and frequency of inspection and review activities for structures which fall under its umbrella criteria.

The DSG applies to those structures that are at least 2.5 meters in height, and which have at least 30,000 cubic meters of storage capacity.

The DSG document is far reaching in terms of applicability and requirements for conformance. This is understandable as the type and complexity of structures that fall under the jurisdiction of the document varies considerably, from relatively small and simple embankments or dikes to massive and complex dams associated with hydroelectric generating facilities, irrigation, flood control, etc.

The DSG requires that all structures exceeding the height and volume minimums described above be classified according to their "consequence category", that is, the consequence of dam failure in terms of life safety, and socio-economic impact. The category assigned may range from very low to very high. The consequence category dictates the requirement and frequency of Dam Safety Reviews.

A Dam Safety Review (DSR) is a comprehensive, formal review process, conducted at regular intervals, that involves completion of checklist items in accordance with the Dam Safety Guidelines.

The DSR forms a baseline of dam history, condition, repair requirements, and extensive documentation of monitoring, operating, safety and emergency procedures.

The frequency of DSR's varies depending on consequence category. For structures where significant life safety and/or socio-economic consequence exist, the DSR is usually conducted every five (5) to ten (10) years. The Lake Geraldine Dam requires a DSR every seven (7) years. The current DSR for the Lake Geraldine Dam was conducted in 2006; therefore, the Lake Geraldine Dam is due for an updated DSR in 2013. If significant alterations (not including repairs that do not change the height or volume of the structure) to the structure take place before this date, an updated DSR would be required.

It is required in the DSG document that in the interval between DSR's, a Dam Safety Inspection (DSI) would be performed on an annual basis. The DSI is a much less comprehensive review, comprising a visual inspection to identify any changes in condition, or any observed concerns. The results of the DSI are incorporated into the DSR documentation. A DSI may trigger repairs, or changes in standard operating procedures.

7. OBSERVATIONS

The Lake Geraldine Dam was accessed on foot. Based on our visual assessment we have the following comments:

- The concrete portions of the dam structure are in general unchanged from that observed for the 2006 DSI.
- The berm structures are in general unchanged from that observed for the 2006 DSI.
- A significant leak has developed in the concrete dam structure south of the spillway section.
- Upwelling along the south concrete wing wall appears to have increased moderately since originally identified in 1997.

To our knowledge, the required documentation (discussed previously) under the Canadian Dam Safety Guidelines is not up to date, and remains incomplete.

Specifically, the Permanent Record File, Logbook, and Operation & Safety Manual have not been updated.

The Emergency Preparedness Plan has not been completed.

8. RECOMMENDATIONS

The following actions are recommended:

1. A grouting program should be designed for implementation in 2010 to address the observed leakage. The grouting program should include injection of the vertical and transverse joints in the vicinity of the above grade leak in the concrete section south of the spillway.

   A grouting program should also target the upwelling source. It is possible that the underwater survey (recommended below) will assist in assessing the source and developing a repair strategy.
2. Preparation of the required Operation & Safety Manual, Logbook, and Permanent File was completed in 2007; however, the documents require updating.
3. The Emergency Preparedness Plan has not been completed. Given the vertical extension of the dam in 2006, we view this requirement as high priority. The Emergency Preparedness Plan should be completed in 2010.
4. In concert with Item 3 above, and the DSG's, remote, and possibly site based monitoring equipment should be installed at the dam. This will require some research, and a design/specification process.
5. An underwater survey should be conducted prior to August 2010.
6. Complete the next DSI prior to October 2010.

We would be pleased to discuss this report with you. Should there be any questions, please contact the undersigned.

Yours truly,

Concentric Associates International Incorporated

Allan Murray, P.Eng.,

APPENDIX A
Photographs

Photograph 1
Overview of North berm.

Photograph 2
Overview of upstream face of concrete structure.

Photograph 3
Overview of spillway section, downstream face.

Photograph 4
Overview of South berm.

Photograph 5
New leak South of spillway section.

Photograph 6
Upwelling area previously identified in 1997.

CONCENTRIC
Concentric Associates International Incorporated

City of Iqaluit Sewage Lagoon
Iqaluit, Nunavut
Dam Safety Inspection

October 29, 2009
REPORT

Produced For:
THE CITY OF IQALUIT
Produced By:
CONCENTRIC ASSOCIATES INTERNATIONAL INCORPORATED
Concentric Project Reference Number:
09-2930

City of Iqaluit Sewage Lagoon
Iqaluit, Nunavut
Dam Safety Inspection

CONTENTS

1. EXECUTIVE SUMMARY

Concentric Associates International Inc., (Concentric) was retained by the City of Iqaluit, to undertake a Dam Safety Inspection (DSI) of the City of Iqaluit sewage lagoon. The scope of work for the assignment has been undertaken in accordance with Concentric's proposal 09-2930 dated October 15 2009.

The site inspection was conducted on October 22, 2009, by Allan Murray, P.Eng., of Concentric. It is recommended that the next DSI be conducted prior to October 2010.

OBSERVATIONS:

No significant changes in condition of the lagoon and retention berms were observed since the previous DSI which was conducted in 2006.

Representative existing conditions have been documented by photographs in Appendix A.

The required documentation (discussed further below) under the Canadian Dam Safety Guidelines is not up to date, and remains incomplete.

RECOMMENDATIONS:

1. Preparation of the required Operation & Safety Manual, Logbook, and Permanent File was completed in 2007; however, the documents require updating.

2. The Emergency Preparedness Plan has not been completed; it is suggested that the relevance of this document be assessed and a decision made regarding its requirement to exist.

3. The capacity of the sewage lagoon should be confirmed.

4. It is understood that the intent of the City of Iqaluit is to retain the sewage lagoon as a back-up facility only. Given this occasional use the facility in its current configuration (pending the capacity check recommended in Item 3, above) should be adequate for the intended purpose. However, this does not mean preventative maintenance can be overlooked. Localized failures and/or seeps are to be expected. The City of Iqaluit should remain aware that the lagoon operates on old technology – it is essentially a "leaky dam", and its use may be prohibited at any time in the future.

5. Complete the next DSI prior to October 2010.

2. INTRODUCTION

Concentric Associates International Inc., (Concentric) was retained by the City of Iqaluit, to undertake a Dam Safety Inspection (DSI) of the City of Iqaluit sewage lagoon located in Iqaluit, Nunavut.

This assignment and the scope of work described herein has been undertaken in accordance with Concentric's proposal 09-2930 submitted on October 15, 2009.

The site visit was conducted on October 22, 2009.

Allan Murray, P.Eng., of Concentric, met with the following personnel at the City of Iqaluit:

- Paul Clow, Director of Engineering, City of Iqaluit

This report summarizes our terms of reference for the assignment, observations, conclusions and recommended action.

3. BACKGROUND

The Canadian Dam Safety Guidelines (DSG) requires that all structures exceeding prescribed height and volume minimums be subject to Dam Safety Reviews (DSR's) and Dam Safety Inspections (DSI's) at regular intervals.

A DSR is a comprehensive, formal review process that involves completion of checklist items in accordance with the Dam Safety Guidelines. The DSR forms a baseline of dam history, condition, repair requirements, and extensive documentation of monitoring, operating, safety and emergency procedures.

The sewage lagoon requires a DSR every ten (10) years. The current DSR for the sewage lagoon was conducted in 2001.

It is required in the DSG document that in the interval between DSR's, a Dam Safety Inspection be performed on an annual basis. The DSI is a much less comprehensive review, comprising a visual inspection only to identify any changes in condition, or any observed concerns.

A detailed historical perspective may be referenced in the DSR on file with the City of Iqaluit.

4. SCOPE OF SERVICES

Our directive has been to undertake a Dam Safety Inspection (DSI) in accordance with the DSG, for the sewage lagoon. The inspection consisted of an on-site visual assessment, notation of any significant changes in condition since the last available DSI, preparation of a written report in a format compatible with the DSR, and a photographic record.

The following is a summary of the scope of work for this assignment. The DSI report is the primary deliverable, and has been prepared in accordance with the DSG document.

- Review available record documentation.
- Conduct a visual on-site assessment of the sewage lagoon
- Prepare a photographic record documenting general and representative conditions
- Identify, characterize, and risk-assess any actual or potential concerns
- Prepare a written report summarizing our observations, items of concern, and recommendations
- Indicate any recommended repairs
- Prioritize action items
- Submit final documents in electronic format and hard copy

Limitations

The DSI is based on visual assessment; no invasive inspection/assessment was done.

This report has been prepared for the sole use of The City of Iqaluit.

5. SUMMARY OF PREVIOUS DSI'S

The following is a summary of observations and recommendations made from past DSI's conducted since the 2001 DSR:

January 7, 2003 (2002) DSI

A DSI was conducted by Trow Consulting Engineers (Report MA15882A, dated January 7, 2003) in October 2002. The DSI was termed "…an interim step prior to the implementation of remedial measures…" recommended in the 2001 DSR.

The DSI noted no significant changes since the 2001 DSR, but highlighted the seepage concerns of the east berm and the threat of overtopping in the spring.

The DSI reiterated the recommendations of the 2001 DSR, as follows:

- There is inadequate information concerning the as-built conditions of the berms
- The berms may not be safe in their current condition and may be non-compliant with the design and performance standards of the DSG.
- Remedial measures include three (3) options - an impermeable liner; buttressing the berms; and building a new lagoon.

Not stated in the 2002 DSI, but recommended in the 2001 DSR, were the following additional requirements:

- Complete the remaining outstanding non-compliance requirements of Section Nos. 3 and 4 of the DSG, as follows:
  - Permanent file
  - Operation, Maintenance and Surveillance Manual
  - Logbook
  - Emergency Preparedness Plan

2003 DSI

Based on our discussions with the City of Iqaluit Engineering Department, there is no 2003 DSI on file. However, a geotechnical investigation was conducted by Trow Associates Inc. (Report OTGE00016794A, dated October 8, 2003) in 2003.

The scope of the geotechnical investigation was to undertake a topographic survey of the lagoon and conduct a slope stability analysis of the berms. A separate hydrologic report is referenced, but was not provided to us. It would appear that the geotechnical investigation was attempting to address some of the as-built issues discussed in the 2002 DSI.

Salient points from the geotechnical investigation include:

- Adequate (satisfying the Dan Safety Guidelines) factors of safety exist for steady state seepage and rapid drawdown scenarios
- The berm slopes should remain stable provided they are protected against overtopping and adequate erosion protection is installed on downstream faces
- Catastrophic failure is unlikely with the above provisos, however, localized failures or seeps are expected until such time as the lagoon is lined with an impervious material, or rebuilt

2004 DSI

A 2004 DSI was commissioned, however, it was not authorized by the City of Iqaluit until February 2005. The DSI was conducted by Concentric.

Much of the site was snow covered at the time of the 2004 DSI so the report was limited in nature and basically reiterated previous concerns and items that remained outstanding.

2005 DSI

A 2005 DSI was not conducted.

2006 DSI

The following is a summary of observations and recommendations from the 2006 DSI prepared by Concentric:

- The lagoon is not in use and sewage is being processed at the sewage treatment plant.
- The lagoon has been drawn down by the outflow with some sludge accumulation.
- The recommended repairs to the west berm have been completed.
- Seepage was not observed downstream of any berms.
- Minimal flow was observed at the outflow.

- Preparation of the required Operation & Safety Manual, Logbook, Permanent File, and Emergency Preparedness Plan remains incomplete.
- The capacity of the sewage lagoon should be confirmed.
- It is understood that the intent of the City of Iqaluit is to retain the sewage lagoon as a back-up facility only. Localized failures and/or seeps are to be expected. The City of Iqaluit should remain aware that the lagoon operates on old technology – it is essentially a "leaky dam", and its use may be prohibited at any time in the future.

Overall, the condition of the structure did not changed significantly since the previous DSI.

6. COMMENTARY ON DAM SAFETY GUIDELINES

The Canadian Dam Association publication, Dam Safety Guidelines (DSG), governs the nature and frequency of inspection and review activities for structures which fall under its umbrella criteria.

The DSG applies to those structures that are at least 2.5 meters in height, and which have at least 30,000 cubic meters of storage capacity.

The DSG document is far reaching in terms of applicability and requirements for conformance. This is understandable as the type and complexity of structures that fall under the jurisdiction of the document varies considerably, from relatively small and simple embankments or dikes to massive and complex dams associated with hydroelectric generating facilities, irrigation, flood control, etc.

The DSG requires that all structures exceeding the height and volume minimums described above be classified according to their "consequence category", that is, the consequence of dam failure in terms of life safety, and socio-economic impact. The category assigned may range from very low to very high. The consequence category dictates the requirement and frequency of Dam Safety Reviews.

A Dam Safety Review (DSR) is a comprehensive, formal review process, conducted at regular intervals, that involves completion of checklist items in accordance with the Dam Safety Guidelines.

The DSR forms a baseline of dam history, condition, repair requirements, and extensive documentation of monitoring, operating, safety and emergency procedures.

The frequency of DSR's varies depending on consequence category. For structures where significant life safety and/or socio-economic consequence exist, the DSR is usually conducted every five (5) to ten (10) years. The sewage lagoon requires a DSR every ten (10) years. The initial DSR for the sewage lagoon was conducted in 2001; therefore, the sewage lagoon is due for an updated DSR in 2011. If significant alterations (not including repairs that do not change the height or volume of the structure) to the structure take place before this date, an updated DSR would be required.

It is required in the DSG document that in the interval between DSR's, a Dam Safety Inspection (DSI) would be performed on an annual basis. The DSI is a much less comprehensive review, comprising a visual inspection to identify any changes in condition, or any observed concerns. The results of the DSI are incorporated into the DSR documentation. A DSI may trigger repairs, or changes in standard operating procedures.

7. OBSERVATIONS

The sewage lagoon was accessed on foot. Based on our visual assessment we have the following comments:

- There were no significant changes in the lagoon or berm structures since the previous DSI, which was conducted in 2006.
- Seepage was not observed downstream of any berms.
- Minimal flow was observed at the outflow.
- To our knowledge, the sewage lagoon capacity has not been confirmed; this should be done as inactivity and sludge/sediment accumulation may have reduced the effective capacity significantly.
- To our knowledge, the required documentation (discussed previously) under the Canadian Dam Safety Guidelines is not up to date, and remains incomplete.

8. RECOMMENDATIONS

The following actions are recommended:

1. Preparation of the required Operation & Safety Manual, Logbook, and Permanent File was completed in 2007; however, the documents require updating.

2. The Emergency Preparedness Plan has not been completed; it is suggested that the relevance of this document be assessed and a decision made regarding its requirement to exist.

3. The capacity of the sewage lagoon should be confirmed.

4. It is understood that the intent of the City of Iqaluit is to retain the sewage lagoon as a back-up facility only. Given this occasional use the facility in its current configuration should be adequate for the intended purpose. However, this does not mean preventative maintenance can be overlooked. Localized failures and/or seeps are to be expected. The City of Iqaluit should remain aware that the lagoon operates on old technology – it is essentially a "leaky dam", and its use may be prohibited at any time in the future.

5. Complete the next DSI prior to October 2010.

We would be pleased to discuss this report with you.

Should there be any questions, please contact the undersigned.

Yours truly,

Concentric Associates International Incorporated

Allan Murray, P.Eng.,
Project Manager

APPENDIX A
Photographs

Photograph 1
Overview looking East.

Photograph 2
Overview looking West

Photograph 3
East Berm, North segment; no change since 2006

Photograph 4
East Berm, South segment; no change since 2006

Photograph 5
West Berm, no change since 2006

Photograph 6
Discharge from Sewage Treatment Plant

Appendix D

Executive Summary of Solid Waste Management Plan

ᑕᖏᓖᑦ ᓴᓃᑦ ᒥᐊᓂᕆᔭᐅᓂᖏᑕ ᐸᕐᓇᐅᑎᖏᑦ - ᐊᖓᔪᖅᑰᑉ ᓇᓗᓇᐃᕈᑎᖏᑦ

ᐃᒥᕐᒧᑦ ᓚᐃᓴᖓᓄᑦ (3AM-IQA0611), ᓄᓇᓕᐸᐅᔭᐃᑦ ᐃᖃᓗᐃᑦ ᑎᓕᔭᐅᓯᒪᕗᑦ ᓄᓇᕗᑦ ᐃᒥᓕᕆᔨᒃᑯᓐᓂᑦ ᑲᑎᒪᔨᖏᓐᓂᑦ ᓴᓇᕐᑯᓪᓗᒋᑦ ᑕᖏᓖᑦ ᓴᓂᕐᑕᐅᓂᖏᑕ ᑲᒪᒋᔭᐅᔾᔪᑎᖏᓐᓂᒃ ᐸᕐᓇᐅᑎᒃᑯᑦ ᐱᖃᓯᐅᑎᓯᒪᓗᒋᑦ: 1) ᓇᓖᖀᕈᓐᓇᕐᓂᖅ ᓇᓪᓕᐊᓐᓂᒃ ᐊᑦᑕᕐᕕᑦᓴᐅᔪᓐᓇᕐᑐᒥᒃ ᐊᒻᒪᓗ ᐅᖃᒪᔭᐅᑕᐅᓗᓂ ᐱᐅᒋᓂᖅᓴᕆᔭᓂᒃ ᓴᖑᕕᐅᖕᒌᕈᓐᓇᕐᑐᓂᒃ, ᐊᒻᒪᓗ 2) ᓂᕈᐊᕐᓗᑎᒃ ᓇᒦᓖᕐᒪᖔᑦ ᐊᑦᑕᕐᕕᑦᓴᖅ.

2010ᒥ, ᓄᓇᓕᐸᐅᔭᐃᑦ ᐃᖃᓗᐃᑦ ᓴᓇᔪᒪᒻᒪᑕ ᑕᖏᓖᑦ ᒥᐊᓂᕆᔭᐅᓂᖏᓐᓂᒃ ᐱᓕᕆᐊᔅᓴᖃᕈᒪᔪᑦ ᐅᑯᓂᖓ ᐃᓗᓕᓕᓐᓂᒃ:

- ᕿᒥᕐᕈᔭᐅᓗᑎᒃ ᐊᐅᓚᑕᐅᕙᒌᕐᑐᑦ ᒥᐊᓂᕆᔭᐅᓂᖏᑦ ᐊᒻᒪᓗ ᑕᖏᓖᑦ ᑲᒪᒋᔭᐅᓂᖏᑕ ᐱᔭᕆᐊᓕᖏᑦ ᓄᓇᓕᖕᓂ;
- ᓇᓗᓇᐃᕐᓯᓗᑎᒃ ᐊᑲᐅᓛᒥᒃ ᑕᖏᓖᑦ ᑲᒪᒋᔭᐅᔾᔪᑎᖏᓐᓂᒃ;
- ᓂᕈᐊᕐᓯᓗᑎᒃ ᓇᓪᓕᐊᓐᓂᒃ ᑕᖏᓕᓐᓄᑦ ᒥᐊᓂᕆᔭᐅᔾᔪᑎᖏᓐᓂᒃ;
- ᓂᕈᐊᕐᓯᓗᑎᒃ ᐋᖅᑭᓱᕐᓯᒪᒐᔭᕐᑕᖏᓐᓂᒃ ᓂᕈᐊᕆᔭᐅᔫᑉ ᐃᓂᖓᓂ;
- ᐸᕐᓇᐃᓗᑎᒃ ᒪᑐᔭᐅᔾᔪᑎᖏᓐᓂᒃ ᓄᓇᓕᐸᐅᔭᐃᑦ ᐊᑦᓯᕕᖓᓂᒃ;
- ᐸᕐᓇᐃᓗᑎᒃ ᓴᓂᖅᑲᓗᐊᕐᑕᐃᓕᒪᓇᓱᐊᕈᑎᑦᓴᓂᒃ ᐊᒻᒪᓗ ;
- ᐸᕐᓇᐃᓗᑎᒃ ᐊᑐᓕᕈᑎᑦᓴᐃᑦ ᐸᕐᓇᐅᑎᖏᓐᓂᒃ, ᓇᓗᓇᐃᕐᑐᖅᓯᒪᐅᑦᓯᐊᕐᓗᑎᒃ ᐊᑐᕐᐸᓪᓕᐊᓂᐊᕐᑐᑦ ᐱᓐᖑᕐᑎᑕᐅᓂᑦᓴᖓᑕ ᓄᑖᑉ ᐊᑦᑕᑯᓄᑦ ᒥᐊᓂᕆᔭᐅᔾᔪᑎᖏᑕ ᐋᖅᑭᐅᒪᓂᖏᓐᓂᒃ ᖃᖓᒃᑰᓂᐊᕐᒪᖔᑕ ᐊᒻᒪᓗ ᐃᖏᕐᕋᓯᒋᐊᕈᑎᑦᓴᖏᓐᓂᒃ ᓴᓇᒪᓂᖓᑕ.
- ᑐᕌᕐᑎᑕᐅᑦᓯᐊᕐᓗᑎᒃ ᐃᓄᓐᓄᑦ ᐊᒻᒪᓗ ᐱᓯᒪᑦᓯᔨᐅᔪᓄᑦ ᐊᐱᖅᓱᕐᓗᒋᑦ

ᑖᓐᓇ ᓴᓇᔭᐅᑉᐸᑦ ᐋᖅᑮᓂᐊᕐᒪᑦ ᑕᖏᓖᑦ ᒥᐊᓂᕆᔭᐅᓂᖏᑕ ᐸᕐᓇᐅᑎᒃᑯᑦ ᖃᐅᔨᓴᕐᑕᐅᓂᑰᔪᒥᒃ ᐊᒻᒪᓗ ᑕᖏᓖᑦ ᓴᓂᖅᑲᐅᑎᖅᑲᕐᕕᖓᓂᒃ ᓂᕈᐊᕐᓯᓂᕐᒥᒃ ᐅᓂᒃᑳᓕᐊᕕᓃᑦ ᐱᔭᓈᖅᑕᐅᓂᑰᔪᑦ 2000 ᐊᒻᒪ 2001, ᐃᓗᐊᓂ.

Solid Waste Management Plan - Executive Summary

Through its Water License (3AM-IQA0611), the City of Iqaluit has been directed by the Nunavut Water Board to develop a Solid Waste Management Plan (SWMP) which will include: 1) options for solid waste disposal and discussion of preferred alternative, and 2) selection of a site for solid waste disposal.

In 2010, the City of Iqaluit plans to undertake the development of a SWMP that will include the following components:

- Analysis of the existing waste management system and the solid waste management needs of the community;
- Identification of appropriate alternate solid waste management system options;
- Selection of a preferred solid waste management system;
- Selection of sites for the components of the preferred solid waste system;
- Development of closure plans for the existing municipal landfills;
- Development of a Waste Reduction and Diversion Program;
- Development of an implementation plan, which will clearly outline the steps to develop the new solid waste management system in the required timeframe and regulatory framework.
- Appropriate public and stakeholder consultation

This work will build on the Solid Waste Management Planning Study and the Solid Waste Facility Site Selection Report completed in 2000 and 2001, respectively.

Appendix E

2009 Spill Reports

Spill #1 - February 15, 2009

FEB-15-2009 15:30 FROM:ARCTIC ALARM STATION 8736924 TO:GN P:1/1

Feb 15 2009 5:27PM City of Iqaluit 8679795910 p.1

RECEIVED
FEB 17 2009

Northwest Territories

NWT SPILL REPORT
(Oil, Gas, Hazardous Chemicals or other Materials)

24 – Hour Report Line
Phone: (867) 920-8130
Fax: (867) 873-6924

A Report Date and Time: FEB 15 2009 2:30 PM
B Date and Time of spill (if known): FEB 15, 2009 1:30 PM
C ☒ Original Report ☐ Update no.
Spill Number: 09-071

D Location and map coordinates (if known) and direction (if moving): IQALUIT HSE 459 A+B

E Party responsible for spill: CITY OF IQALUIT

F Product(s) spilled and estimated quantities (provide data in metric/imperial units if possible): RAW SEWAGE 100 LITRES

G Cause of spill: OVERFILLING OF TRUCK

H Is spill terminated? ☒ yes ☐ no

I If spill is continuing, give estimated rate:

J Is further spillage possible? ☐ yes ☒ no

K Extent of contaminated area (in square meters if possible): 3 SQ METERS

L Factors affecting spill or recovery (weather conditions, terrain, snow cover, etc.): HARD PACKED SNOW & ICE

M Containment (natural depression, dikes, etc.): SPILLED ON THE SNOW

N Action, if any, taken or proposed to contain, recover, clean up or dispose of product(s) and contaminated materials: EXCAVATED SNOW & ICE. REMOVED TO LAND FILL.

O Do you require assistance? ☒ no ☐ yes, describe:

P Possible hazards to person, property, or environment, eg: fire, drink water, fish or wildlife: NONE.

Q Comments or recommendations: ADVISED HELPER TO KEEP AN EYE ON FLOAT LEVEL ON SEWAGE TRUCK.

FOR SPILL LINE USE ONLY

Lead agency:

Spill significance:

Lead Agency contact and time:

Is this file now closed? ☐ yes ☐ no

Reported by: LEVI JEFFREY — Position, Employer, Location: DRIVER, CITY OF IQALUIT — Telephone: 979-5612

Reported to: KEITH BAINES — Position, Employer, Location: FOREMAN, CITY OF IQALUIT, NU — Telephone: 867-222-2947

NWT 17/02/2002

Spill #2 - February 24, 2009

FEB-26-2009 15:12 FROM:ARCTIC ALARM STATION 8736924 TO:GN P:1/1

Feb 26 2009 3:33PM City of Iqaluit 8679795910 p.1

RECEIVED
FEB 27 2009

Canada

NT-NU SPILL REPORT

OIL, GASOLINE, CHEMICALS AND OTHER HAZARDOUS MATERIALS

TEL: (867) 920-8130
FAX: (867) 873-6924
EMAIL: spills@gov.nt.ca

REPORT LINE USE ONLY

A	REPORT DATE: MONTH – DAY – YEAR: 02/26/09	REPORT TIME: 3:50 P.M	☐ ORIGINAL SPILL REPORT, OR ☐ UPDATE # _____ TO THE ORIGINAL SPILL REPORT	REPORT NUMBER: 09.082
B	OCCURRENCE DATE: MONTH – DAY – YEAR: 02/24/09	OCCURRENCE TIME: Approx. 5 P.M		
C	LAND USE PERMIT NUMBER (IF APPLICABLE)	WATER LICENCE NUMBER (IF APPLICABLE)		
D	GEOGRAPHIC PLACE NAME OR DISTANCE AND DIRECTION FROM NAMED LOCATION: Iqaluit House 5135	REGION: ☐ NWT ☐ NUNAVUT ☐ ADJACENT JURISDICTION OR OCEAN		
E	LATITUDE: DEGREES MINUTES SECONDS	LONGITUDE: DEGREES MINUTES SECONDS		
F	RESPONSIBLE PARTY OR VESSEL NAME: City of Iqaluit	RESPONSIBLE PARTY ADDRESS OR OFFICE LOCATION: PO Box 460		
G	ANY CONTRACTOR INVOLVED	CONTRACTOR ADDRESS OR OFFICE LOCATION		
H	PRODUCT SPILLED: Sewage	QUANTITY IN LITRES, KILOGRAMS OR CUBIC METRES: Approximatly 400 litres	U.N. NUMBER	
	SECOND PRODUCT SPILLED (IF APPLICABLE)	QUANTITY IN LITRES, KILOGRAMS OR CUBIC METRES	U.N. NUMBER	
I	SPILL SOURCE: Open sewer service under house	SPILL CAUSE: Sewer back up into access vault	AREA OF CONTAMINATION IN SQUARE METRES: 9 square metres	
J	FACTORS AFFECTING SPILL OR RECOVERY: Frozen Ground	DESCRIBE ANY ASSISTANCE REQUIRED: None	HAZARDS TO PERSONS, PROPERTY OR EQUIPMENT: None	

K — ADDITIONAL INFORMATION, COMMENTS, ACTIONS PROPOSED OR TAKEN TO CONTAIN, RECOVER OR DISPOSE OF SPILLED PRODUCT AND CONTAMINATED MATERIALS:

The contaminated area will be dug up and disposed of when the ground thaws to enable the clean-up crew to do a more thorough job.
The reason for the delay in reporting the spill is the Access Vault is located approxmetly 20-25 metres from the end of the sewer service and darkness had set in so it was not visible.
Three Sewage Vacuum Trucks were called to the scene immediatly when the situation occured to minimize the amount of spillage.

L	REPORTED TO SPILL LINE BY: Rob Hogan	POSITION: Acting Utilidor Forema	EMPLOYER: City of Iqaluit	LOCATION CALLING FROM:	TELEPHONE: 867-975-8509
M	ANY ALTERNATE CONTACT: Steven Iyago	POSITION: Ops. Superintendant	EMPLOYER: City of Iqaluit	ALTERNATE CONTACT LOCATION: Federal Garage	ALTERNATE TELEPHONE: 867-979-5653

REPORT LINE USE ONLY

N	ACKNOWLEDGED BY:	POSITION: STATION OPERATOR	EMPLOYER:	LOCATION CALLED: YELLOWKNIFE, NT	REPORT LINE NUMBER: (867) 920-8130

LEAD AGENCY ☐ EC ☐ CCG ☐ GNWT ☑ GN ☐ ILA ☐ NAC ☐ NES ☐ TC | SIGNIFICANCE ☐ MINOR ☐ MAJOR ☐ UNKNOWN | FILE STATUS ☐ OPEN ☐ CLOSED

AGENCY	CONTACT NAME	CONTACT TIME	REMARKS
LEAD AGENCY	Robert End	02/26/09 15:07	
FIRST SUPPORT AGENCY			
SECOND SUPPORT AGENCY			
THIRD SUPPORT AGENCY			

PAGE 1 OF

Spill #3 - April 29, 2009

MAY-1-2009 10:38 FROM:ARCTIC ALARM STATION 8736924 TO:GN P:1/1

Apr 30 2009 9:49AM City of Iqaluit 8679795910 p.1

Northwest Territories Nunavut Canada

NT-NU SPILL REPORT

OIL, GASOLINE, CHEMICALS AND OTHER HAZARDOUS MATERIALS

NT-NU 24-HOUR SPILL REPORT LINE
TEL: (867) 920-8130
FAX: (867) 873-6924
EMAIL: spills@gov.nt.ca

REPORT LINE USE ONLY

REPORT NUMBER: 09.174

A	REPORT DATE: MONTH – DAY – YEAR: 04/30/09	REPORT TIME: 9:45 A.M	☑ ORIGINAL SPILL REPORT, OR ☐ UPDATE # ____ TO THE ORIGINAL SPILL REPORT	
B	OCCURRENCE DATE: MONTH – DAY – YEAR: 04/29/09	OCCURRENCE TIME: 7:15 P.M		
C	LAND USE PERMIT NUMBER (IF APPLICABLE)	WATER LICENCE NUMBER (IF APPLICABLE)		
D	GEOGRAPHIC PLACE NAME OR DISTANCE AND DIRECTION FROM NAMED LOCATION: Iqaluit Nunavut	REGION: ☐ NWT ☑ NUNAVUT ☐ ADJACENT JURISDICTION OR OCEAN		
E	LATITUDE: DEGREES ____ MINUTES ____ SECONDS ____	LONGITUDE: DEGREES ____ MINUTES ____ SECONDS ____		
F	RESPONSIBLE PARTY OR VESSEL NAME: City of Iqaluit	RESPONSIBLE PARTY ADDRESS OR OFFICE LOCATION: P.O Box 460 Iqaluit Nunavut		
G	ANY CONTRACTOR INVOLVED: N/A	CONTRACTOR ADDRESS OR OFFICE LOCATION		
H	PRODUCT SPILLED: Sewage	QUANTITY IN LITRES, KILOGRAMS OR CUBIC METRES: Approx 2000Litres	U.N. NUMBER	
	SECOND PRODUCT SPILLED (IF APPLICABLE): N/A	QUANTITY IN LITRES, KILOGRAMS OR CUBIC METRES	U.N. NUMBER	
I	SPILL SOURCE: Access Vault 500	SPILL CAUSE: Partial Collapse of Sewer Main	AREA OF CONTAMINATION IN SQUARE METRES: Approx.40 square metes	
J	FACTORS AFFECTING SPILL OR RECOVERY	DESCRIBE ANY ASSISTANCE REQUIRED: None	HAZARDS TO PERSONS, PROPERTY OR EQUIPMENT: None	

K — ADDITIONAL INFORMATION, COMMENTS, ACTIONS PROPOSED OR TAKEN TO CONTAIN, RECOVER OR DISPOSE OF SPILLED PRODUCT AND CONTAMINATED MATERIALS

Rob Hogan with Utilidor Dept. received a call from dispatch notifing him of a sewer spill from A.V 500 at 7;15 p.m April 29.Rob immediatly asked dispatch to page sewer truck driver on call to pump out the access vault and also called the road crew to clean the spill site.
Rob then called Pat Wolfe to assist with the blasting of the sewer main to clear it of blockage.
The road crew then cleaned up the contaminated materials to the sewage lagoon.
Suspect that the sewer main is partially collapsed and will be blasted 3 times a week to prevent any more spills til line can be dug up and repaired.

*Lead Changed to GN as per Catherine Mallet

L	REPORTED TO SPILL LINE BY: Rob Hogan	POSITION: Utilidor Maintainer	EMPLOYER: City of Iqaluit	LOCATION CALLING FROM: Utilidor Shop	TELEPHONE: 867 975 8509	
M	ANY ALTERNATE CONTACT: Steven Iyago	POSITION: Operations Super.	EMPLOYER: City of Iqaluit	ALTERNATE CONTACT LOCATION: Federal Garage	ALTERNATE TELEPHONE: 867 979 5653	

REPORT LINE USE ONLY

N	RECEIVED AT SPILL LINE BY	POSITION: STATION OPERATOR	EMPLOYER	LOCATION CALLED: YELLOWKNIFE, NT	REPORT LINE NUMBER: (867) 920-8130

LEAD AGENCY ☐ DC ☐ CCG ☐ GNWT ☑ GN ☐ ILA ☐ INAC ☐ NDI ☐ TC — SIGNIFICANCE ☐ MINOR ☐ MAJOR ☐ UNKNOWN — FILE STATUS ☐ OPEN ☐ CLOSED

AGENCY	CONTACT NAME	CONTACT TIME	REMARKS
LEAD AGENCY	Could Not Be Reached	05/01/09 10:35	
FIRST SUPPORT AGENCY			
SECOND SUPPORT AGENCY			
THIRD SUPPORT AGENCY			

PAGE 1 OF ____

Spill #4 - June 4, 2009

JUN-5-2009 12:07 FROM:ARCTIC ALARM STATION 8736924 TO:GNWT P:1/1

Northwest Territories Nunavut Canada

NT-NU SPILL REPORT

OIL, GASOLINE, CHEMICALS AND OTHER HAZARDOUS MATERIALS

NT-NU 24-HOUR SPILL REPORT LINE
TEL: (867) 920-8130
FAX: (867) 873-6924
EMAIL: spills@gov.nt.ca

REPORT LINE USE ONLY

A	REPORT DATE: MONTH – DAY – YEAR: 06-04-2009	REPORT TIME: 5:00 PM	☐ ORIGINAL SPILL REPORT, OR ☐ UPDATE # ___ TO THE ORIGINAL SPILL REPORT	REPORT NUMBER: 09 264
B	OCCURRENCE DATE: MONTH – DAY – YEAR: 06-04-2009	OCCURRENCE TIME: 2:00 PM		
C	LAND USE PERMIT NUMBER (IF APPLICABLE)	WATER LICENCE NUMBER (IF APPLICABLE): 3AM-IQA0611		09 · 264
D	GEOGRAPHIC PLACE NAME OR DISTANCE AND DIRECTION FROM NAMED LOCATION: City of Iqaluit	REGION: ☐ NWT ☒ NUNAVUT	☐ ADJACENT JURISDICTION OR OCEAN	
E	LATITUDE: DEGREES ___ MINUTES ___ SECONDS ___	LONGITUDE: DEGREES ___	MINUTES ___	SECONDS ___
F	RESPONSIBLE PARTY OR VESSEL NAME: City of Iqaluit	RESPONSIBLE PARTY ADDRESS OR OFFICE LOCATION: P.O. Box 460, Iqaluit, NU, X0A 1H0		
G	ANY CONTRACTOR INVOLVED	CONTRACTOR ADDRESS OR OFFICE LOCATION		
H	PRODUCT SPILLED: Wastewater	QUANTITY IN LITRES, KILOGRAMS OR CUBIC METRES: Estimate to be Provided	U.N. NUMBER	
	SECOND PRODUCT SPILLED (IF APPLICABLE)	QUANTITY IN LITRES, KILOGRAMS OR CUBIC METRES	U.N. NUMBER	
I	SPILL SOURCE: Landfill Retention Lagoon	SPILL CAUSE: Berm Breach	AREA OF CONTAMINATION IN SQUARE METRES	
J	FACTORS AFFECTING SPILL OR RECOVERY	DESCRIBE ANY ASSISTANCE REQUIRED: None	HAZARDS TO PERSONS, PROPERTY OR ENVIRONMENT: None	

K — ADDITIONAL INFORMATION, COMMENTS, ACTIONS PROPOSED OR TAKEN TO CONTAIN, RECOVER OR DISPOSE OF SPILLED PRODUCT AND CONTAMINATED MATERIALS

At 2:00 PM on June 4, 2009 our landfill operator notified me that the berm in the City Landfill Retention Pond breached and was discharging to the ditching system outside the landfill. The breach was caused by unanticipated snowmelt flowing into the pond. The affected area of the berm is inaccessible to equipment. Pumps are being setup to draw down the pond and transfer the water to an emergency detention pond across the road from the landfill. Samples are being taken and will be sent out for analysis. Visual inspection of the water indicates that it is primarily snowmelt and presents no health hazard.

✓ Lead Changed as per Robert End

L	REPORTED TO SPILL LINE BY: Bruce Rines	POSITION: Director Engineering	EMPLOYER: City of Iqaluit	LOCATION CALLING FROM: Iqaluit	TELEPHONE: 867-222-2968
M	ANY ALTERNATE CONTACT: Stephen Iyago	POSITION: Operations Manager	EMPLOYER: City of Iqaluit	ALTERNATE CONTACT LOCATION: Iqaluit	ALTERNATE TELEPHONE: 867-222-2965

REPORT LINE USE ONLY

N	RECEIVED AT SPILL LINE BY	POSITION: STA[illegible] OPERATOR	EMPLOYER	LOCATION CALLED: YELLOWKNIFE, NT	REPORT LINE NUMBER: (867) 920-8130

LEAD AGENCY ☐ EC ☐ CCG ☐ GNWT ☒ GN ☐ ILA ☐ INAC ☐ NEB ☐ TC

SIGNIFICANCE ☐ MINOR ☐ MAJOR ☐ UNKNOWN

FILE STATUS ☐ OPEN ☐ CLOSED

AGENCY	CONTACT NAME	CONTACT TIME	REMARKS
LEAD AGENCY	Nathan Richer	06/05/09 12:05	
FIRST SUPPORT AGENCY			
SECOND SUPPORT AGENCY			
THIRD SUPPORT AGENCY			

PAGE 1 OF ___

Spill #5 - September 4, 2009

Northwest Territories Nunavut Canada

NT-NU SPILL REPORT

OIL, GASOLINE, CHEMICALS AND OTHER HAZARDOUS MATERIALS

NT-NU 24-HOUR SPILL REPORT LINE
TEL: (867) 920-8130
FAX: (867) 873-6924
EMAIL: spills@gov.nt.ca

REPORT LINE USE ONLY

A	REPORT DATE: MONTH – DAY – YEAR: **September-10-2009**	REPORT TIME: **10:00AM**	☐ ORIGINAL SPILL REPORT, OR ☐ UPDATE # _____ TO THE ORIGINAL SPILL REPORT	REPORT NUMBER ____-____
B	OCCURRENCE DATE: MONTH – DAY – YEAR: **Between Sept-4-2009 and Sept-9-2009**	OCCURRENCE TIME		
C	LAND USE PERMIT NUMBER (IF APPLICABLE)	WATER LICENCE NUMBER (IF APPLICABLE)		
D	GEOGRAPHIC PLACE NAME OR DISTANCE AND DIRECTION FROM NAMED LOCATION: **West 40 Landfill**	REGION: ☐ NWT ☒ NUNAVUT ☐ ADJACENT JURISDICTION OR OCEAN		
E	LATITUDE: DEGREES MINUTES SECONDS	LONGITUDE: DEGREES MINUTES SECONDS		
F	RESPONSIBLE PARTY OR VESSEL NAME: **City of Iqaluit**	RESPONSIBLE PARTY ADDRESS OR OFFICE LOCATION: **P.O. Box 460 Iqaluit, Nu X0A 0H0**		
G	ANY CONTRACTOR INVOLVED	CONTRACTOR ADDRESS OR OFFICE LOCATION		
H	PRODUCT SPILLED: **Landfill runoff**	QUANTITY IN LITRES, KILOGRAMS OR CUBIC METRES: **Approximately 80,000 liters**	U.N. NUMBER	
	SECOND PRODUCT SPILLED (IF APPLICABLE)	QUANTITY IN LITRES, KILOGRAMS OR CUBIC METRES	U.N. NUMBER	
I	SPILL SOURCE: **Culvert**	SPILL CAUSE: **Break in culvert**	AREA OF CONTAMINATION IN SQUARE METRES: **371.6 m^2**	
J	FACTORS AFFECTING SPILL OR RECOVERY	DESCRIBE ANY ASSISTANCE REQUIRED	HAZARDS TO PERSONS, PROPERTY OR ENVIRONMENT	

K — ADDITIONAL INFORMATION, COMMENTS, ACTIONS PROPOSED OR TAKEN TO CONTAIN, RECOVER OR DISPOSE OF SPILLED PRODUCT AND CONTAMINATED MATERIALS:

The spill is contained and is being pumped to our retention pond. INAC and Department of Environment were contacted and made aware of the spill. The spill was called in September 9, 2009 at 4:00PM.

L	REPORTED TO SPILL LINE BY: **Paul Clow**	POSITION: **Project Officer**	EMPLOYER: **City of Iqaluit**	LOCATION CALLING FROM: **Building 2425**	TELEPHONE: **867-979-6363**
M	ANY ALTERNATE CONTACT	POSITION	EMPLOYER	ALTERNATE CONTACT LOCATION	ALTERNATE TELEPHONE

REPORT LINE USE ONLY

N	RECEIVED AT SPILL LINE BY	POSITION: STATION OPERATOR	EMPLOYER	LOCATION CALLED: YELLOWKNIFE, NT	REPORT LINE NUMBER: (867) 920-8130

LEAD AGENCY ☐ EC ☐ CCG ☐ GNWT ☐ GN ☐ ILA ☐ INAC ☐ NEB ☐ TC | SIGNIFICANCE ☐ MINOR ☐ MAJOR ☐ UNKNOWN | FILE STATUS ☐ OPEN ☐ CLOSED

AGENCY	CONTACT NAME	CONTACT TIME	REMARKS
LEAD AGENCY			
FIRST SUPPORT AGENCY			
SECOND SUPPORT AGENCY			
THIRD SUPPORT AGENCY			

PAGE 1 OF _____

Spill #6 - September 15, 2009

Northwest Territories Nunavut Canada

NT-NU SPILL REPORT

OIL, GASOLINE, CHEMICALS AND OTHER HAZARDOUS MATERIALS

NT-NU 24-HOUR SPILL REPORT LINE
TEL: (867) 920-8130
FAX: (867) 873-6924
EMAIL: spills@gov.nt.ca

REPORT LINE USE ONLY

A	REPORT DATE: MONTH – DAY – YEAR: September-18-2009	REPORT TIME: 11:30 AM ET.	☐ ORIGINAL SPILL REPORT, OR ☐ UPDATE # _____ TO THE ORIGINAL SPILL REPORT	REPORT NUMBER ____-____
B	OCCURRENCE DATE: MONTH – DAY – YEAR: September-15-2009	OCCURRENCE TIME: 2:30PM		
C	LAND USE PERMIT NUMBER (IF APPLICABLE)	WATER LICENCE NUMBER (IF APPLICABLE)		
D	GEOGRAPHIC PLACE NAME OR DISTANCE AND DIRECTION FROM NAMED LOCATION: Iqaluit Crushing Site	REGION ☐ NWT ☐ NUNAVUT ☐ ADJACENT JURISDICTION OR OCEAN		
E	LATITUDE DEGREES MINUTES SECONDS	LONGITUDE DEGREES MINUTES SECONDS		
F	RESPONSIBLE PARTY OR VESSEL NAME: City of Iqaluit	RESPONSIBLE PARTY ADDRESS OR OFFICE LOCATION		
G	ANY CONTRACTOR INVOLVED: Gestion Logistique A.C. Inc	CONTRACTOR ADDRESS OR OFFICE LOCATION		
H	PRODUCT SPILLED: Diesel	QUANTITY IN LITRES, KILOGRAMS OR CUBIC METRES: 120 liters	U.N. NUMBER	
	SECOND PRODUCT SPILLED (IF APPLICABLE)	QUANTITY IN LITRES, KILOGRAMS OR CUBIC METRES	U.N. NUMBER	
I	SPILL SOURCE: Old home heating tank	SPILL CAUSE: Crushing	AREA OF CONTAMINATION IN SQUARE METRES	
J	FACTORS AFFECTING SPILL OR RECOVERY	DESCRIBE ANY ASSISTANCE REQUIRED	HAZARDS TO PERSONS, PROPERTY OR ENVIRONMENT	

K — ADDITIONAL INFORMATION, COMMENTS, ACTIONS PROPOSED OR TAKEN TO CONTAIN, RECOVER OR DISPOSE OF SPILLED PRODUCT AND CONTAMINATED MATERIALS

The site that was affected was a previously contaminated site. The soil in the area of the spill is going to be removed by Nunetta Environmental and soil samples have been conducted. The tanks that are leaking are being wrapped in a liner and the contractor is to remove the crushed tanks.The Department of environment was notified as well.

L	REPORTED TO SPILL LINE BY: Paul Clow	POSITION: Project Officer	EMPLOYER: City of Iqaluit	LOCATION CALLING FROM: Building 2425	TELEPHONE: 876-979-6363
M	ANY ALTERNATE CONTACT: Chris Callahan	POSITION: Public Works Director	EMPLOYER: City of Iqaluit	ALTERNATE CONTACT LOCATION: Building 2425	ALTERNATE TELEPHONE: 867-222-2863

REPORT LINE USE ONLY

N	RECEIVED AT SPILL LINE BY	POSITION: STATION OPERATOR	EMPLOYER	LOCATION CALLED: YELLOWKNIFE, NT	REPORT LINE NUMBER: (867) 920-8130

LEAD AGENCY ☐ EC ☐ CCG ☐ GNWT ☐ GN ☐ ILA ☐ INAC ☐ NEB ☐ TC — SIGNIFICANCE ☐ MINOR ☐ MAJOR ☐ UNKNOWN — FILE STATUS ☐ OPEN ☐ CLOSED

AGENCY	CONTACT NAME	CONTACT TIME	REMARKS
LEAD AGENCY			
FIRST SUPPORT AGENCY			
SECOND SUPPORT AGENCY			
THIRD SUPPORT AGENCY			

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