

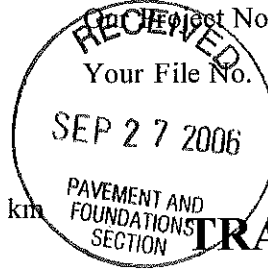
GEOCRES No:  
 31C-172-1  
 300 Water Street  
 Whitby, Ontario L1N 9J2  
 Telephone: (905) 668-9363 Fax: (905) 665-4867  
 E-Mail: tsh@tsh.ca

**TO** Tony Sangiuliano, P. Eng.  
 Foundation Engineer, Foundation Group  
 Ministry of Transportation  
 1201 Wilson Avenue  
 Bldg C, 2<sup>nd</sup> Floor, Room 223  
 Downsview, ON M3M 1J8

Date September 27, 2006

Project No. 42-91065

Your File No. \_\_\_\_\_



**PROJECT** Highway 62 Preliminary Design Study, from 5.3 km  
 north of Cleveland Road to 300 south of County  
 Road 620, including Beaver Creek Bridge  
 Replacement  
 G.W.P. 66-99-00 / 248-99-00

**TRANSMITTAL**

We are sending the following \_\_\_\_\_

| Qty | Drawing No. | Rev. | Title  |
|-----|-------------|------|--|
| 1   |             |      | Final Preliminary Foundation Investigation and Design Report for Highway 62 Beaver Creek Bridge Replacement, dated August 2006 |
| 1   |             |      | Associated QC Documentation  |
|     |             |      |  |
|     |             |      |  |
|     |             |      |  |
|     |             |      |  |
|     |             |      |  |
|     |             |      |  |

|   |  |                      |
|---|--|----------------------|
| x | For Your Information/Action                      | Reviewed             |
|   | For Your Approval and Return                     | Reviewed as Modified |
|   | For Use With Notice of Change/Record or Revision | Revise and Resubmit  |
|   | As Requested                                     | Not Reviewed         |

Remarks

Tony:  
 Please find enclosed the above noted report for your review.

Per Brenda Jamieson, P.Eng.  
 Consultant Project Manager

**JACQUES WHITFORD**

**SUPPLEMENTARY SPECIALTY QUALITY CONTROL PLAN**

**Assignment 4005-A-000310**

**Highway 62, Beaver Creek Bridge**

Foundations Engineering

Submitted by:

F. Griffiths, Ph.D., P.Eng.  
Jacques, Whitford and Associates Limited  
Suite 200, 2781 Lancaster Road  
Ottawa, ON K1B 1A7  
call: 613-738-0708 x 239  
fax: 613-738-0721  
email: [fgriffit@jacqueswhitford.com](mailto:fgriffit@jacqueswhitford.com)

September 30, 2003

Project      ONO 11686

## **1. Introduction**

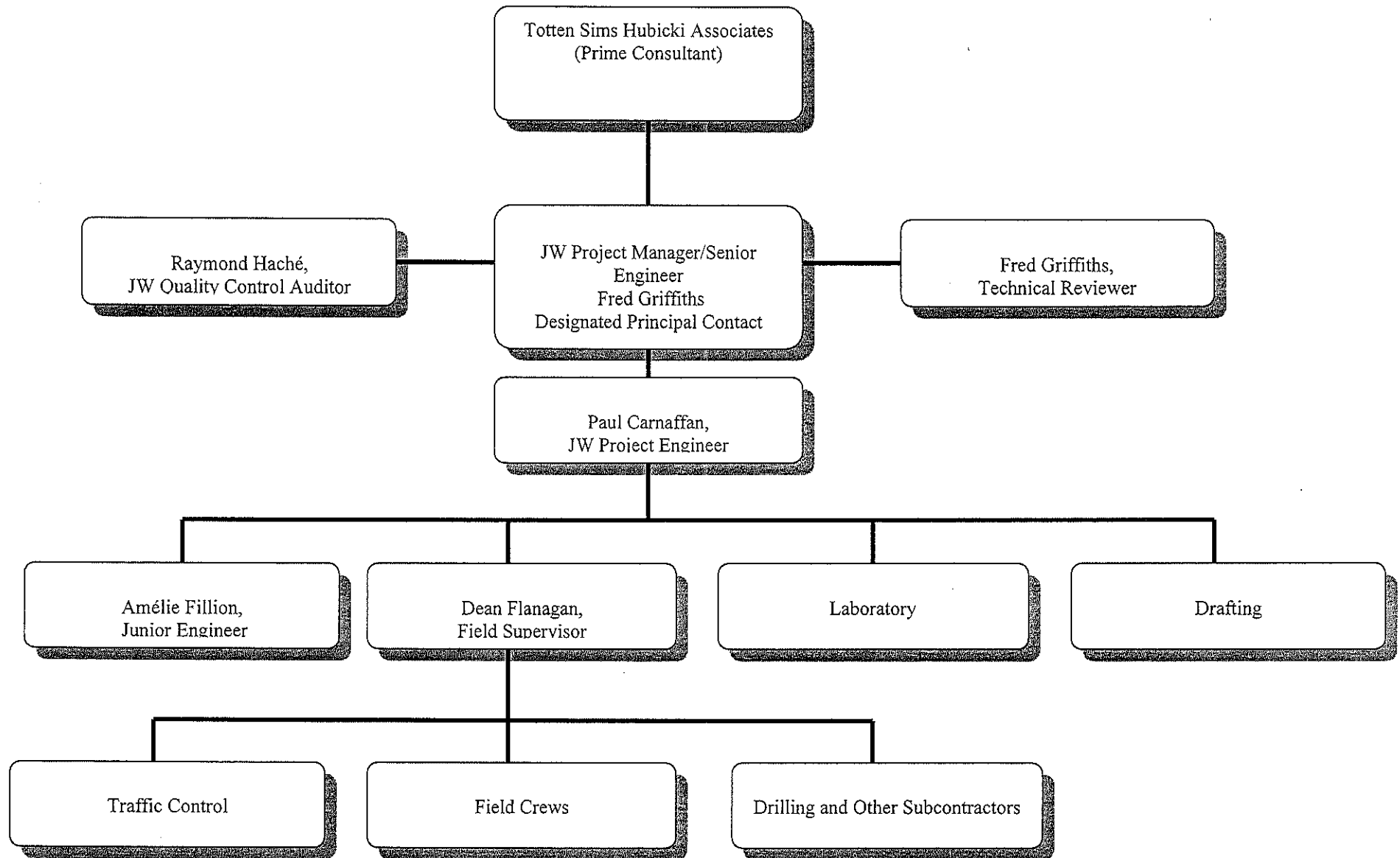
Jacques, Whitford (JW) has prepared this Supplementary Specialty Quality Control Plan for Foundations Engineering for use on Ministry of Transportation of Ontario (MTO) Assignment 4005-A-000310 in accordance with the requirements listed in the Notice to Registered Consultants of October 11, 2001.

The Supplementary Specialty Plan represents one of three components in the MTO Quality Control process as follows:

- Generic Core Plan
- Generic Category Plans
- Supplementary Specialty Plan

The first two components of the plan are registered on RAQS and will stand as generic plans for Jacques, Whitford. The third component has been developed to meet the specific requirements of this assignment.

Jacques Whitford has assembled a highly skilled team of professionals to carry out this assignment. The team has worked together on numerous projects for MTO in the past, thus interactions and reporting between team members is efficient and timely. The organization chart on the following page presents the responsibility and reporting relationships.





## 2. Process Control

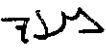
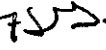


| #   | Phase / Task                 | Methodology<br>(and staff member)   | Deliverables               | Reference<br>Manuals   | Independent Technical Review |               | QC Staff  | Completion<br>Date |
|-----|------------------------------|---|----------------------------|--|------------------------------|---------------|-----------|--------------------|
|     |                              |   |                            |  | Procedure                    | Documentation |           |                    |
| 1.0 | PROJECT START UP             |   |                            |  |                              |               |           |                    |
| 1.1 | Familiarization              | review project documentation including structure (bridge/culvert), embankment, survey, environmental aspects (PC) | N/A                        | Terms of Reference   | review checklist             | initials      | FG<br>7JS | Oct. 17, 2003      |
|     |                              | review applicable Foundation Investigation and Design Reports and geoscience reports (PC)                         | updated investigation plan | reference libraries including MTO Foundation Library (GEOCRES) | review updated plan          | initials      | FG<br>7JS |                    |
|     |                              |   |                            |  | Technical Review No. 1       | memo          | FG<br>7JS |                    |
| 1.2 | Clearances and Notifications | notify MTO District and Foundations Group of schedule (PC)  |                            |  | review checklist             | initials      | FG<br>7JS | Oct. 17, 2003      |
|     |                              | notify MOL, as required (PC)  | MOL Notice                 | MOL Regulations  |                              | initials      | FG<br>NA  |                    |
|     |                              | arrange for clearances (PC)   |                            |  |                              | initials      | EG<br>7JS |                    |
|     |                              | arrange for permission to enter private property (PC)   | PTE Records                |  |                              | initials      | FG<br>NA  |                    |
|     |                              | establish Health and Safety Issues (PC)   | Health & Safety Plan       | OHS Act  | review Health & Safety Plan  | initial plan  | FG<br>7JS |                    |
|     |                              | establish traffic control requirements (DF)   | Traffic Control Plan       | Book 7, Temporary Conditions, Ontario Traffic Manual           | review Traffic Control Plan  | initial plan  | FG<br>7JS |                    |

| #                   | Phase / Task        | Methodology<br>(and Staff Member)   | Deliverables                   | Reference<br>Manuals    | Independent Technical Review |                    | QC STAFF | Completion<br>Date |
|---------------------|---------------------|---|--------------------------------|-------------------------|------------------------------|--------------------|----------|--------------------|
|                     |                     |   |                                |                         | Procedure                    | Documentation      |          |                    |
| 2.0 DATA COLLECTION |                     |   |                                |                         |                              |                    |          |                    |
| 2.1                 | Site Inspection     | layout (DF)   |                                | Terms of Reference      | review checklist             | initials <i>PC</i> | PC       | <i>Nov 28/05</i>   |
|                     |                     | conduct utility clearances for testholes (DF)   | Locate records                 |                         |                              | initials <i>PC</i> | PC       | <i>Nov 17/05</i>   |
|                     |                     | inspect site and critically assess existing surface conditions, structures and embankments, drainage (DF) | Update site Investigation Plan |                         | review updated Plan          | initials <i>PC</i> | PC       | <i>Oct 24/03</i>   |
|                     |                     | select appropriate method for testhole advancement (DF)   |                                |                         |                              | initials <i>PC</i> | PC       | Oct. 24, 2003      |
| 2.2                 | Field Investigation | prestart meeting to review Health & Safety, Site Investigation and Traffic Control Plans (DF)             | meeting minutes                | Terms of Reference      | review checklist             | initials <i>PC</i> | PC       | <i>Nov 24/05</i>   |
|                     |                     | traffic control set up (DF)   |                                |                         |                              | initials <i>PC</i> | PC       | <i>Nov 24/05</i>   |
|                     |                     | advance testholes per number, location, depth requirements (DF)   |                                |                         |                              | initials <i>PC</i> | PC       | <i>Jan 17/06</i>   |
|                     |                     | conduct sampling of testholes per frequency and method requirements (DF)                                  |                                | ASTM protocols          |                              | initials <i>PC</i> | PC       | <i>Jan 17/06</i>   |
|                     |                     | install and monitor standpipes and piezometers (DF)   | water levels                   |                         |                              | initials <i>PC</i> | PC       | <i>Jan 17/06</i>   |
|                     |                     | ensure integrity of samples through appropriate transportation and handling procedures (DF)               | samples                        | ASTM & MTO LS protocols |                              | initials <i>PC</i> | PC       | <i>Jan 17/06</i>   |
|                     |                     | conduct in-situ testing (DF)  | test results                   | MTO & ASTM protocols    |                              | initials <i>PC</i> | PC       | <i>Jan 17/06</i>   |

|                                |             |   |   |  |  |                        |              |  |
|--------------------------------|-------------|---|---|--|--|------------------------|--------------|--|
|                                |             | monitor drilling operations and field investigation results (DF)        | borehole records                                  | MTO Soil Classification Manual                         |  | initials PC            | PC           | Jan 17/06                              |
|                                |             | survey location of testholes (DF)                                       | survey data                                       |  | check calculations                                       | initials PC            | PC           | Jan 31/06                              |
|                                |             | abandon testholes and restore site (DF)                                 | Artesian Condition Sealing Report (if applicable) | MTO Interim Guidelines for Borehole Abandonment        | review Artesian Condition Sealing Report (if applicable) | initials N/A           | PC           | —                                      |
|                                |             |   | Property Damage Report (if applicable)            |  | review Property Damage Report (if applicable)            | initials N/A           | PC           | —                                      |
|                                |             | ensure sufficiency of field investigation for project purpose (DF)      |   |  |  | initials PC            | PC           | <del>Oct 31, 2005</del><br>Jan 17/06   |
| 2.3                            | Lab Testing | inspect samples and confirm field description, select test program (AF) | modified borehole logs                            | Terms of Reference MTO Soil Classification Manual      | review checklist   | initials PC            | PC           | Dec 05/06                              |
|                                |             | conduct number, type of tests per requirements (Lab)                    | test results                                      | MTO LS and ASTM protocols, JW Testing and QC Standards | ensure sufficiency of lab testing, check lab results     | initial lab results PC | PC           | Jan 31/06                              |
|                                |             | confirm field descriptions based on lab testing (AF)                    |   |  |  | initials PC            | PC           | Jan 31/06                              |
|                                |             | Foundation Lab meets requirements specified in RAQS registration (PC)   | modified borehole logs                            |  |  | initials TUX           | FG           | <del>Nov 7, 2003</del><br>Nov. 7, 2003 |
| MILESTONE QUALITY REVIEW NO. 1 |             |   | Audit Memo  |  | Review Procedures/Checklists                             |                        | Memo RH      |  |
|                                |             |   |   |  |  |                        | Nov. 7, 2003 |  |

| #                                     | Phase / Task  | Methodology<br>(and Staff Member)                                   | Deliverables        | Reference<br>Manuals | Independent Technical Review |               | QC Staff  | Completion<br>Date   |
|---------------------------------------|---|---|---------------------|----------------------|------------------------------|---------------|---|--|
|                                       |   |   |                     |                      | Procedure                    | Documentation |   |  |
| 3.0 EXTERNAL STAKEHOLDER CONSULTATION |   |   |                     |                      |                              |               |   |  |
| 3.1                                   | Consultation<br>(with MTO,<br>other<br>jurisdictions,<br>public, project<br>team) | submit correspondence (PC)<br><br>attend meetings, as required (PC) | minutes,<br>records | Terms of Reference   | review checklist             | initials      | FG<br> | Nov. 14, 2003<br><br>02/21/06 |

[illegible]

|                                |   |   |            |  |   |                      |  |   |
|--------------------------------|---|---|------------|--|---|----------------------|--|---|
|                                |   |   |            |  | Technical<br>Review 3                         | memo                 | Technical<br>Reviewer  |   |
| 4.2                            | Conceptual<br>Foundation<br>Design<br>Selection | correspondence / meetings to evaluate<br>alternatives, as required (PC) | N/A        | Terms of<br>Reference, Codes<br>(Highway Bridge<br>Design Code in<br>effect at MTO),<br>Manuals, Texts | review checklist<br><br>Technical<br>Review 4 | initials<br><br>memo | FG <br><br>FG  | <br>02/21/06<br><br>Nov. 21, 2003<br><br>02/21/06 |
| MILESTONE QUALITY REVIEW NO. 2 |   |   | Audit Memo |  | Review Procedures/<br>Checklists              |                      | Memo RH  | Nov. 21, 2003   |

| #                     | Phase / Task | Methodology<br>(and Staff Member)  | Deliverables   | Reference<br>Manuals  | Independent Technical Review |               | QC Staff      | Completion<br>Date        |
|-----------------------|--------------|--|--|---|------------------------------|---------------|---------------|---------------------------|
|                       |              |  |  |   | Procedure                    | Documentation |               |                           |
| 5.0 TECHNICAL REPORTS |              |  |  |   |                              |               |               |                           |
| 5.1                   | Final Report | update analysis and design to reflect input received during consultation   | FINAL Preliminary Foundation Investigation and Design Report | Terms of Reference, Codes (Highway Bridge Design Code in effect at MTO), Manuals, Texts | review Checklist             | initials      | FG <i>FLS</i> |                           |
|                       |              |  |  |   | review calc's                | initials      | FG <i>FLS</i> |                           |
|                       |              | report split: Investigation & Design   |  |   | initials                     | FG <i>FLS</i> |               |                           |
|                       |              | report contains appropriate content & rec's  |  |   | initials                     | FG <i>FLS</i> |               |                           |
|                       |              | report contains rec's for preferred alternative designs for temp, interim & permanent cases, red-flag issues & specs |  |   | initials                     | FG <i>FLS</i> |               |                           |
|                       |              |  |  |   | initials                     | FG<br>NA      |               |                           |
|                       |              | report signed and stamped by 2 P.Eng's (designated Principal Contact)  |  |   | signatures                   | FG <i>FLS</i> |               |                           |
|                       |              | Technical Review No. 5   |  |   | memo                         | FG <i>FLS</i> |               |                           |
|                       |              |  |  |   |                              |               |               | 06/08/22<br>Dec. 12, 2003 |

| #                              | Phase / Task             | Methodology<br>(and Staff Member)                                    | Deliverables | Reference<br>Manuals  | Independent Technical Review                          |                                  | QC Staff                            | Completion<br>Date                  |           |
|--------------------------------|--------------------------|--|--------------|---|---|----------------------------------|-------------------------------------|-------------------------------------|-----------|
|                                |                          |  |              |   | Procedure   | Documentation                    |                                     |                                     |           |
| 6.0                            | PRELIMINARY DESIGN       |  |              |   |   |                                  |                                     |                                     |           |
| 6.1                            | Preliminary Design Check | consultation with project team including Structural Engineers (PC)   |              | Terms of Reference, Codes (Highway Bridge Design Code in effect at MTO), Manuals, Texts | review Checklist<br><br><i>Technical Review No. 6</i> | initials<br><br><i>memo</i>      | FG <i>755</i><br><br>FG <i>755.</i> |                                     |           |
| 6.2                            | Staging / Detours        | consultation with Project Team (PC)                                  |              | Terms of Reference, Codes (Highway Bridge Design Code in effect at MTO), Manuals, Texts | review Checklist<br><br><i>Technical Review No. 6</i> | initials<br><br><i>memo</i>      | FG <i>755</i><br><br>FG <i>755</i>  |                                     |           |
| 6.3                            | Constructability Review  | consultation with Project Team including Construction Engineers (PC) |              | Terms of Reference, Codes (Highway Bridge Design Code in effect at MTO), Manuals, Texts | review Checklist<br><br><i>Technical Review No. 6</i> | initials<br><br><i>memo</i>      | FG <i>755</i><br><br>FG <i>755</i>  | <i>May, 2004</i><br><i>06/08/22</i> |           |
| MILESTONE QUALITY REVIEW NO. 3 |                          |  |              |   | Audit Memo  | Review Procedures/<br>Checklists | Memo                                | RH                                  | May, 2004 |

### **3. Internal Reviews and Checking**

#### **3.1 Project Technical Reviews / Acceptance**

Technical Reviews and Acceptance Checking will be carried out by JW during the course of this Foundations Engineering Assignment. The sequence of activities provided in the Process Control tables will be used in order to establish technical accuracy of the services and conformance to the Technical Standards and Specifications.

In addition, JW will carry out independent technical reviews for approval/acceptance of the critical tasks, as required. The technical reviews will be carried out by Senior Engineers licensed to practice in the Province of Ontario and familiar with Foundations Engineering projects.

The checks will provide traceable documentation in:

- Methodology or approach to doing the work
- Policies, Procedures, Standards and Specifications used.
- Accuracy and completeness of data, reports, measurements and calculations

The Technical Reviewer will sign and stamp the final report.

Technical reviews will occur at the following stages:

|                        |   |
|------------------------|---|
| Technical Review No. 1 | Review of Field Investigation Plan              |
| Technical Review No. 2 | Review of Site Investigation Documentation      |
| Technical Review No. 3 | Review of Draft Report                          |
| Technical Review No. 4 | Review of Foundation Design Selection           |
| Technical Review No. 5 | Review of Final Report                          |
| Technical Review No. 6 | Review of Preliminary Design Stage Consultation |

#### **3.2 Milestone Quality Reviews**

This section details the Milestone Quality Reviews to be undertaken by JW throughout the duration of the assignment. The Quality Reviews are independent examinations to determine whether the quality measures and related results comply with the quality objectives of the agreed QC Plan. The comparison is therefore between the actually recorded activities against those specified in the plan.

Quality Reviews will occur at the following milestones during Foundations Engineering Assignments:

|                      |   |
|----------------------|---|
| Quality Review No. 1 | Completion of Field and Laboratory Investigations |
| Quality Review No. 2 | Completion of Draft Report                        |
| Quality Review No. 3 | Completion of Assignment                          |

The Quality Reviews will be carried out by a Senior Staff Member or Manager with sufficient authority to impact the performance of the services and enable a successful implementation of the Plan.

JW will conduct all Milestone Quality Reviews, at the milestone deliverable completions or whenever there are perceived deviations from the Quality Control Plan.








The Quality Review findings will be documented in Quality Reports provided solely for that purpose. The Quality Review may disclose non-conformities to the Quality Control Plan. The Quality Control Auditor will notify the Project Manager of the non-conformities. The Project Manager will take action to resolve the non-conformities in a timely manner. These non-conformities, their resolution and corrective action shall also be recorded in the Quality Review Report(s). The Project Manager will provide the Ministry with the Quality Review Reports within 5 business days after each Quality Review completion. These Reports will also be easily retrievable and available for perusal by MTO staff or its agents upon request.

#### **4. Quality Control Records**

The following pages provide the Technical and Quality review checklists which will be utilized for reporting results of the reviews. These documents will be forwarded to MTO within five business days of the completion of a review. Copies will be also forwarded to the JW Project Manager. The originals will be kept within the Quality Control File for the assignment.

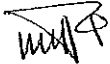


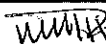
**Technical Review Memos****Technical Review No. 1****Review of Field Investigation Plan**

The Technical Reviewer will examine the field investigation plan with respect to methodology, procedures and standards to check for conformance with the Terms of Reference, suitability to existing conditions and project requirements, and to ensure that the proposed work will effectively meet the project objectives given the construction history.

| Field Investigation Plan          | Accordance   | Required Actions and Documentation |
|-----------------------------------|--|------------------------------------|
| Foundation Elements               |  02-21-06 |                                    |
| Approach Fills and Embankments    |  02-21-06 |                                    |
| In-situ Testing                   |  u        |                                    |
| Sampling Procedures               |  u        |                                    |
| Groundwater                       |  u        |                                    |
| Corrosion Resistance              |  u        |                                    |
| Surveys<br>(vertical, horizontal) |  u        |                                    |










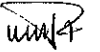

**Technical Review No. 2      Site Investigation Documentation**

The Technical Reviewer will examine the summarized field and laboratory information to check for accuracy and completeness of data and conformance with the Terms of Reference and project requirements.

| Field Information  | Accordance  | Required Actions and Documentation |
|--|---|------------------------------------|
| Testhole Logs<br>- Fills<br>- Cohesive<br>- Non-cohesive<br>- Bedrock<br>- Groundwater | <br>02-21-06 |                                    |
| Surveys  | <br>02-21-06 |                                    |
| Borehole Location Plan   | <br>02-21-06 |                                    |
| Stratigraphic Plot   | <br>02-21-06 |                                    |
| Laboratory Information   | Accordance  | Required Actions and Documentation |
| Soils  | 711.  |                                    |
| Bedrock  | NA  |                                    |
| Corrosion Resistance   | NA  |                                    |


**Technical Review No. 3      Review of Draft Preliminary Report**

The following items will be reviewed within the foundation file and the Draft Preliminary Foundation Report to document methodology, standards, accuracy of data and calculations in comparison to the Terms of Reference and project requirements.

| Foundation Design File  | Accordance   | Required Actions and Documentation |
|---|--|------------------------------------|
| Foundation Design   |  02-21-06 |                                    |
| Earth Pressure Design   |  u        |                                    |
| Embankment Design/Stability   |  u        |                                    |
| Dewatering  |  u        |                                    |
| Erosion Protection  |  u        |                                    |
| Frost Protection  |  u        |                                    |
| Construction Concerns   |  u        |                                    |
| Cost Assessment   |  u        |                                    |
| <b>Draft Preliminary Foundation Report</b>  |  u        |                                    |
| Foundation Investigation <ul style="list-style-type: none"> <li>- Site Description</li> <li>- Investigation Procedure</li> <li>- Description of subsurface Conditions</li> <li>- Borehole Location Plan</li> <li>- Stratigraphic Plot</li> <li>- Borehole Records</li> <li>- Testing Results</li> </ul>   |  u      |                                    |
| Foundation Design <ul style="list-style-type: none"> <li>- Proposed Development</li> <li>- Geotechnical Assessment</li> <li>- Proposed Alternatives</li> <li>- Alternative Comparison</li> <li>- Recommended Alternative</li> <li>- Design Recommendations <ul style="list-style-type: none"> <li>• Structure Foundation</li> <li>• Earth Pressure</li> <li>• Embankments</li> <li>• Dewatering</li> <li>• Erosion Protection</li> <li>• Frost Protection</li> <li>• Construction Concerns</li> </ul> </li> <li>- Red Flag Issues</li> <li>- Specifications</li> <li>- Details</li> </ul> |  u      |                                    |




**Technical Review No. 4****Foundation Design Selection**

The following items will be reviewed to ensure that adequate consultation has occurred with the appropriate team members prior to selection of final design.

| Foundation Design Selection   | Accordance   | Required Actions and Documentation |
|---|--|------------------------------------|
| Consultation with<br>- MTO Foundations Group<br>- Structural Engineer<br>- Construction<br>- Planning and Design<br>- Pavement/Geotechnical Section |  02-21-06 |                                    |

**Technical Review No. 5****Review of Final Preliminary Report**

The following items will be reviewed for accuracy and completeness within the final Preliminary Foundation Report in comparison to the Terms of Reference and Project Requirements as well as the comments received from the prime consultant and other project team members.

| Final Preliminary Foundation Report   | Accordance   | Required Actions and Documentation |
|---|--|------------------------------------|
| Review with MTO Foundation Groups' comments   |  06/08/18 |                                    |
| Review with prime consultant comments   |  06/08/18 |                                    |
| Review with team comments<br>- Pavement/Geotechnical Section<br>- Planning and Design<br>- Construction<br>- Structural | NA.  |                                    |
| Review with RFP   |  06/08/18 |                                    |

**Technical Review No. 6****Preliminary Design Stage Consultation**

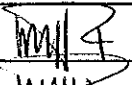
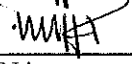
All input to the design team will be reviewed by the Technical Reviewer during this stage of the project.

| Final Design and Tender Preparatoin   | Accordance   | Required Actions and Documentation |
|---------------------------------------|--------------|------------------------------------|
| Consultation with Structural Engineer | FLM 02/08/18 |                                    |
| Consultation concerning Staging       | FLM 06/08/18 |                                    |
| Constructability Review               | —            |                                    |

## Quality Review Memos





### Quality Review No. 1      Completion of Field and Laboratory Investigations

The QC Auditor will carry out a review of the project to this point to ensure that the process control procedures established above have been appropriately applied and documented. In addition, the QC Auditor will confirm that the Technical Reviews required to this stage have been completed and filed as required. Finally, the QC Auditor will review the occurrence and disposition of any deviations or non-conformities. The following checklist will be included with Quality Review Memo No.1:

| Item                                      | Accordance  | Suggested Actions and Documentation |
|---|---|-------------------------------------|
| Adherence to Process Control              |  | 02-21-06                            |
| Completion of Technical Review Memo No. 1 |  | 02-21-06                            |
| Deviations or Non-Conformities            | NA  |                                     |

**Quality Review No. 2      Completion of Draft Report**

The QC Auditor will carry out a review of the project to this point to ensure that the process control procedures established above have been appropriately applied and documented. In addition, the QC Auditor will confirm that the Technical Reviews required to this stage have been completed and filed as required. Finally, the QC Auditor will review the occurrence and disposition of any deviations or non-conformities. The following checklist will be included with Quality Review Memo No.2:

| Item                                      | Accordance  | Suggested Actions and Documentation |
|---|---|-------------------------------------|
| Adherence to Process Control              |  | 02-21-06                            |
| Completion of Technical Review Memo No. 2 |  | 02-21-06                            |
| Completion of Technical Review Memo No. 3 |  | 02-21-06                            |
| Completion of Technical Review Memo No. 4 |  | 02-21-06                            |
| Deviations or Non-Conformities            | NA  |                                     |

**Quality Review No. 3      Completion of Assignment**

Upon completion of the assignment, the QC Auditor will carry out a review of the project to ensure that the process control procedures established above have been appropriately applied and documented. In addition, the QC Auditor will confirm that the Technical Reviews required to this stage have been completed and filed as required. The QC Auditor will review the occurrence and disposition of any deviations or non-conformities. In addition, the QC Auditor will provide suggestions on possible improvements for implementation on the next assignment. The following checklist will be included with Quality Review Memo No. 3.

| Item                                      | Accordance       | Suggested Actions and Documentation |
|---|------------------|-------------------------------------|
| Adherence to Process Control              | <del>WNA</del> 4 | 06/09/01                            |
| Completion of Technical Review Memo No. 5 | <del>WNA</del> 4 | 06/09/01                            |
| Completion of Technical Review Memo No. 6 | <del>WNA</del> 4 | 06/09/01                            |
| Deviations or Non-Conformities            | NA               |                                     |
| Possible Improvements                     | NA               |                                     |

## **Sangiuliano, Tony (MTO)**

---

**From:** Sangiuliano, Tony (MTO)  
**Sent:** September 29, 2006 8:32 AM  
**To:** Stewart, Angela (MTO)  
**Subject:** Final Preliminary Foundation Investigation and Design Report - Beaver Creek Replacement - Hwy 62 - WP 248-99-00

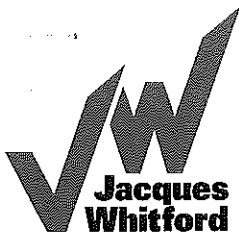
Angela:

We have reviewed the final Foundation Investigation and Design Report for the Beaver Creek Bridge Replacement. The report was received under TSH's transmittal dated September 27, 2006 with a letter from Jacques Whitford dated August 21, 2006 addressing our comments contained in our memorandum dated March 30, 2006. The report was also accompanied by JWL's Supplementary Specialty Quality Control Plan.

In general, the revised report and JWL's letter address our comments. The only clarification that should be requested from the Consultant is regarding the Axial Resistance of the driven piles to the glacial till. The report recommends a factored axial resistance at ULS of 600 kN and an axial resistance at SLS of 500 kN. On MTO projects, we have typically used values of 1600 kN and 1800 kN at SLS and ULS respectively for end bearing piles driven to very dense glacial tills.

As discussed previously, a detailed foundation investigation and design will be required to confirm the end bearing materials for the driven piles at the site.

Tony



Engineering,  
Scientific,  
Planning and  
Management  
Consultants

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Canada K1B 1A7

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[www.jacqueswhitford.com](http://www.jacqueswhitford.com)

August 21, 2006

Project No. NO11686

Ms. Brenda Jamieson  
Totten Sims Hubicki  
300 Water Street  
Whitby ON L1N 9J2

Dear Ms. Jamieson:

**Re: Response to Comments  
Draft Preliminary Foundation Investigation Report  
Hwy 62 Beaver Creek Bridge Replacement, WP 66-99-00**

Jacques Whitford prepared a Draft Preliminary Foundation Investigation and Design Report for the proposed Bridge Replacement on Highway 62. The report (Number ONO11686) was dated February 21, 2006. Comments have been received from the Ministry of Transportation of Ontario concerning the report. The present letter provides our responses to the Ministry comments with recommendations on approaches for the final report.

We have reproduced the Ministry comments in normal font in the following sections and have provided our response in *italics*.

#### **GENERAL COMMENTS**

- The Foundation Engineering Terms of Reference explicitly require that "Boreholes shall extend to refusal as defined by material for which Standard Penetration Tests exceeding 100 blows per 0.3 m" at each abutment location. The Consultant has not satisfied the Foundation Engineering Terms of Reference in this regard. Additional fieldwork is necessary to confirm refusal to facilitate the foundation design at the abutment locations. *Please see reply to comment on Investigation Procedure below.*
- Clarification should also be provided that a separate detour structure will not be constructed. *A sentence to this effect will be added to Section 6.1 of the final report.* ✓
- The report should be completed on single sided paper rather than double sided. *The final report will be presented on single sided paper.* ✓

#### **Section 2.0 - Site Description and Geology**

- A description of the performance of the structure foundation and approach embankments should be included in the report. Is there any evidence of structural distress, settlement, instability, etc? *No evidence of embankment settlement or instability for the existing structure was noted in the field. Additional text will be provided within Section 2.0. Photographs will be added to Appendix C.* ✓

**Jacques  
Whitford**

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ISO 9001:2000 &  
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Content 

**Jacques Whitford** © 2006

- A description of the Beaver Creek channel slopes and performance should be included in the report. *Additional text will be provided within Section 2.0.* ✓
- The geometry and height of the existing approach fills should be included. *Additional text will be provided within Section 2.0.* ✓
- The report should elaborate on the terminology "hardpan". *The term "hardpan" was extracted from the 1937 General Drawing. The term is not one currently given much use. In general, the term was applied to a hard layer of earth material that is difficult to dig or drill. It was most frequently applied to a hard often clayey layer of cemented soil particles or to a clayey glacial till. Additional text will be added to Section 2.0 to reflect the foregoing discussion.* ✓

### Section 3.0 - Investigation Procedures

- The report should explain why portable drilling equipment was used. *The locations of the proposed abutments are within the existing creek. A portable drill rig mounted on a raft was used due to access restrictions. Additional descriptive text will be added to the report.* ✓
- The method of borehole advancement (casing, washboring, etc) should be discussed in the report. *Additional descriptive text will be added to the report.* ✓
- The report identifies that "wet and loose conditions" precluded the application of the SPT testing at depth and was substituted with Dynamic Cone Penetration Testing (DCPT). The Foundation Engineering Terms of Reference require that "Boreholes shall extend to refusal as defined by material for which Standard Penetration Tests exceeding 100 blows per 0.3 m". The Foundation Engineering Terms of Reference have not been satisfied for the borehole investigation and hence an accurate determination of the founding soil/rock for the abutment foundation design has not been completed. ✓

*This point was the subject of a telephone conference call between Jacques Whitford, Totten Sims Hubicki and the Foundations Engineering and Planning and Design staff of the Ministry on May 16, 2006. At that time JW described the field investigation that was carried out during the preliminary investigation. Due to the groundwater and soil conditions which were encountered in the field, Standard Penetration Testing (SPT) proved to be difficult. Furthermore the SPT results were not found to be meaningful as the groundwater flow into the casing disturbed the soils prior to insertion of the spoon. A dynamic cone penetrometer (DCPT) was driven as a replacement to the SPT test. The DCPT tests were carried out to a depth such that the normal refusal criterion of 100 blows per 300 mm was exceeded at both abutment locations. It was concluded during the conference call that the Terms of Reference were satisfied for* ✓

*this Preliminary Foundation Investigation. It was also concluded that additional investigations will be required during Detailed Design.*

- Confirmation should be provided that the borehole abandonment materials and procedure satisfy the requirements of MOE Regulation 903. Boreholes were abandoned as required. *Additional text will be added to this effect.*
- Details of the piezometer installation should be included in the report. Additional text will be added concerning this point. These details should also be included on the individual borehole logs. *The borehole logs for BH 05-1 and 05-4 will be modified to include this information.*

#### Section 4.0 - Results

- General Comment – The title of this section should be "Description of Subsurface Conditions" rather than "Results". *Agreed*

##### 4.3 Sandy Silt, some Gravel, Occasional Cobbles (TILL)

- Is a sample retrieved in the bottom half of one split spoon sample (BH 05-2, SS13) sufficient to define this stratum? *Please refer to reply to comments provided in Section 3.0. Additional drilling and sampling will be required during detailed design.*

##### 4.4 Bedrock

- Why is this subsection included when bedrock was not investigated? *The descriptions concerning refusal will be transferred to Section 4.3.*

#### FOUNDATION DESIGN REPORT

##### Section 6.0 - Discussion

###### 6.1 Proposed Development

- The report should elaborate on the existing footings (pile tip elevations, founding materials, pile size, etc). *The report will be modified by the addition of: A review of the 1937 General Drawing for the existing bridge (copy attached in Appendix C) indicates that it is supported on timber piles approximately 10m in length and driven into "hardpan".*
- The span lengths of the existing structure should be included in the report. *The report will be modified by the addition of: The existing bridge is a three span structure (8.4 m, 8.2 m and 8.4 m span lengths) with a concrete deck and steel frame. It is apparent that there has been some structural alteration since construction of the original bridge. Photographs of the site are presented in Appendix C.*

- Clarification is needed on the proposed construction staging. The third paragraph describes that the new structure will be offset 15 metres east of the existing structure. The need for roadway protection should be discussed associated with this offset as illustrated on Drawing 11686-2 in Appendix A. *Additional details will be provided on staging. The new structure is to be constructed on a new alignment. There will be no need for a detour structure, however, as-noted, temporary roadway protection will be required.*

### 6.3 Foundation Options

- Shouldn't the report identify that shallow foundations are not feasible at the site for the reasons identified in the second last paragraph on page 10 (dewatering) and the fact that the surficial soils will offer a low bearing resistance? *A statement will be provided in advance of Table 6.1 indicating that spread footings are not feasible at this site due to low bearing resistance and construction difficulties associated with foundation unwatering. This alternative will be removed from Table 6.1.*
- Clarification is needed regarding the end bearing material for the driven piles. Are piles to be driven to a set or refusal within the till deposit or to bedrock. The option for piles driven to bedrock should be qualified in the table that bedrock has to be proven. The options for piles driven to till and piles driven to bedrock should be separate alternatives. Without any evidence of bedrock, it is difficult to understand how end-bearing piles on bedrock can be provided as a recommendation. *Bedrock was not proven by coring during the preliminary investigation. The table will be modified to separate piles driven to till and piles driven to bedrock. A comment will be added in the risk/consequences column for the latter concerning the need to confirm the presence of bedrock and the potential need to drive the piles additional length to reach bedrock. For the preliminary foundation design, it will be recommended that geotechnical resistances associated with pile refusal within the till be incorporated in the preliminary designs. It will also be stated in Section 6.3 that if the final geotechnical investigation report reveals that bedrock is within a practical driving depth, higher geotechnical resistances will be available for the final design.*
- The report should be more decisive regarding the "likelihood" that dewatering using well points and that shoring "would likely" is required. The report should clarify whether dewatering and/or shoring will be required. *For this project, it is recommended that these measures be included in the preliminary design. The wording will be strengthened in the final report.*

- In the last paragraph, the recommendation is given that the replacement bridge should be founded on H-piles driven to bedrock. This should be modified as mentioned earlier in view of the fact that bedrock was not encountered at the site. *Please see previous reply.*

## Section 7.0 - Preliminary Recommendations

### 7.1 Structure Foundations

#### Axial Resistance

- Clarification is needed on the estimated pile tip elevation and the assumption of bedrock as a founding material as mentioned previously. Recommendations should not be provided for driven piles on bedrock when bedrock has not been confirmed. *Please see previous reply. Recommendations will be modified to provide resistance values for driven piles into till.*
- Clarification is needed on the statement that the Factored Axial Resistance at ULS corresponds to the factored structural resistance "which is defined by MTO as the upper permissible limit of the Factored Geotechnical Resistance at ULS (Ultimate Geotechnical Resistance x Resistance Factor)." This is confusing. For piles driven to bedrock doesn't the structural resistance of the pile govern the design and not the geotechnical resistance? Isn't this the case irrelevant of the "previous experience within the Algonquin Highlands"? *MTO has indicated in the past that when the actual Geotechnical Resistance exceeds the Structural Resistance, that the recommended Geotechnical Resistance should correspond to the latter. The statement "previous experience within the Algonquin Highland" will be modified to state that "previous experience within the Algonquin Highland have consistently revealed rock types with high rock strengths where the Geotechnical Resistance would exceed the structural resistances." This statement is included given that we do not have cored rock samples to test for strength and that not all rock types will necessarily provide a geotechnical resistance that exceeds the structural resistance. The section will be reworded to improve clarity and to reflect the recommendation that driven piles be set in till.*
- Are piles driven to a set in the glacial till deposit a feasible alternative? If so recommendations should be provided accordingly. Yes, *recommendations will be provided.*

#### Lateral Resistance

- Table 6.4 – Clarification is needed that the lateral resistance should be calculated using the non cohesive approach. Is this non-cohesive approach defined in the CHBDC? *Reference to the non-cohesive approach may be found in the commentary to the CHBDC Section C6.8.7.1 a). The title of Table 7.2 will be modified to: Recommended Lateral Pile Design Parameters (Non-Cohesive Approach). This reference will be included in the report.* ✓
- Clarification is needed regarding the recommended coefficient of horizontal subgrade reaction of  $3000 \text{ kN/m}^3$ . The recommendation is based on the loose to compact state of denseness within "the upper 10 metres". How about below the 10 metres depth? Does the coefficient of horizontal subgrade reaction of  $3000 \text{ kN/m}^3$  also apply to the underlying till? *All pile bending movements and horizontal pile deflections will occur within the upper soils and the provision of higher values beyond 10 m will not influence the deflection calculations. However, based on this comment, we assume that MTO prefers to have values beyond 10 m, therefore, the surficial loose to compact zone will be extended to 14 m below grade. An  $n_h$  value of  $10,000 \text{ kN/m}^3$  will be provided for the till, which occurs at depths greater than 14m.* ✓

#### Tensile Resistance

- Shouldn't the tensile resistances tabulated in Table 7.3 be rounded off? *Agreed.* ✓

#### Pile Notes

- Clarification is needed on the recommended bearing point/driving shoes. Is OPSD 3000.100 an applicable drawing in CPS? Should the standard drawing SS103-12 be referenced instead if driving shoes are being recommended? *Drawing SS103-12 (copy attached) provides details for splicing of steel H-Piles. In the absence of other applicable drawings we recommend referencing OPSD 3000.100 for Pile Driving Shoes.* ✓

#### 7.2 Earth Pressure Design

- Are OPSD 3102.1 and OPSD 3101.15 applicable drawings? Should OPSD 3501.000 be referenced for minimum Granular Backfill Requirements for Abutments? *It is our understanding that OPSD 3101.15 (copy attached) replaces OPSD 3501.000, which is no longer available on the website.* ✓

### 7.3 Seismic Design Considerations

#### 7.3.4 Seismic Forces on Abutments and Retaining Walls

- The report should comment on the similarity of the static earth pressure coefficients and the combined static/seismic earth pressure coefficients tabulated in Tables 6.8 and 6.9 respectively. *The similarity is due to the low Zonal Acceleration Ratio for this area. A comment will be added comparing the static versus combined coefficients.* ✓

### 7.4 Embankment Design

- Are fill materials to be placed underwater? If so, for rock fill, does the geometry have to be flattened to 1.5H: 1V from 1.25H: 1V? *As noted in the report, rock fill extending below water level should be placed at 1.5H:1V.* ✓
- Clarification is needed that all settlements (within the fill (earth or rock and within the native) will be realized during/following construction. *The section will be restructured to improve clarity.* ✓
- Should 8 mm be rounded off (settlement within the embankment fill)? *Agreed, the value will be reported as 10 mm.* ✓

### 7.6 Erosion Protection

- Clarification should be given that the erosion protection recommendation is applicable for the forward slopes as compared to the transverse slopes. *The first paragraph of this section will be modified to specifically mention the embankment forward slopes.* ✓

### 7.8 Other Construction Considerations

#### Site Grading and Preparation

- Fourth paragraph – Reference should be made to SP 105S10 for compaction requirements. *Agreed.* ✓

#### Excavation

- Shoring design shall be carried out in accordance in SP 539S01 rather than OPSS 539. *SP539S01 no longer appears on the website. It is our understanding that it is now contained in the latest revision of OPSS 539.*
- Clarification is needed on the excavation encroachment restriction discussed in the last paragraph. This should be illustrated on a figure. *A figure will be prepared and included within Appendix D.*

Section 8.0 - Future Investigations

- Regarding the CPT, should a seismic cone be used to determine shear wave velocities, which in turn can be used to determine dynamic shear moduli? *Agreed.*

Closure

We trust that the above meets your present requirements. Should you have any questions or should you need additional details, please do not hesitate to contact us at your convenience.

Yours truly,

**JACQUES WHITFORD LIMITED**

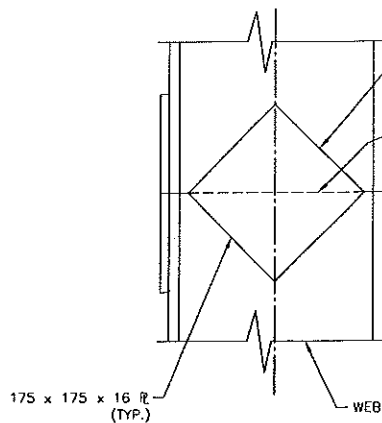
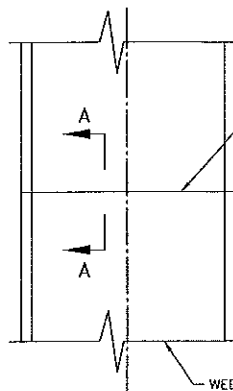


Fred J. Griffiths, Ph.D., P.Eng



Paul Carnaffan, M.Eng., P.Eng.

P:\2006\10000\11686 - Hwy 62\Beaver Creek Bridge\Comment.Resp.August 21, 2006.doc



NOTES:

1. SPLICE PLATE  
THE UPPER F
2. THE UPPER  
PLATES WELD  
BE MADE.

GENERAL NOTES:

1. PILE ENDS TO BE SPLICED SHALL BE CUT SQUARE PERPENDICULAR TO CENTRELINELINE OF PILE.
2. FLANGE AND SPLICE PLATES SHALL BE ACCORDING TO CSA G40.20/G40.21-98 GRADE 300W.
3. WELDING SHALL BE ACCORDING TO CSA-W59M.
4. THIS STANDARD APPLIES TO H-PILE SIZES HP310x79, HP310x110, AND HP310x132.
5. HANDLING HOLES SHALL ONLY BE MADE IN THE PORTION OF THE PILE TO BE CUT OFF OR IN THE PORTION OF THE PILE IN THE CONCRETE PILE CAP.

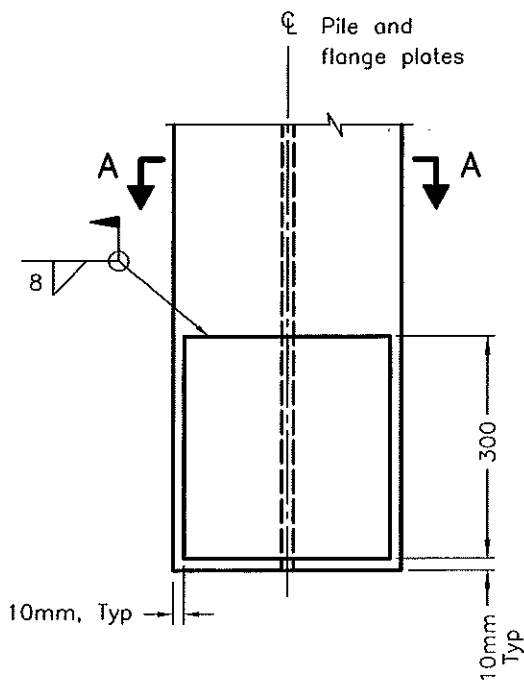
REFER TO 1.1.8 IN THE STRUCTURAL MANUAL FOR PROFESSIONAL ENGINEER STAMPING REQUIREMENTS.

STANDARD DRAWING  
MARCH 2006

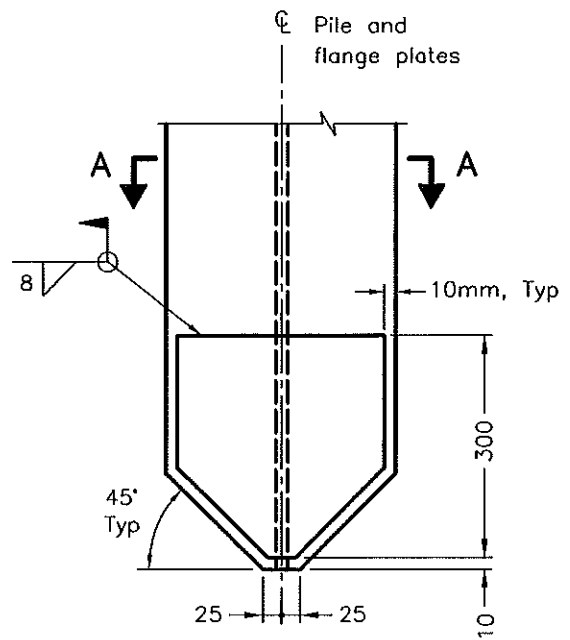
SS103-12

## SPLICE DETAILS FOR STEEL H-PILES

| REVISIONS | DESCRIPTION |          |      |      |      |
|-----------|-------------|----------|------|------|------|
|           | DESIGN      | CHK      | CODE | LOAD | DATE |
|           | CHK         | CHBDC-00 |      |      |      |
|           | CHK         | CHG      |      |      | DAWG |

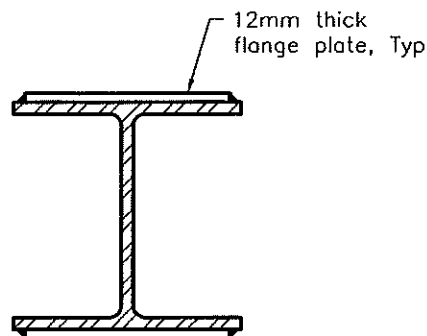


TYPE I



TYPE II

ELEVATION



PILE DRIVING SHOE  
SECTION A-A

NOTES:

- A Flange plates shall be according to CSA-G40.20/G40.21, Grade 300W.
- B Welding shall be according to CSA-W59.
- C Driving shoe Type I shall be used unless Type II is specified.
- D All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

Nov 2005

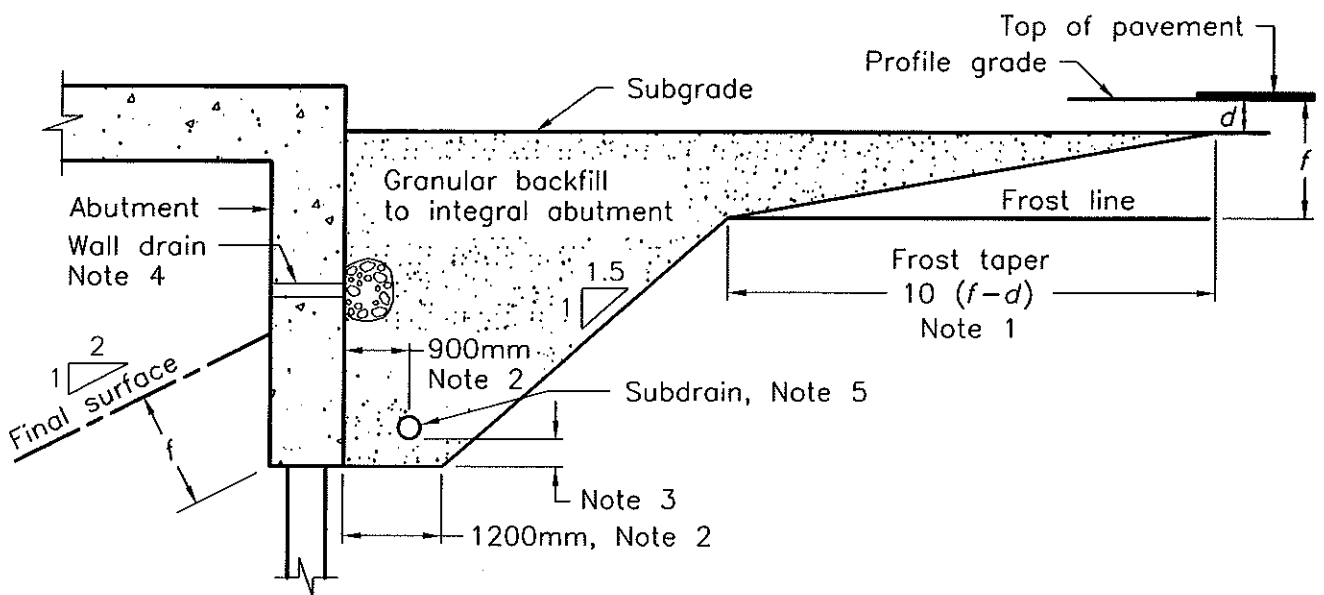
Rev 1

FOUNDATION  
PILES

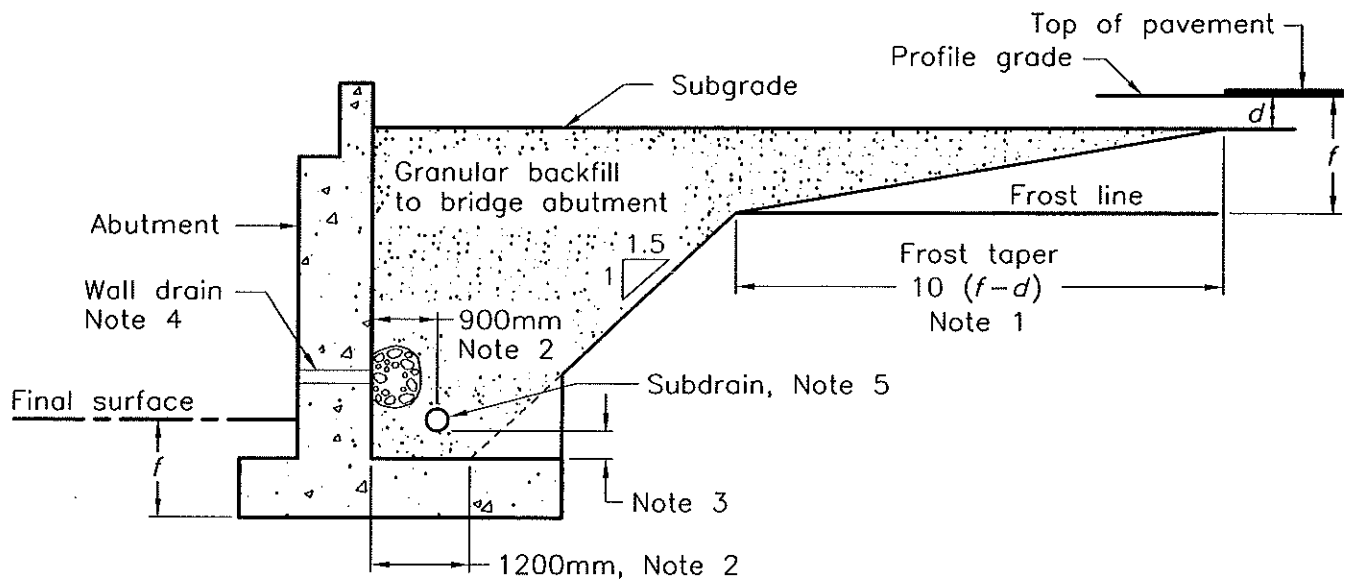
STEEL H-PILE DRIVING SHOE



OPSD - 3000.100



### INTEGRAL ABUTMENT



### ABUTMENT

#### NOTES:

- 1  $d$  = depth of combined base and subbase courses.  
 $f$  = roadbed depth of frost penetration as specified.
- 2 Dimensions perpendicular to back face of abutment.
- 3 Height to be consistent with positive drainage of subdrain as specified.
- 4 Where specified, wall drains shall be installed according to OPSD-3190.100.
- 5 150mm dia perforated pipe subdrain wrapped with geotextile.
- A Lateral limits of granular backfill to bridge abutment to be inside face to inside face of retaining wall or wingwall. Frost taper shall extend the full width of the fill unless interrupted by the retaining wall or wingwall.
- B Sections shown are parallel to centreline of roadway.
- C Subdrain to be installed with a 2% gradient behind wall.
- D All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

Nov 2005

Rev 0

**WALLS**  
**ABUTMENT, BACKFILL**  
**MINIMUM GRANULAR REQUIREMENT**



**OPSD - 3101.150**

# MEMORANDUM



To: A. Stewart, P. Eng.  
Project Manager  
Planning & Design, Eastern Region

30 March 2006

From: Pavements and Foundations Section  
Room 223, Bldg "C".

Tel: (416) 235-5267  
Fax: (416) 235-3919

Re: Draft Preliminary Foundation Investigation and Design Report Review  
Hwy 62 – Beaver Creek Bridge Replacement  
WP 66-99-00

We have completed our evaluation of the Draft Preliminary Foundation Investigation and Design Report for the proposed Hwy 62 Beaver Creek bridge replacement dated February 21, 2006 prepared by Jacques Whitford. Our office received the report on March 30, 2006 submitted under TSH's transmittal dated March 28, 2006.

Our review is based on verifying that the Foundation Investigation and Design Report satisfy the terms of reference for completeness. The Consultant is responsible for the accuracy of the subsurface information and adequacy of the technical aspects of the recommendations. Any deficiency identified in this memorandum is intended to alert the Consultant but shall not relieve the Consultant of any responsibility for their work. The Ministry assumes no responsibility or liability for these aspects of the report.

The Foundation Engineering Terms of Reference explicitly require that "Boreholes shall extend to refusal as defined by material for which Standard Penetration Tests exceeding 100 blows per 0.3m" at each abutment location. The Consultant has not satisfied the Foundation Engineering Terms of Reference in this regard. Additional fieldwork is necessary to confirm refusal to facilitate the foundation design at the abutment locations.

Clarification should also be provided that a separate detour structure will not be constructed.

Review comments are given under the appropriate subsection of the report. It is recommended that the Consultant be instructed to address the deficiencies included in this memorandum.

The report should be completed on single sided paper rather than double sided.

## FOUNDATION INVESTIGATION REPORT

### 2.0 Site Description and Geology

- A description of the performance of the structure foundation and approach embankments should be included in the report. Is there any evidence of structural distress, settlement, instability, etc?

- A description of the Beaver Creek channel slopes and performance should be included in the report.
- The geometry and height of the existing approach fills should be included.
- The report should elaborate on the terminology “hardpan”.

### 3.0 Investigation Procedure

- The report should explain why portable drilling equipment was used.
- The method of borehole advancement (casing, washboring, etc) should be discussed in the report.
- The report identifies that “wet and loose conditions” precluded the application of the SPT testing at depth and was substituted with Dynamic Cone Penetration Testing (DCPT). The Foundation Engineering Terms of Reference require that *“Boreholes shall extend to refusal as defined by material for which Standard Penetration Tests exceeding 100 blows per 0.3m”*. The Foundation Engineering Terms of Reference have not been satisfied for the borehole investigation and hence an accurate determination of the founding soil/rock for the abutment foundation design has not been completed.
- Confirmation should be provided that the borehole abandonment materials and procedure satisfy the requirements of MOE Regulation 903.
- Details of the piezometer installation should be included in the report. These details should also be included on the individual borehole logs.

### 4.0 Results

- General Comment – The title of this section should be *“Description of Subsurface Conditions”* rather than *“Results”*.

#### 4.3 Sandy Silt, some Gravel, Occasional Cobbles (TILL)

- Is a sample retrieved in the bottom half of one split spoon sample (BH 05-2, SS13) sufficient to define this stratum?

#### 4.4 Bedrock

- Why is this subsection included when bedrock was not investigated?

## 6.0 Discussion

### 6.1 Proposed Development

- The report should elaborate on the existing footings (pile tip elevations, founding materials, pile size, etc).
- The span lengths of the existing structure should be included in the report.
- Clarification is needed on the proposed construction staging. The third paragraph describes that the new structure will be offset 15 metres east of the existing structure. The need for roadway protection should be discussed associated with this offset as illustrated on Drawing 11686-2 in Appendix A.

### 6.3 Foundation Options

- Shouldn't the report identify that shallow foundations are not feasible at the site for the reasons identified in the second last paragraph on page 10 (dewatering) and the fact that the surficial soils will offer a low bearing resistance?
- Clarification is needed regarding the end bearing material for the driven piles. Are piles to be driven to a set or refusal within the till deposit or to bedrock. The option for piles driven to bedrock should be qualified in the table that bedrock has to be proven. The options for piles driven to till and piles driven to bedrock should be separate alternatives. Without any evidence of bedrock, it is difficult to understand how end-bearing piles on bedrock can be provided as a recommendation.
- The report should be more decisive regarding the "likelihood" that dewatering using well points and that shoring "would likely" is required. The report should clarify whether dewatering and/or shoring will be required.
- In the last paragraph, the recommendation is given that the replacement bridge should be founded on H-piles driven to bedrock. This should be modified as mentioned earlier in view of the fact that bedrock was not encountered at the site..

## 7.0 Preliminary Recommendations

### 7.1 Structure Foundations

#### Axial Resistance

- Clarification is needed on the estimated pile tip elevation and the assumption of bedrock as a founding material as mentioned previously. Recommendations should not be provided for driven piles on bedrock when bedrock has not been confirmed.
- Clarification is needed on the statement that the Factored Axial Resistance at ULS

corresponds to the factored structural resistance *which is defined by MTO as the upper permissible limit of the Factored Geotechnical Resistance at ULS (Ultimate Geotechnical Resistance  $\times$  Resistance Factor)*. This is confusing. For piles driven to bedrock doesn't the structural resistance of the pile govern the design and not the geotechnical resistance? Isn't this the case irrelevant of the "previous experience within the Algonquin Highlands"?

- Are piles driven to a set in the glacial till deposit a feasible alternative? If so recommendations should be provided accordingly.

#### Lateral Resistance

- Table 6.4 – Clarification is needed that the lateral resistance should be calculated using the non cohesive approach. Is this non-cohesive approach defined in the CHBDC?
- Clarification is needed regarding the recommended coefficient of horizontal subgrade reaction of  $3000 \text{ kN/m}^3$ . The recommendation is based on the loose to compact state of denseness within "the upper 10 metres". How about below the 10 metres depth? Does the coefficient of horizontal subgrade reaction of  $3000 \text{ kN/m}^3$  also apply to the underlying till?

#### Tensile Resistance

- Shouldn't the tensile resistances tabulated in Table 7.3 be rounded off?

#### Pile Notes

- Clarification is needed on the recommended bearing point/driving shoes. Is OPSD 3000.100 an applicable drawing in CPS? Should the standard drawing SS103-12 be referenced instead if driving shoes are being recommended?

### 7.2 Earth Pressure Design

- Are OPSD 3102.1 and OPSD 3101.15 applicable drawings? Should OPSD 3501.000 be referenced for minimum Granular Backfill Requirements for Abutments?

### 7.3 Seismic Design Considerations

#### 7.3.4 Seismic Forces on Abutments and Retaining Walls

- The report should comment on the similarity of the static earth pressure coefficients and the combined static/seismic earth pressure coefficients tabulated in Tables 6.8 and 6.9 respectively.

### 7.4 Embankment Design

- Are fill materials to be placed underwater? If so, for rock fill, does the geometry have to be flattened to 1.5H: 1V from 1.25H: 1V?

- Clarification is needed that all settlements (within the fill (earth or rock and within the native) will be realized during/following construction.
- Should 8 mm be rounded off (settlement within the embankment fill)?

#### 7.6 Erosion Protection

- Clarification should be given that the erosion protection recommendation is applicable for the forward slopes as compared to the transverse slopes.

#### 7.8 Other Construction Considerations

##### Site Grading and Preparation

- Fourth paragraph – Reference should be made to SP 105S10 for compaction requirements.

##### Excavation

- Shoring design shall be carried out in accordance in SP 539S01 rather than OPSS 539.
- Clarification is needed on the excavation encroachment restriction discussed in the last paragraph. This should be illustrated on a figure.

#### 8.0 Future Investigations

- Regarding the CPT, should a seismic cone be used to determine shear wave velocities, which in turn can be used to determine dynamic shear moduli?

We trust these comments are sufficient for your purposes. If you require additional assistance, please do not hesitate to contact our office.

T. Sangiuliano, P. Eng.  
Foundation Engineer

for

D. Dundas, P. Eng.  
Senior Foundation Engineer

## **Sangiuliano, Tony (MTO)**

---

**From:** Sangiuliano, Tony (MTO)  
**Sent:** 31-Mar-06 12:14 PM  
**To:** Stewart, Angela (MTO); Mihov, Boris (MTO)  
**Subject:** Draft Preliminary Foundation Investigation and Design Report - Beaver Creek Bridge Replacement - GWP 248-99-00

Angela/Boris:

We have completed our review of the Draft Preliminary Foundation Investigation and Design Report for the abovementioned structure. Our review comments are provided in the attached memorandum. It is requested that your review our comments and then a teleconference be set up to discuss our comments.

Tony



draftreportreviewfo  
undationsBe...

# MEMORANDUM



To: A. Stewart, P. Eng.  
Project Manager  
Planning & Design, Eastern Region

30 March 2006

From: Pavements and Foundations Section  
Room 223, Bldg "C".

Tel: (416) 235-5267  
Fax: (416) 235-3919

Re: Draft Preliminary Foundation Investigation and Design Report Review  
Hwy 62 – Beaver Creek Bridge Replacement  
WP 66-99-00

We have completed our evaluation of the Draft Preliminary Foundation Investigation and Design Report for the proposed Hwy 62 Beaver Creek bridge replacement dated February 21, 2006 prepared by Jacques Whitford. Our office received the report on March 30, 2006 submitted under TSH's transmittal dated March 28, 2006.

Our review is based on verifying that the Foundation Investigation and Design Report satisfy the terms of reference for completeness. The Consultant is responsible for the accuracy of the subsurface information and adequacy of the technical aspects of the recommendations. Any deficiency identified in this memorandum is intended to alert the Consultant but shall not relieve the Consultant of any responsibility for their work. The Ministry assumes no responsibility or liability for these aspects of the report.

The Foundation Engineering Terms of Reference explicitly require that "Boreholes shall extend to refusal as defined by material for which Standard Penetration Tests exceeding 100 blows per 0.3m" at each abutment location. The Consultant has not satisfied the Foundation Engineering Terms of Reference in this regard. Additional fieldwork is necessary to confirm refusal to facilitate the foundation design at the abutment locations.

Clarification should also be provided that a separate detour structure will not be constructed.

Review comments are given under the appropriate subsection of the report. It is recommended that the Consultant be instructed to address the deficiencies included in this memorandum.

The report should be completed on single sided paper rather than double sided.

## FOUNDATION INVESTIGATION REPORT

### 2.0 Site Description and Geology

- A description of the performance of the structure foundation and approach embankments should be included in the report. Is there any evidence of structural distress, settlement, instability, etc?

- A description of the Beaver Creek channel slopes and performance should be included in the report.
- The geometry and height of the existing approach fills should be included.
- The report should elaborate on the terminology “hardpan”.

### 3.0 Investigation Procedure

- The report should explain why portable drilling equipment was used.
- The method of borehole advancement (casing, washboring, etc) should be discussed in the report.
- The report identifies that “wet and loose conditions” precluded the application of the SPT testing at depth and was substituted with Dynamic Cone Penetration Testing (DCPT). The Foundation Engineering Terms of Reference require that “*Boreholes shall extend to refusal as defined by material for which Standard Penetration Tests exceeding 100 blows per 0.3m*”. The Foundation Engineering Terms of Reference have not been satisfied for the borehole investigation and hence an accurate determination of the founding soil/rock for the abutment foundation design has not been completed.
- Confirmation should be provided that the borehole abandonment materials and procedure satisfy the requirements of MOE Regulation 903.
- Details of the piezometer installation should be included in the report. These details should also be included on the individual borehole logs.

### 4.0 Results

- General Comment – The title of this section should be “*Description of Subsurface Conditions*” rather than “*Results*”.

#### 4.3 Sandy Silt, some Gravel, Occasional Cobbles (TILL)

- Is a sample retrieved in the bottom half of one split spoon sample (BH 05-2, SS13) sufficient to define this stratum?

#### 4.4 Bedrock

- Why is this subsection included when bedrock was not investigated?

## 6.0 Discussion

### 6.1 Proposed Development

- The report should elaborate on the existing footings (pile tip elevations, founding materials, pile size, etc).
- The span lengths of the existing structure should be included in the report.
- Clarification is needed on the proposed construction staging. The third paragraph describes that the new structure will be offset 15 metres east of the existing structure. The need for roadway protection should be discussed associated with this offset as illustrated on Drawing 11686-2 in Appendix A.

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#### 8.0 Future Investigations

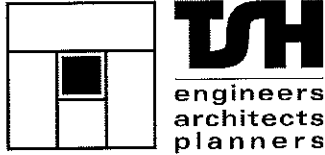
- Regarding the CPT, should a seismic cone be used to determine shear wave velocities, which in turn can be used to determine dynamic shear moduli?

We trust these comments are sufficient for your purposes. If you require additional assistance, please do not hesitate to contact our office.

T. Sangiuliano, P. Eng.  
Foundation Engineer

for

D. Dundas, P. Eng.  
Senior Foundation Engineer



300 Water Street  
Whitby, Ontario L1N 9J2  
Telephone: (905) 668-9363 Fax: (905) 665-4867  
E-Mail: tsh@tsh.ca

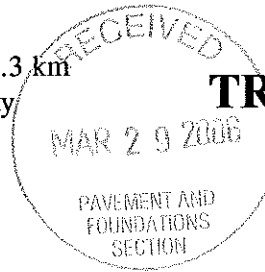
**TO** Tony Sangiuliano, P. Eng.  
Foundation Engineer, Foundation Group  
Ministry of Transportation  
1201 Wilson Avenue  
Bldg C, 2<sup>nd</sup> Floor, Room 223  
Downsview, ON M3M 1J8

Date March 28, 2006

Our Project No. 42-91065

Your File No. \_\_\_\_\_

**PROJECT** Highway 62 Preliminary Design Study, from 5.3 km  
north of Cleveland Road to 300 south of County  
Road 620, including Beaver Creek Bridge  
Replacement  
G.W.P. 66-99-00 / 248-99-00



**TRANSMITTAL**

We are sending the following \_\_\_\_\_

| Qty | Drawing No.                                      | Rev. | Title  |
|-----|--|------|--|
| 1   |  |      | Draft Preliminary Foundation Investigation and Design Report for Highway 62 Beaver Creek Bridge Replacement, dated February 2006 |
| 1   |  |      | Associated QC Documentation  |
|     |  |      |  |
|     |  |      |  |
|     |  |      |  |
|     |  |      |  |
|     |  |      |  |
|     |  |      |  |
|     |  |      |  |
| x   | For Your Information/Action                      |      | Reviewed   |
|     | For Your Approval and Return                     |      | Reviewed as Modified   |
|     | For Use With Notice of Change/Record or Revision |      | Revise and Resubmit  |
|     | As Requested                                     |      | Not Reviewed   |

Remarks

Tony:  
Please find enclosed the above noted report for your review.  
  
cc: A. Stewart, MTO

Per Brenda Jamieson, P.Eng.

Consultant Project Manager

**JACQUES WHITFORD**  
**SUPPLEMENTARY SPECIALTY QUALITY CONTROL PLAN**

**Assignment 4005-A-000310**

**Highway 62, Beaver Creek Bridge**

Foundations Engineering

Submitted by:

F. Griffiths, Ph.D., P.Eng.  
Jacques, Whitford and Associates Limited  
Suite 200, 2781 Lancaster Road  
Ottawa, ON K1B 1A7  
call: 613-738-0708 x 239  
fax: 613-738-0721  
email: [fgriffit@jacqueswhitford.com](mailto:fgriffit@jacqueswhitford.com)

September 30, 2003

Project      ONO 11686

## **1. Introduction**

Jacques, Whitford (JW) has prepared this Supplementary Specialty Quality Control Plan for Foundations Engineering for use on Ministry of Transportation of Ontario (MTO) Assignment 4005-A-000310 in accordance with the requirements listed in the Notice to Registered Consultants of October 11, 2001.

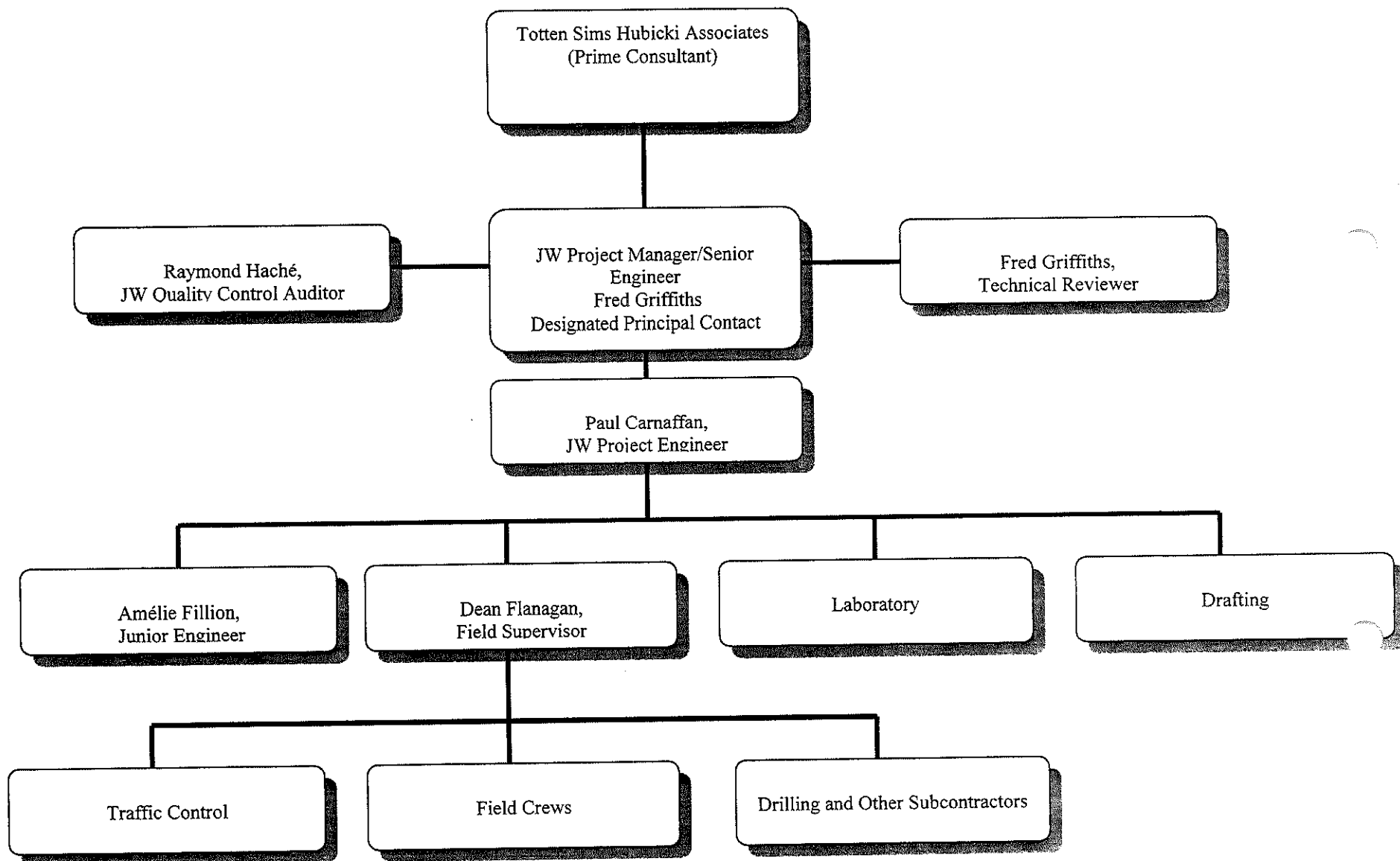
The Supplementary Specialty Plan represents one of three components in the MTO Quality Control process as follows:

- Generic Core Plan
- Generic Category Plans
- Supplementary Specialty Plan

The first two components of the plan are registered on RAQS and will stand as generic plans for Jacques, Whitford. The third component has been developed to meet the specific requirements of this assignment.

---

Jacques Whitford has assembled a highly skilled team of professionals to carry out this assignment. The team has worked together on numerous projects for MTO in the past, thus interactions and reporting between team members is efficient and timely. The organization chart on the following page presents the responsibility and reporting relationships.




## 2. Process Control

| #                    | Phase / Task                 | Methodology<br>(and staff member)   | Deliverables               | Reference<br>Manuals   | Independent Technical Review |               | QC Staff | Completion<br>Date |
|----------------------|------------------------------|---|----------------------------|--|------------------------------|---------------|----------|--------------------|
|                      |                              |   |                            |  | Procedure                    | Documentation |          |                    |
| 1.0 PROJECT START UP |                              |   |                            |  |                              |               |          |                    |
| 1.1                  | Familiarization              | review project documentation including structure (bridge/culvert), embankment, survey, environmental aspects (PC) | N/A                        | Terms of Reference   | review checklist             | initials      | FG       | Oct. 17, 2003      |
|                      |                              | review applicable Foundation Investigation and Design Reports and geoscience reports (PC)                         | updated investigation plan | reference libraries including MTO Foundation Library (GEOCRES) | review updated plan          | initials      | FG       |                    |
|                      |                              |   |                            |  | Technical Review No. 1       | memo          | FG       |                    |
| 1.2                  | Clearances and Notifications | notify MTO District and Foundations Group of schedule (PC)  | MOL Notice                 | MOL Regulations  | review checklist             | initials      | FG       | Oct. 17, 2003      |
|                      |                              | notify MOL, as required (PC)  |                            |  |                              | initials      | FG       |                    |
|                      |                              | arrange for clearances (PC)   |                            |  |                              | initials      | FG       |                    |
|                      |                              | arrange for permission to enter private property (PC)   | PTE Records                | initials   | FG                           |               |          |                    |
|                      |                              | establish Health and Safety Issues (PC)   | Health & Safety Plan       | OHS Act  | review Health & Safety Plan  | initial plan  | FG       |                    |
|                      |                              | establish traffic control requirements (DF)   | Traffic Control Plan       | Book 7, Temporary Conditions, Ontario Traffic Manual           | review Traffic Control Plan  | initial plan  | FG       |                    |

| #                   | Phase / Task        | Methodology<br>(and Staff Member)   | Deliverables                   | Reference<br>Manuals    | Independent Technical Review |                    | QC STAFF | Completion<br>Date |
|---------------------|---------------------|---|--------------------------------|-------------------------|------------------------------|--------------------|----------|--------------------|
|                     |                     |   |                                |                         | Procedure                    | Documentation      |          |                    |
| 2.0 DATA COLLECTION |                     |   |                                |                         |                              |                    |          |                    |
| 2.1                 | Site Inspection     | layout (DF)   |                                | Terms of Reference      | review checklist             | initials <i>PC</i> | PC       | Nov 20/05          |
|                     |                     | conduct utility clearances for testholes (DF)   | Locate records                 |                         |                              | initials <i>PC</i> | PC       | Nov 17/05          |
|                     |                     | inspect site and critically assess existing surface conditions, structures and embankments, drainage (DF) | Update site Investigation Plan |                         | review updated Plan          | initials <i>PC</i> | PC       | Oct 24/03          |
|                     |                     | select appropriate method for testhole advancement (DF)   |                                |                         |                              | initials <i>PC</i> | PC       | Oct. 24, 2003      |
| 2.2                 | Field Investigation | prestart meeting to review Health & Safety, Site Investigation and Traffic Control Plans (DF)             | meeting minutes                | Terms of Reference      | review checklist             | initials <i>PC</i> | PC       | Nov 24/05          |
|                     |                     | traffic control set up (DF)   |                                |                         |                              | initials <i>PC</i> | PC       | Nov 24/05          |
|                     |                     | advance testholes per number, location, depth requirements (DF)   |                                |                         |                              | initials <i>PC</i> | PC       | Jan 17/06          |
|                     |                     | conduct sampling of testholes per frequency and method requirements (DF)                                  |                                | ASTM protocols          |                              | initials <i>PC</i> | PC       | Jan 17/06          |
|                     |                     | install and monitor standpipes and piezometers (DF)   | water levels                   |                         |                              | initials <i>PC</i> | PC       | Jan 17/06          |
|                     |                     | ensure integrity of samples through appropriate transportation and handling procedures (DF)               | samples                        | ASTM & MTO LS protocols |                              | initials <i>PC</i> | PC       | Jan 17/06          |
|                     |                     | conduct in-situ testing (DF)  | test results                   | MTO & ASTM protocols    |                              | initials <i>PC</i> | PC       | Jan 17/06          |
|                     |                     |   |                                |                         |                              |                    |          |                    |

|                                |             |   |   |  |  |                               |                      |  |
|--------------------------------|-------------|---|---|--|--|-------------------------------|----------------------|--|
|                                |             | monitor drilling operations and field investigation results (DF)        | borehole records                                  | MTO Soil Classification Manual                         |  | initials <i>PC</i>            | PC                   | Jan 17/06                              |
|                                |             | survey location of testholes (DF)                                       | survey data                                       |  | check calculations                                       | initials <i>PC</i>            | PC                   | Jan 31/06                              |
|                                |             | abandon testholes and restore site (DF)                                 | Artesian Condition Sealing Report (if applicable) | MTO Interim Guidelines for Borehole Abandonment        | review Artesian Condition Sealing Report (if applicable) | initials <i>N/A</i>           | PC                   | —                                      |
|                                |             |   | Property Damage Report (if applicable)            |  | review Property Damage Report (if applicable)            | initials <i>N/A</i>           | PC                   | —                                      |
|                                |             | ensure sufficiency of field investigation for project purpose (DF)      |   |  |  | initials <i>PC</i>            | PC                   | <del>Oct 31, 2003</del><br>Jan 17/06   |
| 2.3                            | Lab Testing | inspect samples and confirm field description, select test program (AF) | modified borehole logs                            | Terms of Reference MTO Soil Classification Manual      | review checklist   | initials <i>PC</i>            | PC                   | Dec 05/06                              |
|                                |             | conduct number, type of tests per requirements (Lab)                    | test results                                      | MTO LS and ASTM protocols, JW Testing and QC Standards | ensure sufficiency of lab testing, check lab results     | initial lab results <i>PC</i> | PC                   | Jan 31/06                              |
|                                |             | confirm field descriptions based on lab testing (AF)                    |   |  |  | initials <i>PC</i>            | PC                   | Jan 31/06                              |
|                                |             | Foundation Lab meets requirements specified in RAQS registration (PC)   | modified borehole logs                            |  |  | initials                      | FG                   | <i>N/A</i><br>02/21/06<br>Nov. 7, 2003 |
| MILESTONE QUALITY REVIEW NO. 1 |             |   | Audit Memo  |  | Review Procedures/<br>Checklists                         |                               | Memo RH Nov. 7, 2003 |  |



| #   | Phase / Task  | Methodology<br>(and Staff Member)                                   | Deliverables        | Reference<br>Manuals | Independent Technical Review |               | QC Staff | Completion<br>Date   |
|-----|---|---|---------------------|----------------------|------------------------------|---------------|----------|--|
|     |   |   |                     |                      | Procedure                    | Documentation |          |  |
| 3.0 | EXTERNAL STAKEHOLDER CONSULTATION   |   |                     |                      |                              |               |          |  |
| 3.1 | Consultation<br>(with MTO,<br>other<br>jurisdictions,<br>public, project<br>team) | submit correspondence (PC)<br><br>attend meetings, as required (PC) | minutes,<br>records | Terms of Reference   | review checklist             | initials      | FG       | Nov. 14, 2003<br><br><br>02/21/06 |

## Foundations Engineering

[illegible]

# Foundations Engineering

Page 9 of 21

|                                |   |   |     |  | Technical<br>Review 3                         | memo                 | Technical<br>Reviewer            |  |
|--------------------------------|---|---|-----|--|---|----------------------|----------------------------------|--|
| 4.2                            | Conceptual<br>Foundation<br>Design<br>Selection | correspondence / meetings to evaluate<br>alternatives, as required (PC) | N/A | Terms of<br>Reference, Codes<br>(Highway Bridge<br>Design Code in<br>effect at MTO),<br>Manuals, Texts | review checklist<br><br>Technical<br>Review 4 | initials<br><br>memo | FG<br><br>FG                     | <div> <br/> 02/21/06<br/><br/> Nov. 21, 2003<br/><br/> <br/> 02/21/06 </div> |
| MILESTONE QUALITY REVIEW NO. 2 |   |   |     |  | Audit Memo                                    |                      | Review Procedures/<br>Checklists |  |
|                                |   |   |     |  |   |                      | Memo RH                          |  |
|                                |   |   |     |  |   |                      | Nov. 21, 2003                    |  |

| #   | Phase / Task      | Methodology<br>(and Staff Member)   | Deliverables   | Reference<br>Manuals  | Independent Technical Review  |   | QC Staff   | Completion<br>Date |
|-----|-------------------|---|--|---|---|---|--|--------------------|
|     |                   |   |  |   | Procedure   | Documentation   |  |                    |
| 5.0 | TECHNICAL REPORTS |   |  |   |   |   |  |                    |
| 5.1 | Final Report      | <p>update analysis and design to reflect input received during consultation</p> <p>prepare FINAL Preliminary Foundation Investigation and Design Report in accordance with MTO protocols.</p> | FINAL Preliminary Foundation Investigation and Design Report | Terms of Reference, Codes (Highway Bridge Design Code in effect at MTO), Manuals, Texts | <p>review Checklist</p> <p>review calc's</p> <p>report split: Investigation &amp; Design</p> <p>report contains appropriate content &amp; rec's</p> <p>report contains rec's for preferred alternative designs for temp, interim &amp; permanent cases, red-flag issues &amp; specs</p> <p>report signed and stamped by 2 P.Eng's (designated Principal Contact)</p> <p><i>Technical Review No. 5</i></p> | <p>initials</p> <p>initials</p> <p>initals</p> <p>initials</p> <p>initials</p> <p>initials</p> <p>signatures</p> <p><i>memo</i></p> | <p>FG</p> <p>FG</p> <p>FG</p> <p>FG</p> <p>FG</p> <p>FG</p> <p>FG</p> <p><i>FG</i></p> | Dec. 12, 2003      |

| #                              | Phase / Task             | Methodology<br>(and Staff Member)                                    | Deliverables | Reference<br>Manuals  | Independent Technical Review                          |                             | QC Staff            | Completion<br>Date |
|--------------------------------|--------------------------|--|--------------|---|---|-----------------------------|---------------------|--------------------|
|                                |                          |  |              |   | Procedure   | Documentation               |                     |                    |
| 6.0 PRELIMINARY DESIGN         |                          |  |              |   |   |                             |                     |                    |
| 6.1                            | Preliminary Design Check | consultation with project team including Structural Engineers (PC)   |              | Terms of Reference, Codes (Highway Bridge Design Code in effect at MTO), Manuals, Texts | review Checklist<br><br><i>Technical Review No. 6</i> | initials<br><br><i>memo</i> | FG<br><br><i>FG</i> |                    |
| 6.2                            | Staging / Detours        | consultation with Project Team (PC)                                  |              | Terms of Reference, Codes (Highway Bridge Design Code in effect at MTO), Manuals, Texts | review Checklist<br><br><i>Technical Review No. 6</i> | initials<br><br><i>memo</i> | FG<br><br><i>FG</i> |                    |
| 6.3                            | Constructability Review  | consultation with Project Team including Construction Engineers (PC) |              | Terms of Reference, Codes (Highway Bridge Design Code in effect at MTO), Manuals, Texts | review Checklist<br><br><i>Technical Review No. 6</i> | initials<br><br><i>memo</i> | FG<br><br><i>FG</i> | <i>May, 2004</i>   |
| MILESTONE QUALITY REVIEW NO. 3 |                          |  | Audit Memo   |   | Review Procedures/<br>Checklists                      |                             | Memo<br><br>RH      | May, 2004          |

### **3. Internal Reviews and Checking**

#### **3.1 Project Technical Reviews / Acceptance**

Technical Reviews and Acceptance Checking will be carried out by JW during the course of this Foundations Engineering Assignment. The sequence of activities provided in the Process Control tables will be used in order to establish technical accuracy of the services and conformance to the Technical Standards and Specifications.

In addition, JW will carry out independent technical reviews for approval/acceptance of the critical tasks, as required. The technical reviews will be carried out by Senior Engineers licensed to practice in the Province of Ontario and familiar with Foundations Engineering projects.

The checks will provide traceable documentation in:

- Methodology or approach to doing the work
- Policies, Procedures, Standards and Specifications used.
- Accuracy and completeness of data, reports, measurements and calculations

The Technical Reviewer will sign and stamp the final report.

Technical reviews will occur at the following stages:

|                        |   |
|------------------------|---|
| Technical Review No. 1 | Review of Field Investigation Plan              |
| Technical Review No. 2 | Review of Site Investigation Documentation      |
| Technical Review No. 3 | Review of Draft Report                          |
| Technical Review No. 4 | Review of Foundation Design Selection           |
| Technical Review No. 5 | Review of Final Report                          |
| Technical Review No. 6 | Review of Preliminary Design Stage Consultation |

#### **3.2 Milestone Quality Reviews**

This section details the Milestone Quality Reviews to be undertaken by JW throughout the duration of the assignment. The Quality Reviews are independent examinations to determine whether the quality measures and related results comply with the quality objectives of the agreed QC Plan. The comparison is therefore between the actually recorded activities against those specified in the plan.

Quality Reviews will occur at the following milestones during Foundations Engineering Assignments:

|                      |   |
|----------------------|---|
| Quality Review No. 1 | Completion of Field and Laboratory Investigations |
| Quality Review No. 2 | Completion of Draft Report                        |
| Quality Review No. 3 | Completion of Assignment                          |

The Quality Reviews will be carried out by a Senior Staff Member or Manager with sufficient authority to impact the performance of the services and enable a successful implementation of the Plan.

JW will conduct all Milestone Quality Reviews, at the milestone deliverable completions or whenever there are perceived deviations from the Quality Control Plan.








The Quality Review findings will be documented in Quality Reports provided solely for that purpose. The Quality Review may disclose non-conformities to the Quality Control Plan. The Quality Control Auditor will notify the Project Manager of the non-conformities. The Project Manager will take action to resolve the non-conformities in a timely manner. These non-conformities, their resolution and corrective action shall also be recorded in the Quality Review Report(s). The Project Manager will provide the Ministry with the Quality Review Reports within 5 business days after each Quality Review completion. These Reports will also be easily retrievable and available for perusal by MTO staff or its agents upon request.

#### **4. Quality Control Records**

The following pages provide the Technical and Quality review checklists which will be utilized for reporting results of the reviews. These documents will be forwarded to MTO within five business days of the completion of a review. Copies will be also forwarded to the JW Project Manager. The originals will be kept within the Quality Control File for the assignment.

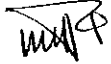

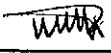
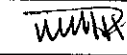
**Technical Review Memos****Technical Review No. 1****Review of Field Investigation Plan**

The Technical Reviewer will examine the field investigation plan with respect to methodology, procedures and standards to check for conformance with the Terms of Reference, suitability to existing conditions and project requirements, and to ensure that the proposed work will effectively meet the project objectives given the construction history.

| Field Investigation Plan          | Accordance   | Required Actions and Documentation |
|-----------------------------------|--|------------------------------------|
| Foundation Elements               |  02-21-06 |                                    |
| Approach Fills and Embankments    |  02-21-06 |                                    |
| In-situ Testing                   |  u        |                                    |
| Sampling Procedures               |  u        |                                    |
| Groundwater                       |  u        |                                    |
| Corrosion Resistance              |  u        |                                    |
| Surveys<br>(vertical, horizontal) |  u        |                                    |












**Technical Review No. 2      Site Investigation Documentation**

The Technical Reviewer will examine the summarized field and laboratory information to check for accuracy and completeness of data and conformance with the Terms of Reference and project requirements.

| <b>Field Information</b>   | <b>Accordance</b>   | <b>Required Actions and Documentation</b> |
|--|---|---|
| Testhole Logs<br>- Fills<br>- Cohesive<br>- Non-cohesive<br>- Bedrock<br>- Groundwater | <br>02-21-06 |   |
| Surveys  | <br>02-21-06 |   |
| Borehole Location Plan   | <br>02-21-06 |   |
| Stratigraphic Plot   | <br>02-21-06 |   |
| <b>Laboratory Information</b>  | <b>Accordance</b>   | <b>Required Actions and Documentation</b> |
| Soils  |   |   |
| Bedrock  |   |   |
| Corrosion Resistance   |   |   |


**Technical Review No. 3      Review of Draft Preliminary Report**

The following items will be reviewed within the foundation file and the Draft Preliminary Foundation Report to document methodology, standards, accuracy of data and calculations in comparison to the Terms of Reference and project requirements.

| Foundation Design File  | Accordance   | Required Actions and Documentation |
|---|--|------------------------------------|
| Foundation Design   |  02-21-06 |                                    |
| Earth Pressure Design   |  u        |                                    |
| Embankment Design/Stability   |  u        |                                    |
| Dewatering  |  u        |                                    |
| Erosion Protection  |  u        |                                    |
| Frost Protection  |  u        |                                    |
| Construction Concerns   |  u        |                                    |
| Cost Assessment   |  u        |                                    |
| <b>Draft Preliminary Foundation Report</b>  |  u        |                                    |
| Foundation Investigation <ul style="list-style-type: none"><li>- Site Description</li><li>- Investigation Procedure</li><li>- Description of subsurface Conditions</li><li>- Borehole Location Plan</li><li>- Stratigraphic Plot</li><li>- Borehole Records</li><li>- Testing Results</li></ul>   |  u      |                                    |
| Foundation Design <ul style="list-style-type: none"><li>- Proposed Development</li><li>- Geotechnical Assessment</li><li>- Proposed Alternatives</li><li>- Alternative Comparison</li><li>- Recommended Alternative</li><li>- Design Recommendations<ul style="list-style-type: none"><li>• Structure Foundation</li><li>• Earth Pressure</li><li>• Embankments</li><li>• Dewatering</li><li>• Erosion Protection</li><li>• Frost Protection</li><li>• Construction Concerns</li></ul></li><li>- Red Flag Issues</li><li>- Specifications</li><li>- Details</li></ul> |  u      |                                    |

**Technical Review No. 4****Foundation Design Selection**

The following items will be reviewed to ensure that adequate consultation has occurred with the appropriate team members prior to selection of final design.

| Foundation Design Selection  | Accordance   | Required Actions and Documentation |
|--|--|------------------------------------|
| Consultation with <ul style="list-style-type: none"><li>- MTO Foundations Group</li><li>- Structural Engineer</li><li>- Construction</li><li>- Planning and Design</li><li>- Pavement/Geotechnical Section</li></ul> |  02-21-06 |                                    |

**Technical Review No. 5****Review of Final Preliminary Report**

The following items will be reviewed for accuracy and completeness within the final Preliminary Foundation Report in comparison to the Terms of Reference and Project Requirements as well as the comments received from the prime consultant and other project team members.

| Final Preliminary Foundation Report   | Accordance | Required Actions and Documentation |
|---|------------|------------------------------------|
| Review with MTO Foundation Groups' comments   |            |                                    |
| Review with prime consultant comments   |            |                                    |
| Review with team comments <ul style="list-style-type: none"><li>- Pavement/Geotechnical Section</li><li>- Planning and Design</li><li>- Construction</li><li>- Structural</li></ul> |            |                                    |
| Review with RFP   |            |                                    |

**Technical Review No. 6****Preliminary Design Stage Consultation**

All input to the design team will be reviewed by the Technical Reviewer during this stage of the project.

| <b>Final Design and Tender Preparatoin</b> | <b>Accordance</b> | <b>Required Actions and Documentation</b> |
|--|-------------------|---|
| Consultation with Structural Engineer      |                   |   |
| Consultation concerning Staging            |                   |   |
| Constructability Review                    |                   |   |

**Quality Review Memos****Quality Review No. 1      Completion of Field and Laboratory Investigations**

The QC Auditor will carry out a review of the project to this point to ensure that the process control procedures established above have been appropriately applied and documented. In addition, the QC Auditor will confirm that the Technical Reviews required to this stage have been completed and filed as required. Finally, the QC Auditor will review the occurrence and disposition of any deviations or non-conformities. The following checklist will be included with Quality Review Memo No.1:

| <b>Item</b>                               | <b>Accordance</b> | <b>Suggested Actions and Documentation</b> |
|---|-------------------|--|
| Adherence to Process Control              |                   |  |
| Completion of Technical Review Memo No. 1 |                   |  |
| Deviations or Non-Conformities            | NA                |  |

**Quality Review No. 2      Completion of Draft Report**

The QC Auditor will carry out a review of the project to this point to ensure that the process control procedures established above have been appropriately applied and documented. In addition, the QC Auditor will confirm that the Technical Reviews required to this stage have been completed and filed as required. Finally, the QC Auditor will review the occurrence and disposition of any deviations or non-conformities. The following checklist will be included with Quality Review Memo No.2:

| <b>Item</b>                               | <b>Accordance</b> | <b>Suggested Actions and Documentation</b> |
|---|-------------------|--|
| Adherence to Process Control              |                   |  |
| Completion of Technical Review Memo No. 2 |                   |  |
| Completion of Technical Review Memo No. 3 |                   |  |
| Completion of Technical Review Memo No. 4 |                   |  |
| Deviations or Non-Conformities            | NA                |  |

**Quality Review No. 3      Completion of Assignment**

Upon completion of the assignment, the QC Auditor will carry out a review of the project to ensure that the process control procedures established above have been appropriately applied and documented. In addition, the QC Auditor will confirm that the Technical Reviews required to this stage have been completed and filed as required. The QC Auditor will review the occurrence and disposition of any deviations or non-conformities. In addition, the QC Auditor will provide suggestions on possible improvements for implementation on the next assignment. The following checklist will be included with Quality Review Memo No. 3.

| <b>Item</b>                               | <b>Accordance</b> | <b>Suggested Actions and Documentation</b> |
|---|-------------------|--|
| Adherence to Process Control              |                   |  |
| Completion of Technical Review Memo No. 5 |                   |  |
| Completion of Technical Review Memo No. 6 |                   |  |
| Deviations or Non-Conformities            | NA                |  |
| Possible Improvements                     | NA                |  |

## Sangiuliano, Tony (MTO)

**To:** Weisser, Vladimir (MTO)  
**Subject:** RE: GWP 66-99-00, Hwy 62 from Cnty Rd 620 southerly for 17.6 km; GWP 248-99-00 Hwy 62, Beaver Cr. Bridge; GWP 545-93-00 Hwy 60, Clark's & Kearney Bridge.

Vladimir:

The cost for conducting a total of three preliminary foundation investigations at:

1. Beaver Creek
2. Clark's Creek
3. Kearney Creek

is \$75,000.

Terms of Reference for Foundation Engineering for Preliminary Design are attached.



FDN Terms for  
Preliminary Desi...

-----Original Message-----

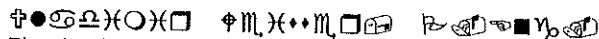
**From:** Weisser, Vladimir (MTO)  
**Sent:** January 10, 2003 4:31 PM  
**To:** Bhatti, Wiker; Bowers, Robin (MTO); Ingram, Dale (MTO); Kerr, David; Ng, Ed (MTO); Ogilvie, Kevin; Oomen, Martin; Pearson, Dave (MTO); Poirier, Chris (MTO); Purchase, Bruce; Sangiuliano, Tony (MTO); Sproule, Darwyn (MTO); Telford, Tom (MTO); Webster, Paul (MTO)  
**Cc:** Lee, George (MTO); Robinson, Bob (MTO); Peters, Lloyd (MTO); Prince, Andy (MTO)  
**Subject:** GWP 66-99-00, Hwy 62 from Cnty Rd 620 southerly for 17.6 km; GWP 248-99-00 Hwy 62, Beaver Cr. Bridge; GWP 545-93-00 Hwy 60, Clark's & Kearney Bridge.

Hello Team Members,

Attached are Minutes from the Project Scoping Meeting. Should you have any comments, please let me know. Further please note that the cost estimate is required by January 16, 2003 and Tof R for EOI Notice by January 20, 2003. Please provide your information as required. I am attaching also a draft of the EOI posting for your review and input.

Thank you for your co operation.

<< File: EOI Notice Template July 2002.doc >> << File: Minutes 66PIMtg.doc >>



Planning & Design  
Ministry of Transportation  
Eastern Region  
Phone: (613) 547 1799  
Fax: (613) 540 5106

# MEMORANDUM

To: V. Weisser, Project Manager  
Planning and Design Section  
Eastern Region

May 10, 2001

From: Pavements and Foundations Section  
Room 315, Central Bldg.

Tel: (416) 235-5267  
Fax: (416) 235-5240

Re: RFP Evaluation-Preliminary Design Services  
Hwy 62 – from 5.3 km North of Cleveland Rd to 300 m south of County Rd 620  
GWP 66-99-00 and 248-99-00

As requested, our office has completed the evaluation of the TPM preliminary design proposals for the above mentioned project. Our evaluation consisted of reviewing only the foundation components of the following project sections:

1. Project Schedule
2. Management Plan - Key Staff
3. Preliminary Design Plan - Foundation Design

Table 1 attached summarizes the evaluations of the three proposals.

In general, the evaluations reveal that the proposals address the foundation terms of reference. A rating could not be provided for the Foundation Engineering Key Staff in the Management Plan because the "Foundation Engineering Specialist" was excluded from the Key Staff table included on page 8 of the evaluation form. All proposals satisfy the Key Staff requirements.

We are concerned with the differences in scope of investigation identified with the proposals. The Golder proposal is based on a three(3) span structure, the Jacques Whitford's proposals are based on a single span structure and the Peto MacCallum proposal identifies that a third borehole be placed "in the centre of the existing structure". Furthermore, the Golder proposal is based on ten(10) metre deep boreholes rather than stating that the boreholes will be advanced to refusal. The inconsistencies, restrictions and limitations proposed can produce claims for extra work unless clarification is requested up front.

The terms of reference require that boreholes be advanced at the proposed structure foundation locations and to the appropriate depths. It is therefore recommended that confirmation be sought for all the technical proposals that the boreholes will be advanced to the appropriate depth at the proposed structure foundation locations in accordance with the terms of reference and that the financial proposal reflect this scope of work.

We trust this evaluation is sufficient for your purposes. If you have any questions, please do not hesitate to contact our office.

T. Sangiuliano, P. Eng.  
Foundation Engineer  
for

D. Dundas, P. Eng.  
Senior Foundation Engineer

Table 1 - RFP Evaluation Summary Table

| Evaluation Component   | Morrison<br>Hershefield/Golder   | Giffels/<br>Jacques Whitford  | Harmer Podolak/Jacques<br>Whitford  | Stantec/Peto MacCallum   |
|--|--|---|---|--|
| Project Schedule   | - Site investigation not clearly defined as an activity in Gantt Chart   | ✓ - no deficiencies   | ✓ - no deficiencies   | ✓ - no deficiencies  |
| Management Plan - Key Staff  | ✓ - addressed  | ✓ - addressed   | ✓ - addressed   | ✓ - addressed  |
| Preliminary Design Plan - Foundations<br>(Max Score = 100)<br>• Compliance with Project Requirements in Section B of the TPM RFP (Max Score = 50)                                    | <ul style="list-style-type: none"> <li>✓ - addressed<br/>borehole depths based on assumption that refusal will be encountered at 10 metre depth</li> <li>- one(1) Shelby tube sample per borehole may not be sufficient;</li> <li>- why so many Point Load Tests?</li> </ul> | <ul style="list-style-type: none"> <li>✓ - partially addressed investigation assumes one span integral abutment structure and hence borehole numbers are fewer than proposals submitted by others(4 including approach holes vs 6)</li> <li>- although settlement is identified as a possible concern, consolidation tests not explicitly identified, only "other tests deemed necessary to characterize the properties of the soil"</li> </ul> | <ul style="list-style-type: none"> <li>✓ - partially addressed investigation assumes one span integral abutment structure and hence borehole numbers are fewer than proposals submitted by others(4 including approach holes vs 6)</li> <li>- although settlement is identified as a possible concern, consolidation tests not explicitly identified, only "other tests deemed necessary to characterize the properties of the soil"</li> </ul> | <ul style="list-style-type: none"> <li>✓ - partially addressed investigation includes 3 boreholes for replacement structure, 1 BH at either abutment and 1 BH at centre of structure; boreholes are to be advanced at proposed structure foundation locations</li> </ul> |
| • Plan for anticipated meeting with the Ministry, and the status of the deliverables which will have been achieved at the time any formal meetings are to take place(Max Score = 30) | ✓ - addressed  | ✓ - addressed   | ✓ - addressed   | ✓ - addressed  |
| • Understanding and commitment to apply proper Ministry Directives, Guidelines, Manuals, etc(Max Score = 20)   | ✓ - addressed  | ✓ - addressed   | ✓ - addressed   | ✓ - addressed  |
| <b>TOTAL</b>   | <b>80</b>  | <b>75</b>   | <b>75</b>   | <b>78</b>  |



# Memorandum

Planning and Design Section

613 545 4815  
Fax: 613 540 5106

**To: Tony Sangiuliano**  
**Pavements and Foundation Section**

2001-05-03

**Re: Hwy. 62 Resurfacing (W.P66-99-00) & Beaver Creek Reconstruction**  
**(W.P. 248-99-00) RFP.**

The RFP for Hwy 62 improvements and Beaver Creek Structure replacement closed yesterday. Four Consulting firms (Morrison Hershfield, Harmer Podolak, Stantec, Giffels) have submitted their proposals.

Vladimir Weisser sent you an electronic version of the evaluation document and a copy of the original RFP. This package is the Consultants' proposals. As requested please evaluate the proposals and provide Vladimir with your evaluation by Friday, May 25, 2001.

Thank you for your co-operation.

Maureen Belch  
Senior Transportation Design Technician  
Planning and Design



EOI Submission Due Date: Monday November 6, 2000  
EOI Submission Due Time: 1:30:00 PM

## 1 Month Posting

### 1. Consultant Agreement #:

Assignment #: 4005-A-000162

### 2. MTO Project Manager & Phone #:

Shared Services Bureau/Tenders Office, Fax #(613) 545-4769

### 3. Issuing Office or Section:

Section: Planning and Design  
Region: Eastern

### 4. Project WP#:

W.P. # 66-99-00 and W.P. # 248-99-00

### 5. MTO District/Highway/Bridge Site #:

District: 43, Bancroft  
Highway: 62  
Bridge Site #: 11-34  
Other:

WP 248-99-00

### 6. Project Length/Location:

- 1) WP 66-99-00, Hwy 62, from 5.3 km north of Cleveland Road northerly to 300 m south of County Road 620, 17.3 km, and
- 2) WP 248-99-00, Hwy 62, Beaver Creek Structure Replacement  
County of Hastings, Townships of Tudor and Cashel and Limerick

### 7. Project Type (Category):

Highway Engineering  
(Drainage and Hydrology Engineering, Property)  
Environmental  
Surveying  
Pavement Design and Road Infrastructure Management  
Electrical  
Traffic Engineering  
Bridge Engineering  
Foundations Engineering

### 8. Specialties Required:

Highway Engineering – PRELIMINARY DESIGN – FUNCTIONAL PLANNING AND

## DESIGN STUDIES

- DRAINAGE AND HYDROLOGY ENGINEERING
- Environmental – ACCOUSTICS AND VIBRATION
- ARCHAEOLOGY / HERITAGE
- CLASS ENVIRONMENTAL ASSESSMENT PROCESS
- CONTAMINANT / WASTE MANAGEMENT
- LANDSCAPE ARCHITECTURE
- NATURAL SCIENCES
- SOCIO-ECONOMICS / AGRICULTURE
- Surveying – PRELIMINARY AND DETAIL ENGINEERING DESIGN
- Pavement Design and Road Infrastructure Management – SOILS AND PAVEMENT INVESTIGATIONS – MEDIUM COMPLEXITY
- PAVEMENT DESIGN – MEDIUM COMPLEXITY
- Electrical Engineering – MINOR ELECTRICAL WORK
- Traffic Engineering – TRAFFIC OPERATIONS STUDIES
- Bridge Engineering – Design and Evaluation – Single Span
- Foundations Engineering – GEOTECHNICAL (STRUCTURES AND EMBANKMENTS) – LOW COMPLEXITY

## 9. Description of Project:

### Highway Engineering

Two separate preliminary designs are required. One preliminary design study is required for the resurfacing of 17.3 km of Highway 62. This rural highway needs to be upgraded for drainage, geometric, traffic operations, clear zone safety and possible relocation of municipal lighting and pavement deficiencies. A separate preliminary design study is also required for the temporary detour and replacement of the Beaver Creek Structure. A survey will be required to update existing ETR sheets, possible temporary traffic signals at the detour and foundations investigations will be required at the structure.

### Environmental

These two preliminary designs will follow the approved environmental planning process for Group 'B' projects under the Class Environmental Assessment for Provincial Transportation Facilities (1977). At study completion, two Transportation Environmental Study Reports will be produced.

### Geotechnical

The geotechnical component of the assignment will generally involve: a literature review; a review of contract and pavement performance data; a field review of areas of proposed improvements and identification of potential geotechnical issues; soils and pavement investigations consisting of approx. 1 borehole and 1 core per km of roadway; soils investigations at proposed passing lanes; crack survey with cores; development of preliminary pavement rehabilitation strategies to carry forward to detail design; participation in study team as required; preparation of summary document.

### Preliminary and Detail Engineering Design (Engineering Surveys)

Full pre-contract engineering survey specialties with the following mandatory requirements. As a minimum, the respondents to this project notice must have demonstrated expertise in the following and provide proof of the same:

- a) Successful completion of at least two similar full pre-contract engineering surveys. – The project will require the establishment of horizontal and vertical project control and integration into the existing geodetic referencing

framework; least squares adjustment of survey data; collection of 3d ground data; creation of a DTM; calculation of alignments, cross-sections and profiles, and base plan preparation.

- b) Deliverables must be compatible with Ministry Engineering digital data formats (Autocad v. 12, Softdesk v 8.0) – Specify software and hardware to be used for the current project. Provide specific project details, eg. Location, manager and provide any Performance Appraisals.
- c) List of staff and their applicable experience for the above-noted speciality is required.

### **Electrical Engineering**

A design for temporary traffic signals may be required at the Beaver Creek Structure. Their may be a requirement for relocation of municipal lighting.

### **Traffic Engineering**

A traffic report is required to document the proposed operational improvements within this work project.

The following items have been completed and will be made available to the short listed firms for use in the preparation of the RFP and final design package:

- ETR Plates
- Digital Terrain Model
- Aerial Mosaic
- Pavement Performance Records

### **Bridge Engineering**

A preliminary design for a full structure replacement is required.

### **Foundations Engineering**

A foundation investigation for the removal and replacement of the structure at the Beaver Creek is required.

- Foundation Engineering / Geotechnical  
- medium complexity

## **10. Assignment approximate start and completion dates:**

Pre-contract  
engineering phase: January 2001 to March 2003  
Construction  
administration phase: N/A

## **11. Method of Acquisition:**

Request for Proposal

## **12. Submit 3 copies of EOI by Mail or Courier to:**

Name: Shared Services Bureau  
Address: 355 Counter Street

Postal Bag 4000  
Kingston, Ontario  
K7L 5A3

Phone #: (613)545-4881

### 13. Comments:

1) When submitting EOI clearly mark on outer envelope:

EXPRESSION OF INTEREST,

Agreement Number 4005-A-000162

W.P. 67-99-00, Highway 7

Failure to submit by the date and time indicated, or failure to submit the required copies in the required format, will result in disqualification of the EOI.

2) Only firms that can demonstrate satisfactory ability the *Prime Specialties* of "Highway Engineering – Preliminary Design – Functional Planning and Design Studies" and "Bridge Engineering – Design and Evaluation - Single Span" will be considered as candidates for the Prime Consultant position on this assignment.

3) Companies preparing submissions are advised to refer to "Speciality Criteria" located on the government's web site for the specific requirements of the identified "Specialties" ([www.raqs.mto.gov.on.ca](http://www.raqs.mto.gov.on.ca)).

4) **Submit 8 (eight) copies of EOI and not 3 as shown in #12.**

5) When assessing submissions from companies interested in performing this work, **the ministry may select on an interview basis**, the ministry will assign weights to the required engineering services specialties according to the following distribution:

HIGHWAY ENGINEERING **20%**

- Preliminary Design – Functional Planning and Design Studies
- Drainage and Hydrology Engineering

ENVIRONMENTAL **15%**

Class EA Process – Acoustics & Vibration  
Archaeology / Heritage  
Class Environmental Assessment Process  
Contaminant / Waste Management  
Landscape Architecture  
Natural Sciences  
Socio-Economics / Agriculture

SURVEYING **10%**

- Preliminary and Detail Engineering Design

PAVEMENT DESIGN AND ROAD INFRASTRUCTURE MANAGEMENT **15%**

ELECTRICAL ENGINEERING **5%**

TRAFFIC ENGINEERING **5%**

BRIDGE ENGINEERING **20 %**

FOUNDATIONS **10%**

6) AN EOI SUBMITTED FOR THIS ASSIGNMENT MUST ALSO INCLUDE A COMPLETED RAQS DECLARATION STATEMENT. The signed and dated statement must indicate the following:

"I/We hereby certify that (legal name of company), at the time of submitting this Expression of Interest, has verified that our company is approved in the Essential Specialities in R.A.Q.S. and that the Key Personnel identified in R.A.Q.S. for our company are current and valid for the Essential Specialities required for this assignment, or where such identified Key Personnel are no longer current and valid for our company, revised Key Personnel information has been 'Submitted For Approval' in R.A.Q.S."

7) For this EOI submission, proponents must use the LONG FORM EOI dated April 4, 1997 which may be downloaded from the Ministry website. Proponents are to include in their EOI submissions, the number and type of similar MTO projects that staff have worked on in the past.

8) There is a limit of 15 pages allowed for completion of Attachment 2 of the EOI.

## FOUNDATION ENGINEERING TERMS OF REFERENCE for Preliminary Design

### 4.8 Foundation Engineering

#### 4.8.1 Project Scope

A preliminary design study is required for the temporary detour and replacement of the Beaver Creek Structure. A foundation investigation is required for the design and construction of the removal and replacement of the structure at the Beaver Creek.

The Foundation Engineering consultant services required for this assignment have been categorised as **medium** complexity, **Geotechnical** speciality.

For Engineering Materials Testing and Evaluation, the consultant shall be qualified to carry out low complexity soil testing including quick triaxial compression test and consolidation test.

#### 4.8.2 Terms of Reference 'General'

Consultant services shall be provided in accordance with the most recent edition of the Canadian Highway Bridge Design Code in effect for MTO projects, the 'Guideline for Professional Engineers Providing Geotechnical Engineering Services' (1993) published by the Professional Engineers of Ontario and the provisions in these Terms of Reference. The purpose of the consultant's proposal is to demonstrate understanding of the project requirements and for proposal evaluation. The Terms of Reference shall govern where conflicts occur.

For both direct and TPM assignments, Foundation Engineering consultants and subconsultants respectively that are registered in MTO's consultant acquisition system (RAQS) at complexity ratings in the required speciality that meet or exceed the identified complexity requirement for this assignment are eligible to provide Foundation Engineering services for this project.

Alternatively, for TPM assignments, the TPM prime consultant may propose a Foundation Engineering sub-consultant that is not registered. In this case, the TPM prime consultant must submit sufficient documentation at the EOI stage to demonstrate that subconsultant's capability to meet or exceed the RAQS requirements for the Foundation Engineering speciality and complexity requirements identified for this assignment. The TPM prime consultant is responsible for selecting qualified Foundation Engineering sub-consultants.

In order to ensure consistency and accountability, the designated principal contact identified for Foundation Engineering services by MTO must be the liaison for this project and shall sign, and where required, seal all submissions and correspondence.

Services include, but are not restricted to:

Conducting a site investigation that shall be of sufficient scope to provide adequate subsurface information to justify preliminary recommendations and to permit planning of detail design assignments.

This is normally accomplished by evaluating the available geological and other pertinent subsurface information including the nature of the terrain and the performance of existing structures and/or roads, and making an adequate number of boreholes, soil samples, rock core

samples, dynamic cone tests, test pits and soundings (explorations) to supplement existing data, and carrying out laboratory tests on samples to obtain factual information, such as:

- The vertical and horizontal extent of subsurface materials (including both soil and rock) and their pertinent engineering properties.
- Groundwater conditions including groundwater levels perched or otherwise, the location of aquifers, the location and characteristics of artesian groundwater if any, the quantity of flow and the presence or otherwise, of natural gas or chemicals dissolved in groundwater or surface water.

***Minimum requirements for subsurface investigation:***

One borehole is required at each abutment of the proposed structure. Intermediate boreholes are required so that borehole spacing does not exceed 50m. Boreholes shall extend to refusal as defined by material for which Standard Penetration Tests exceeding 100 blows per 0.3m.

One borehole is required on either side of the Beaver Creek along the alignment of any temporary detour structure. Boreholes shall extend to refusal as defined by material for which Standard Penetration Tests exceeding 100 blows per 0.3m.

For bidding purposes, ~~where no existing subsurface information is available~~, it shall be assumed that borehole depths will not exceed 30m. Where competent stratum is not reached within 30m, additional boring shall be negotiated as extra work prior to being carried out.

Sampling is required at 1.5 m intervals to a depth of 15m, and 3m intervals beyond 15m. Sufficient sampling and in situ testing, such as the Standard Penetration Test and MTO Field Vane Test, are required to develop a comprehensive subsurface model. The consultant shall retain samples for a period of 1 year after completion of the project unless otherwise authorized in writing by the Ministry.

Abandoned explorations shall be backfilled, or otherwise restored, to ensure the safety and environmental integrity of the site. Borehole abandonment procedures shall be in accordance with MOE Regulation 903 and the most recent MTO guidelines. In general, boreholes and piezometer tubes shall be backfilled with a suitable bentonite/cement mixture. Test pits shall be backfilled with suitable material and re-vegetated or otherwise protected from erosion. Temporary open holes shall be adequately covered. Holes in roads shall be backfilled as required to prevent future settlement and acceptably patched where pavement surfaces have been damaged. Where encountered, artesian groundwater conditions shall be sealed at their source. Full details of the artesian condition and the sealing operation shall be included in the Preliminary Foundation Investigation Report.

Fieldwork shall be carried out in accordance with the Occupational Health and Safety Act and MTO's Occupational Health and Safety Act Guidelines.

Providing traffic protection to MTO standards during the course of any field investigations.

Surveying the locations and elevations of all boreholes, test pits and soundings, and referring them to fixed reference points and data. Locations are to be identified by MTO co-ordinates (Northing and Easting). Where MTO co-ordinates are not available locations are to be identified by MTO Station and Offset. The vertical accuracy shall be within 0.1m. Horizontal accuracy shall be within 0.5 m.

***Minimum Laboratory Testing Requirements:***

Laboratory testing shall consist of routine testing of 25% of samples. The consultant shall provide a table detailing the proposed laboratory testing program. Routine lab testing is defined as a suite of natural water content, Atterberg Limit and grain size distribution analyses.

### ***Borehole Log Preparation and Foundation Drawing:***

Preparing borehole log sheets, figures and drawings in accordance with the Ministry's standards. The Foundation Drawing shall consist of a plan showing the locations of all borings, test pits and soundings. A stratigraphic profile shall be included in the Foundation Drawing for the proposed replacement structure and the detour.

### ***Minimum Requirements for the Preliminary Foundation Investigation and Design Report:***

A Preliminary Foundation Investigation and Design Report shall be prepared containing the geotechnical information required for the preliminary foundation engineering of the Project including the field and laboratory test results, and the foundation recommendations for the preliminary design of the Project. The Report shall be signed and sealed by two Professional Engineers licensed by the Professional Engineers of Ontario, one of whom shall be that firm's designated principal identified contact for MTO Foundation Engineering projects.

A single Preliminary Foundation Investigation and Design Reports shall be prepared for the bridge structure and associated embankments and the proposed detour.

One (1) digital file (in MTO's current standard word processing program) of the text and any digital drawings available and three (3) hard copies of the Preliminary Foundation Investigation and Design Report shall be forwarded to the Project Manager.

One (1) digital file (in MTO's current standard word processing program and IESCad protocol ) of the text and any digital drawings available and one (1) hard copy of the Preliminary Foundation Investigation and Design Report shall be forwarded to

Ontario Ministry of Transportation  
Pavements and Foundations Section  
Foundations Group  
Room 223, Building C  
1201 Wilson Avenue  
Downsview, Ontario M3M 1J8

A hard copy of draft Preliminary Foundation Investigation and Design Reports, signed by two Professional Engineers licensed by the Professional Engineers of Ontario, one of whom shall be that firm's designated principal identified contact for MTO Foundation Engineering projects, shall be submitted as per the design schedule. Draft reports shall be marked DRAFT but must be comprehensive and technically complete except for issues that are clearly identified as under development and conceptual.

Where draft Foundation and Investigation Reports are submitted, they will be considered in the evaluation of performance of the Consultant.

The Report shall consist of two parts:

#### **Preliminary Foundation Investigation Report**

For bridges, the Preliminary Foundation Investigation Report shall present a subsurface model under the plan limits of foundation elements, and at the immediate approaches within 20m of the structure. For embankments, the Report shall include those sections identified under Section 4.8.3.

This portion of the report shall consist of factual information only, with no reference to recommendations or project proposals, and present details of subsurface conditions to justify preliminary recommendations.

The Preliminary Foundation Investigation Report shall consist of

- \* Site Description
- \* Investigation Procedures including site investigation and lab testing procedures
- \* Description of Subsurface Conditions including soil, rock and groundwater conditions.

#### Preliminary Foundation Design Report

The Preliminary Foundation Design Report shall present discussion and recommendations for planning purposes for both the structure and detour. Recommendations shall be presented in accordance with the requirements of the most recent edition of the Canadian Highway Bridge Design Code in effect for MTO projects. The consultant shall analyse field data and test results and make preliminary recommendations, including but not limited to:

- Structure foundations design (shallow or deep) including anticipated axial resistances, approximate founding elevations of potential foundation options
- Embankment settlement and stability
- Construction concerns of potential geotechnical problems associated with the site, including the need for shoring, dewatering.
- Comment on scope of work required for detail design

The consultant shall identify and present a comprehensive overview of the advantages, disadvantages, costs and risks/consequences of viable alternative foundation schemes in tabular format. The report should conclude a preferred alternative from a foundation technical and cost effectiveness perspective.

Liaising with the TPM team to communicate and integrate preliminary foundation engineering requirements into the planning process.

For bidding purposes, the consultant should expect to attend three team meetings with combined MTO and TPM teams. Requirements to attend more meetings shall be considered as additional work.

#### **4.8.3 Terms of Reference 'Project Specific'**

The preliminary design shall include recommendations for the preliminary design and construction of the structure foundations for both the structure and detour and recommendations for the design and construction of the approach embankments and specific construction considerations.

Sufficient subsurface information should be obtained at the structure to permit consideration of integral abutment alternatives. The recommendations should consider the requirements for roadway protection during construction.

A single Preliminary Foundation Investigation and Design Report shall be prepared.

#### **4.8.4 Reference Documents**

Information from past foundation investigations may be viewed in the GEOCRES Library, Pavements and Foundations Section. For an appointment, call (416) 235-5526.

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#### **4.8.5 Proposal Instructions**

The Preliminary Design Plan is to include the following sections:

- 4.8 Foundations Engineering
  - 4.8.1 Scope/Work Plans
  - 4.8.2 Deliverables
  - 4.8.3 Staffing
  - 4.8.4 Site Investigation and Field Testing
  - 4.8.5 Material Testing

Under 4.8.4, the proposal shall include a sketch map of the borehole locations, and a chart highlighting the borehole drilling program at specific structures/embankments.

March 22, 2004  
16-00026-3.2

Mr. Tony Sangiuliano, P.Eng.  
Foundation Engineer  
Ontario Ministry of Transportation  
Pavement and Foundations Section  
Foundations Group  
Room 223, Central Building  
1201 Wilson Avenue  
Downsview, Ontario M3M 1J8

Dear Mr. Sangiuliano:

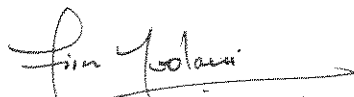
Subject: **W.P. 103-99-00 – Highway 7/12**  
**From Brock 2<sup>nd</sup> Line to North Junction Highway 7**  
**Beaver River Bridge Replacement**  
**QC Documentation – Milestone Quality Review No. 1.**

Enclosed please find the QC documentation for the following previously issued report:  
**Beaver River Bridge (Site 22-66).**

We have reviewed the foundation design recommendations and these will be incorporated in the design of the structures.

Yours very truly,

**MARSHALL MACKLIN MONAGHAN LIMITED**



for Robert D. Kivi, P. Eng.  
Vice-President  
Transportation Engineering

Encl.

cc. T. Nanthakumaran, MTO (Transmittal only)  
Firoz Moolani, MMM

**MILESTONE QUALITY REVIEW No: 1**  
**SITE INVESTIGATION AND FIELD TESTING PLAN**

Page 1 of 4

Project Name BEAVER RIVER BRIDGE REPLACEMENT Project No 19-1423-19  
GWP # 103-99-00 SITE 22-66  
HIGHWAY 7/12  
 Client MARSHALL MACKLIN MONAGHAN Date FEB. 19/04

| Item  | Yes | No* | Comments                    |
|---|-----|-----|-----------------------------|
| Have the Terms of Reference, site plans, previous investigations and other available data been reviewed?                                  | ✓   |     |                             |
| Does the Site Investigation and Field Testing Plan fully address the requirements of the Terms of Reference and the project requirements? | ✓   |     |                             |
| Has a site-specific Health and Safety review been completed and briefing notes prepared?  | ✓   |     |                             |
| Are Traffic Control and Railway Protection Plans in place, if required?   | ✓   |     |                             |
| Has a staff briefing been held and did it include Health and Safety and Traffic/Railway protection plans?                                 | ✓   |     |                             |
| Have the appropriate specialty contractors been hired and briefed on the equipment requirements?  | ✓   |     |                             |
| Has the borehole layout been completed in the field?  | ✓   |     | ONE BH HAS A SHORT CORE RUN |
| Have utility clearances been completed and the clearance or stakeout forms placed in the file and copies provided to the field staff?     | ✓   |     |                             |
|   |     |     |                             |
|   |     |     |                             |
|   |     |     |                             |
|   |     |     |                             |

\* If "No", comments must be provided or documentation be attached.

Quality Auditor

PAULO BRANCO

*P. Branco*

**MILESTONE QUALITY REVIEW No: 1**  
**FIELD AND LABORATORY WORK**

Page 2 of 4

| Project Name <u>BEAVER RIVER BRIDGE REPLACEMENT</u>  |     | Project No <u>19-1423-19</u> |                                    |
|--|-----|------------------------------|------------------------------------|
| Client <u>MASHALL MACKLIN MCDONAGHAN</u>   |     | Date <u>FEB. 19/04</u>       |                                    |
| Item   | Yes | No*                          | Comments                           |
| Were all planned of boreholes drilled?   | ✓   |                              |                                    |
| Were there deviations from the planned locations? (If "Yes", document why.)  |     | ✓                            |                                    |
| Were the borehole depths as specified and appropriate to the site conditions?  | ✓   |                              |                                    |
| Was all required routine and specialized field testing conducted?  | ✓   |                              |                                    |
| Were piezometers installed?  | ✓   |                              |                                    |
| Have groundwater levels been recorded?   | ✓   |                              |                                    |
| Have final borehole coordinates and geodetic elevations been obtained ?  | ✓   |                              |                                    |
| Has borehole abandonment been completed?   |     |                              | <u>PIEZOMETERS TO BE ABANDONED</u> |
| If reports are required for unrestored damages or artesian groundwater conditions, have these been prepared?                               |     |                              | <u>NONE REQUIRED</u>               |
| Were there any safety incidents or damage to utilities or private property? If so, have the necessary reports been prepared and submitted? |     | ✓                            | <u>NONE REQUIRED</u>               |
| Were incoming borehole samples recorded?   | ✓   |                              |                                    |
| Were visual identifications completed?   | ✓   |                              |                                    |
| Have routine tests been completed and presented on borehole logs and/or separate graphical plots?  | ✓   |                              |                                    |
| Do the routine tests represent 25% of all samples collected?   | ✓   |                              |                                    |
| Has any required specialized testing been completed and properly presented?  |     | ✓                            | <u>NONE REQUIRED</u>               |

\* If "No", comments must be provided or documentation be attached.

Quality Auditor

PAULO BRANCO - P. Branco

## Page 3 of 4

Client MARSHAL MACKLIN MONAGHAN Date FEB 19/04

\* If "No", comments must be provided or documentation be attached.

Quality Auditor PAULO BRANCO - *P Branco*

**MILESTONE QUALITY REVIEW No: 1  
REPORTING**

Page 4 of 4

|  |  |                             |  |
|--|--|-----------------------------|--|
| Project Name <u>BEAVER <sup>RIVER</sup> BRIDGE REPLACEMENT</u> |  | Project No <u>R-1423-19</u> |  |
| Client <u>MARSHAL MACKLIN MONAGHAN</u>                         |  | Date <u>FEB 19/04</u>       |  |

| Item  | Yes | No* | Comments |
|---|-----|-----|----------|
| Have borehole logs been prepared in accordance with MTO standards?  | ✓   |     |          |
| Is all field and laboratory data clearly presented?   | ✓   |     |          |
| Have the plans and the stratigraphic profiles and cross-sections been prepared in accordance with MTO standards?  | ✓   |     |          |
| Has the report been prepared as two sections as required?   | ✓   |     |          |
| Have all standard sections been included?   | ✓   |     |          |
| Have sections been included addressing all project-specific topics?   | ✓   |     |          |
| If a draft report is being issued, has it been identified as "Draft"?   | ✓   |     |          |
| If any issues are "conceptual" and incomplete, have they been clearly identified as such?   | ✓   |     |          |
| Are borehole logs, data plots, plans etc. all included?   | ✓   |     |          |
| Are standard insert sheets included?  | ✓   |     |          |
| Has the report been signed and sealed by two Professional Engineers including the Review Principal and a Designated Principal Contact for MTO Foundations Projects? | ✓   |     |          |
| For the Final Report, have all comments from the Client (MTO or Prime Consultant) been fully addressed and resolved?  |     |     |          |
| At final reporting, have the required hard copies and digital files been prepared?  |     |     |          |

\* If "No", comments must be provided or documentation be attached.

Quality Auditor

PAULO BRANCO - P. Branco

## Project Specific Supplementary Specialty Plan: Foundation Assignments

GWP No.: 103-99-00, Site 22-66, Beaver River Bridge Replacement

Purchase Order No.: 2005-A-000161

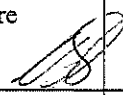

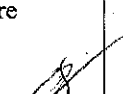
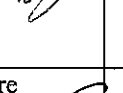
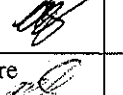
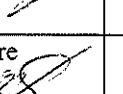
Highway No.: Highway 7/12

Location: Blackwater, Ontario

Consultant/Sub-consultant Name: **Thurber Engineering Ltd.**

Specialty: **Foundation Engineering - Geotechnical (Structures & Embankments)**

Date: **February 2004**

| No.<br>(1)                   | Phase/Task<br>(2)                              | Methodology<br>(3)  | Deliverables<br>(4) | Reference<br>Manuals<br>(5)   | Independent Technical<br>Review                |  | Quality<br>Control<br>Review and<br>Auditor<br>Staff<br>(8) | Completion<br>Date for<br>Task and<br>Milestone<br>Quality<br>Review<br>(9) |
|------------------------------|--|---|---------------------|---|--|--|---|---|
|                              |  |   |                     |   | Procedure<br>(6)                               | Documentatio<br>n<br>(7)   |   |   |
| 1.0 FOUNDATION INVESTIGATION |  |   |                     |   |  |  |   |   |
| 1.1                          | Project<br>initiation                          | Initiate internal<br>documentation, brief project<br>staff  | N/A                 | RFP;<br>Correspondence  | Review<br>documentation                        | Signature<br>   | A. Gorman,<br>P.Eng.  | September<br>30, 2003   |
| 1.2                          | Background<br>Data<br>Collection and<br>Review | Review and list existing<br>plans and geological maps,<br>reports, RFP and<br>correspondence  | N/A                 | N/A   | Check list of<br>materials for<br>completeness | Signature<br>   | A. Gorman,<br>P.Eng.  | September<br>30, 2003   |
| 1.3                          | Site Inspection                                | Visit site, inspect visible<br>geology, topography and<br>land use. Assess<br>requirements for drill<br>access, traffic control and<br>safety plan. | N/A                 | Ontario Traffic<br>Manual, Book7;<br>Thurber Safety<br>Manual;<br>OHSA; Terms<br>of Reference | Review results<br>of site<br>inspection.       | Signature<br>  | A. Gorman,<br>P.Eng.  | September<br>30, 2003   |
| 1.4                          | Prepare<br>Traffic<br>Control Plan             | Prepare a written plan for<br>traffic control taking<br>account of site conditions  | N/A                 | Ontario Traffic<br>Manual, Book7  | Review Traffic<br>Plan <i>NOT REVIEWED</i>     | Signature<br> | A. Gorman,<br>P.Eng.  | September<br>30, 2003   |
| 1.5                          | Prepare Safety<br>Plan                         | Prepare written plan for site<br>conditions.  | N/A                 | OHSA; Book 7;<br>Thurber Safety<br>Manual   | Review Safety<br><i>OK 7/03</i>                | Signature<br> | A. Gorman,<br>P.Eng.  | September<br>30, 2003   |
| 1.6                          | Permission to<br>Enter (PTE)                   | Co-ordinate permission to<br>enter private property.  | N/A                 | N/A   | Review PTE<br><i>11/17 in notes</i>            | Signature<br> | A. Gorman,<br>P.Eng.  | September<br>30, 2003   |

# Project Specific Supplementary Specialty Plan: Foundation Assignments

GWP No.: 103-99-00, Site 22-66, Beaver River Bridge Replacement

Purchase Order No.: 2005-A-000161


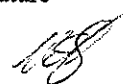


Highway No.: Highway 7/12

Location: Blackwater, Ontario

Consultant/Sub-consultant Name: **Thurber Engineering Ltd.**

Specialty: **Foundation Engineering - Geotechnical (Structures & Embankments)**

Date: **February 2004**

| No.<br>(1) | Phase/Task<br>(2)             | Methodology<br>(3)   | Deliverables<br>(4) | Reference<br>Manuals<br>(5) | Independent Technical<br>Review   |  | Quality<br>Control<br>Review and<br>Auditor<br>Staff<br>(8) | Completion<br>Date for<br>Task and<br>Milestone<br>Quality<br>Review<br>(9) |
|------------|-------------------------------|--|---------------------|-----------------------------|---|--|---|---|
|            |                               |  |                     |                             | Procedure<br>(6)  | Documentatio<br>n<br>(7)   |   |   |
| 1.7        | Brief Staff                   | Meet with all field staff plus key office and laboratory staff   | N/A                 | N/A                         | Review Briefing Notes   | Signature<br>GCR/03<br> | A. Gorman,<br>P.Eng.  | September<br>30, 2003   |
| 1.8        | Engage Specialist Contractors | Provide written instructions regarding project requirements, schedule and site specific issues to contractors (drilling, traffic control, etc)         | N/A                 | N/A                         | Review Contractor instructions.   | Signature<br>           | A. Gorman,<br>P.Eng.  | September<br>30, 2003   |
| 1.9        | Borehole Layout               | Co-ordinate layout of borehole locations in field by surveyor. Obtain record of locations by UTM co-ordinates.   | N/A                 | N/A                         | Review record of locations.<br>4/10/03<br>THURBER<br>CO-ORD/03<br>FILED LDM | Signature<br>          | A. Gorman,<br>P.Eng.  | September<br>30, 2003   |
| 1.10       | Project Notification          | File Notice of Project with MOL.<br>Notify<br>i) MTO Project Manager<br>ii) MTO Local Operations<br>iii) TPM Team<br><br>of commencement of fieldwork. | N/A                 | N/A                         | Review notifications<br><br>NO NOTICE<br>FILED<br>- \$50K                   | Signature<br>         | A. Gorman,<br>P.Eng.  | September<br>30, 2003   |
| 1.11       | Utility                       | Contact local Utility  | N/A                 | N/A                         | Review utility  | Signature  | A. Gorman,  | September   |

## Project Specific Supplementary Specialty Plan: Foundation Assignments

GWP No.: 103-99-00, Site 22-66, Beaver River Bridge Replacement


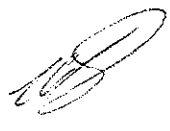

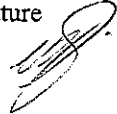
Purchase Order No.: 2005-A-000161

Highway No.: Highway 7/12  
Location: Blackwater, Ontario

Consultant/Sub-consultant Name: **Thurber Engineering Ltd.**

Specialty: **Foundation Engineering - Geotechnical (Structures & Embankments)**

Date: **February 2004**

| No.<br>(1) | Phase/Task<br>(2)   | Methodology<br>(3)   | Deliverables<br>(4)                      | Reference<br>Manuals<br>(5)  | Independent Technical<br>Review  |  | Quality<br>Control<br>Review and<br>Auditor<br>Staff<br>(8) | Completion<br>Date for<br>Task and<br>Milestone<br>Quality<br>Review<br>(9) |
|------------|---|--|--|--|--|--|---|---|
|            |   |  |  |  | Procedure<br>(6)   | Documentatio<br>n<br>(7)   |   |   |
|            | Clearance   | Companies and MTO<br>Electrical Section to meet on<br>site to clear borehole<br>locations.   |  |  | locate sheets.   |                     | P.Eng.  | 30, 2003  |
| 1.12       | Site<br>Investigation<br>and Field<br>Testing                           | Drill boreholes at prescribed<br>locations and to prescribed<br>depths.<br>Conduct SPT sampling and<br>install piezometers.<br>Protect integrity of samples<br>through appropriate<br>handling and transportation<br>procedures. Restore site as<br>far as is practicable. | N/A                                      | MTC Soils<br>Classification<br>Manual, ASTM<br>Methods,<br>CFEM        | Review field<br>documentation.<br><br><i>1 BH LOGS<br/>BEFORE<br/>COMING<br/>COMPLETED</i> | Signature<br><br>   | A. Gorman,<br>P.Eng.  | February 13,<br>2004  |
| 1.13       | Laboratory<br>Testing   | Record incoming samples<br>and conduct visual<br>identifications (VI).<br>Conduct routine testing in<br>accordance with Proposal.  | N/A                                      | MTO<br>Laboratory<br>Manual, ASTM<br>Methods,<br>Terms of<br>Reference | Review results<br>and conduct<br>random re-<br>calculations                                | Signature<br><br> | A. Gorman,<br>P.Eng.  | February 17,<br>2004  |
| 1.14       | Prepare<br>graphical<br>borehole logs,<br>Plans, Profiles<br>and Cross- | Obtain base plan from Prime<br>Consultant, plot borehole<br>locations and draft profiles<br>and cross-sections. Prepare<br>borehole logs on gINT   | Borehole logs,<br>plans and<br>profiles. | MTO Drafting<br>Standards for<br>Foundations                           | Review logs,<br>plans and<br>profiles for<br>accuracy,<br>completeness                     | Signature<br><br> | A. Gorman,<br>P.Eng.  | February 20,<br>2003  |

## Project Specific Supplementary Specialty Plan: Foundation Assignments

GWP No.: 103-99-00, Site 22-66, Beaver River Bridge Replacement

Purchase Order No.: 2005-A-000161

Highway No.: Highway 7/12  
Location: Blackwater, Ontario

Consultant/Sub-consultant Name: **Thurber Engineering Ltd.**

Specialty: **Foundation Engineering - Geotechnical (Structures & Embankments)**

Date: **February 2004**

| No.<br>(1) | Phase/Task<br>(2)           | Methodology<br>(3)   | Deliverables<br>(4)  | Reference<br>Manuals<br>(5)                        | Independent Technical<br>Review   |  | Quality<br>Control<br>Review and<br>Auditor<br>Staff<br>(8) | Completion<br>Date for<br>Task and<br>Milestone<br>Quality<br>Review<br>(9) |
|------------|-----------------------------|--|--|--|---|--|---|---|
|            |                             |  |  |  | Procedure<br>(6)  | Documentatio<br>n<br>(7)                           |   |   |
|            | sections                    | software.  |  |  | and conformance<br>to MTO<br>Standards  |  |   |   |
| 1.15       | Engineering<br>analysis     | Perform calculations for:<br>i) foundation resistance<br>ii) settlement<br>iii) stability<br>iv) earth pressures<br>v) other calculations as<br>required by the project<br>specifics   | N/A  | CHBDC,<br>CFEM, RFQ                                | Review for<br>soundness of<br>engineering<br>judgement,<br>review<br>calculation<br>sheets  | Approved<br>calculation<br>sheets<br><br><i>PM</i> | P.K.<br>Chatterji,<br>P.Eng.,                               | February 20,<br>2003  |
| 1.16       | Draft Report<br>Preparation | Complete DRAFT<br>Foundation Investigation<br>and Design Report<br>Report signed by 2 P.Eng's<br>one of whom is the<br>Designated Principal<br>Contact<br>Prepare report in two<br>sections<br>i) Foundation<br>Investigation Report<br>ii) Foundation Design<br>Report<br>Check report contains | Draft<br>Foundation<br>Investigation<br>and Design<br>Report | Terms of<br>Reference,<br>Codes,<br>CHBDC,<br>CFEM | Critical technical<br>review. Check<br>report contains<br>appropriate<br>content and<br>recommendation<br>Check report<br>documents<br>appropriate<br>range of<br>alternative<br>recommendatio<br>ns with pros,<br>cons and risks | Signature<br><br><i>PM</i>                         | P.K.<br>Chatterji,<br>P.Eng.,                               | February 20,<br>2003  |

**Project Specific Supplementary Specialty Plan: Foundation Assignments**

GWP No.: 103-99-00, Site 22-66, Beaver River Bridge Replacement

Purchase Order No.: 2005-A-000161

Highway No.: Highway 7/12  
Location: Blackwater, Ontario

Consultant/Sub-consultant Name: **Thurber Engineering Ltd.**

Specialty: **Foundation Engineering - Geotechnical (Structures & Embankments)**

Date: **February 2004**

| No.<br>(1)                            | Phase/Task<br>(2)           | Methodology<br>(3)   | Deliverables<br>(4)  | Reference<br>Manuals<br>(5)                        | Independent Technical<br>Review                             |                          | Quality<br>Control<br>Review and<br>Auditor<br>Staff<br>(8) | Completion<br>Date for<br>Task and<br>Milestone<br>Quality<br>Review<br>(9) |
|---------------------------------------|-----------------------------|--|--|--|---|--------------------------|---|---|
|                                       |                             |  |  |  | Procedure<br>(6)  | Documentatio<br>n<br>(7) |   |   |
|                                       |                             | appropriate content and<br>recommendations<br>Check report documents<br>appropriate range of<br>alternative<br>recommendations with pros,<br>cons, risks and cost<br>estimates |  |  | presented   |                          |   |   |
| <b>MILESTONE QUALITY REVIEW No: 1</b> |                             |  | <b>Audit memo</b>  | <b>Review procedure memo/checklist</b>             |   |                          | <b>Paulo J.<br/>Branco,<br/>P.Eng.</b>                      | <b>February<br/>20, 2003</b>  |
| 1.17                                  | Draft Report<br>Submission  |  | Draft Report   |  |   |                          |   | February 20,<br>2004  |
| 1.18                                  | Final Report<br>Preparation | Review and incorporate<br>comments received from<br>MTO and the TPM Team.  | Final<br>Foundation<br>Investigation<br>and Design<br>Report | Terms of<br>Reference,<br>Codes,<br>CHBDC,<br>CFEM | Review final<br>report for<br>incorporation of<br>comments. | Signature                | P.K.<br>Chatterji,<br>P.Eng.,,                              | March 26<br>2004  |
| <b>MILESTONE QUALITY REVIEW No: 2</b> |                             |  | <b>Audit memo</b>  | <b>Review procedure memo/checklist</b>             |   |                          | <b>Paulo J.<br/>Branco,<br/>P.Eng.</b>                      | <b>March 26,<br/>2004</b>   |
| 1.19                                  | Final Report<br>Submission  | Review Report<br>Scan digital files for<br>possible viruses  | Final Report   |  |   |                          |   | March 30,<br>2004   |

**Project Specific Supplementary Specialty Plan: Foundation Assignments**

GWP No.: 103-99-00, Site 22-66, Beaver River Bridge Replacement

Purchase Order No.: 2005-A-000161

Highway No.: Highway 7/12

Location: Blackwater, Ontario

Consultant/Sub-consultant Name: **Thurber Engineering Ltd.**

Specialty: **Foundation Engineering - Geotechnical (Structures & Embankments)**

Date: **February 2004**

| No.<br>(1) | Phase/Task<br>(2)                   | Methodology<br>(3)  | Deliverables<br>(4) | Reference<br>Manuals<br>(5)     | Independent Technical<br>Review |                          | Quality<br>Control<br>Review and<br>Auditor<br>Staff<br>(8) | Completion<br>Date for<br>Task and<br>Milestone<br>Quality<br>Review<br>(9) |
|------------|-------------------------------------|---|---------------------|---------------------------------|---------------------------------|--------------------------|---|---|
|            |                                     |   |                     |                                 | Procedure<br>(6)                | Documentatio<br>n<br>(7) |   |   |
| 1.20       | Design Check                        | Consultation with the project team, including Structural Engineers<br>Review Contract Foundation Drawings | N/A                 | Terms of Reference, CHBDC, CFEM | Review drawings.                | Signature                | A. Gorman, P.Eng.   | T.B.D.  |
| 1.21       | Staging/<br>Detour                  | Consultation with project team  | Memo                | Terms of Reference, CHBDC, CFEM | Review recommendations          | Signature                | A. Gorman, P.Eng.   | T.B.D.  |
| 1.22       | Resolution of Construction Problems | Provide technical support for Foundation Engineering problems   | Correspondence      | Terms of Reference              | Review correspondence           | Signature                | A. Gorman, P.Eng.   | T.B.D.  |

CHBDC – Canadian Highway Bridge Design Code  
CFEM – Canadian Foundation Engineering Manual



Ontario

**DATE:** June 9, 2003

**RE:** GWP 66-99-00, 248-99-00, Hwy 62 South of CR 620, Beaver Creek Bridge Replacement - RFP Submission

Thank you for your co-operation.

B. Becking

## Attachments

## Sangiuliano, Tony (MTO)

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**To:** Weisser, Vladimir (MTO)  
**Subject:** RE: GWP 66-99-00, Hwy 62 from Cnty Rd. 620 southerly for 17.3 km; GWP 248-99-00, Hwy 62 Beaver Creek Bridge replacement

Vladimir:

As requested, attached please find the Foundation Terms of Reference for the abovementioned project.

Tony



FDN Terms for  
Preliminary Desi...

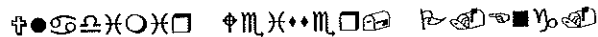
-----Original Message-----

**From:** Weisser, Vladimir (MTO)  
**Sent:** April 3, 2003 2:19 PM  
**To:** Weisser, Vladimir (MTO); Kerr, David (MTO); Ogilvie, Kevin (MTO); Webster, Paul (MTO); Sangiuliano, Tony (MTO); Ng, Ed (MTO); Bhatti, Wikar (MTO); Purchase, Bruce (MTO)  
**Subject:** RE: GWP 66-99-00, Hwy 62 from Cnty Rd. 620 southerly for 17.3 km; GWP 248-99-00, Hwy 62 Beaver Creek Bridge replacement

Hello Team,

Please provide me with Term of Reference for the above noted project by April 17, 2003.

Thank you for your co operation.



Planning & Design  
Ministry of Transportation  
Eastern Region  
Phone: (613) 547 1799  
Fax: (613) 540 5106

## FOUNDATION ENGINEERING TERMS OF REFERENCE for Preliminary Design

### 4.8 Foundation Engineering

#### 4.8.1 Project Scope

A preliminary design study is required for the temporary detour and replacement of the Beaver Creek Structure. A foundation investigation is required for the design and construction of the removal and replacement of the structure at the Beaver Creek.

The Foundation Engineering consultant services required for this assignment have been categorised as **medium** complexity, **Geotechnical** speciality.

For Engineering Materials Testing and Evaluation, the consultant shall be qualified to carry out low complexity soil testing including quick triaxial compression test and consolidation test.

#### 4.8.2 Terms of Reference 'General'

Consultant services shall be provided in accordance with the most recent edition of the Canadian Highway Bridge Design Code in effect for MTO projects, the 'Guideline for Professional Engineers Providing Geotechnical Engineering Services' (1993) published by the Professional Engineers of Ontario and the provisions in these Terms of Reference. The purpose of the consultant's proposal is to demonstrate understanding of the project requirements and for proposal evaluation. The Terms of Reference shall govern where conflicts occur.

For both direct and TPM assignments, Foundation Engineering consultants and subconsultants respectively that are registered in MTO's consultant acquisition system (RAQS) at complexity ratings in the required speciality that meet or exceed the identified complexity requirement for this assignment are eligible to provide Foundation Engineering services for this project.

Alternatively, for TPM assignments, the TPM prime consultant may propose a Foundation Engineering sub-consultant that is not registered. In this case, the TPM prime consultant must submit sufficient documentation at the EOI stage to demonstrate that subconsultant's capability to meet or exceed the RAQS requirements for the Foundation Engineering speciality and complexity requirements identified for this assignment. The TPM prime consultant is responsible for selecting qualified Foundation Engineering sub-consultants.

In order to ensure consistency and accountability, the designated principal contact identified for Foundation Engineering services by MTO must be the liaison for this project and shall sign, and where required, seal all submissions and correspondence.

Services include, but are not restricted to:

Conducting a site investigation that shall be of sufficient scope to provide adequate subsurface information to justify preliminary recommendations and to permit planning of detail design assignments.

This is normally accomplished by evaluating the available geological and other pertinent subsurface information including the nature of the terrain and the performance of existing structures and/or roads, and making an adequate number of boreholes, soil samples, rock core

samples, dynamic cone tests, test pits and soundings (explorations) to supplement existing data, and carrying out laboratory tests on samples to obtain factual information, such as:

- The vertical and horizontal extent of subsurface materials (including both soil and rock) and their pertinent engineering properties.
- Groundwater conditions including groundwater levels perched or otherwise, the location of aquifers, the location and characteristics of artesian groundwater if any, the quantity of flow and the presence or otherwise, of natural gas or chemicals dissolved in groundwater or surface water.

***Minimum requirements for subsurface investigation:***

One borehole is required at each abutment of the proposed structure. Intermediate boreholes are required so that borehole spacing does not exceed 50m. Boreholes shall extend to refusal as defined by material for which Standard Penetration Tests exceeding 100 blows per 0.3m.

One borehole is required on either side of the Beaver Creek along the alignment of any temporary detour structure. Boreholes shall extend to refusal as defined by material for which Standard Penetration Tests exceeding 100 blows per 0.3m.

For bidding purposes, where no existing subsurface information is available, it shall be assumed that borehole depths will not exceed 30m. Where competent stratum is not reached within 30m, additional boring shall be negotiated as extra work prior to being carried out.

Sampling is required at 1.5 m intervals to a depth of 15m, and 3m intervals beyond 15m. Sufficient sampling and in situ testing, such as the Standard Penetration Test and MTO Field Vane Test, are required to develop a comprehensive subsurface model. The consultant shall retain samples for a period of 1 year after completion of the project unless otherwise authorized in writing by the Ministry.

Abandoned explorations shall be backfilled, or otherwise restored, to ensure the safety and environmental integrity of the site. Borehole abandonment procedures shall be in accordance with MOE Regulation 903 and the most recent MTO guidelines. In general, boreholes and piezometer tubes shall be backfilled with a suitable bentonite/cement mixture. Test pits shall be backfilled with suitable material and re-vegetated or otherwise protected from erosion. Temporary open holes shall be adequately covered. Holes in roads shall be backfilled as required to prevent future settlement and acceptably patched where pavement surfaces have been damaged. Where encountered, artesian groundwater conditions shall be sealed at their source. Full details of the artesian condition and the sealing operation shall be included in the Preliminary Foundation Investigation Report.

Fieldwork shall be carried out in accordance with the Occupational Health and Safety Act and MTO's Occupational Health and Safety Act Guidelines.

Providing traffic protection to MTO standards during the course of any field investigations.

Surveying the locations and elevations of all boreholes, test pits and soundings, and referring them to fixed reference points and data. Locations are to be identified by MTO co-ordinates (Northing and Easting). Where MTO co-ordinates are not available locations are to be identified by MTO Station and Offset. The vertical accuracy shall be within 0.1m. Horizontal accuracy shall be within 0.5 m.

***Minimum Laboratory Testing Requirements:***

Laboratory testing shall consist of routine testing of 25% of samples. The consultant shall provide a table detailing the proposed laboratory testing program. Routine lab testing is defined as a suite of natural water content, Atterberg Limit and grain size distribution analyses.

### ***Borehole Log Preparation and Foundation Drawing:***

Preparing borehole log sheets, figures and drawings in accordance with the Ministry's standards. The Foundation Drawing shall consist of a plan showing the locations of all borings, test pits and soundings. A stratigraphic profile shall be included in the Foundation Drawing for the proposed replacement structure and the detour.

### ***Minimum Requirements for the Preliminary Foundation Investigation and Design Report:***

A Preliminary Foundation Investigation and Design Report shall be prepared containing the geotechnical information required for the preliminary foundation engineering of the Project including the field and laboratory test results, and the foundation recommendations for the preliminary design of the Project. The Report shall be signed and sealed by two Professional Engineers licensed by the Professional Engineers of Ontario, one of whom shall be that firm's designated principal identified contact for MTO Foundation Engineering projects.

A single Preliminary Foundation Investigation and Design Reports shall be prepared for the bridge structure and associated embankments and the proposed detour.

One (1) digital file (in MTO's current standard word processing program) of the text and any digital drawings available and three (3) hard copies of the Preliminary Foundation Investigation and Design Report shall be forwarded to the Project Manager.

One (1) digital file (in MTO's current standard word processing program and IESCad protocol ) of the text and any digital drawings available and one (1) hard copy of the Preliminary Foundation Investigation and Design Report shall be forwarded to

Ontario Ministry of Transportation  
Pavements and Foundations Section  
Foundations Group  
Room 223, Building C  
1201 Wilson Avenue  
Downsview, Ontario M3M 1J8

A hard copy of draft Preliminary Foundation Investigation and Design Reports, signed by two Professional Engineers licensed by the Professional Engineers of Ontario, one of whom shall be that firm's designated principal identified contact for MTO Foundation Engineering projects, shall be submitted as per the design schedule. Draft reports shall be marked DRAFT but must be comprehensive and technically complete except for issues that are clearly identified as under development and conceptual.

Where draft Foundation and Investigation Reports are submitted, they will be considered in the evaluation of performance of the Consultant.

The Report shall consist of two parts:

#### **Preliminary Foundation Investigation Report**

For bridges, the Preliminary Foundation Investigation Report shall present a subsurface model under the plan limits of foundation elements, and at the immediate approaches within 20m of the structure. For embankments, the Report shall include those sections identified under Section 4.8.3.

This portion of the report shall consist of factual information only, with no reference to recommendations or project proposals, and present details of subsurface conditions to justify preliminary recommendations.

The Preliminary Foundation Investigation Report shall consist of

- \* Site Description
- \* Investigation Procedures including site investigation and lab testing procedures
- \* Description of Subsurface Conditions including soil, rock and groundwater conditions.

#### Preliminary Foundation Design Report

The Preliminary Foundation Design Report shall present discussion and recommendations for planning purposes for both the structure and detour. Recommendations shall be presented in accordance with the requirements of the most recent edition of the Canadian Highway Bridge Design Code in effect for MTO projects. The consultant shall analyse field data and test results and make preliminary recommendations, including but not limited to:

- Structure foundations design (shallow or deep) including anticipated axial resistances, approximate founding elevations of potential foundation options
- Embankment settlement and stability
- Construction concerns of potential geotechnical problems associated with the site, including the need for shoring, dewatering.
- Comment on scope of work required for detail design

The consultant shall identify and present a comprehensive overview of the advantages, disadvantages, costs and risks/consequences of viable alternative foundation schemes in tabular format. The report should conclude a preferred alternative from a foundation technical and cost effectiveness perspective.

Liaising with the TPM team to communicate and integrate preliminary foundation engineering requirements into the planning process.

For bidding purposes, the consultant should expect to attend three team meetings with combined MTO and TPM teams. Requirements to attend more meetings shall be considered as additional work.

#### **4.8.3 Terms of Reference 'Project Specific'**

The preliminary design shall include recommendations for the preliminary design and construction of the structure foundations for both the structure and detour and recommendations for the design and construction of the approach embankments and specific construction considerations.

Sufficient subsurface information should be obtained at the structure to permit consideration of integral abutment alternatives. The recommendations should consider the requirements for roadway protection during construction.

A single Preliminary Foundation Investigation and Design Report shall be prepared.

#### **4.8.4 Reference Documents**

Information from past foundation investigations may be viewed in the GEOCRE Library, Pavements and Foundations Section. For an appointment, call (416) 235-5526.

---

#### **4.8.5 Proposal Instructions**

The Preliminary Design Plan is to include the following sections:

- 4.8 Foundations Engineering
  - 4.8.1 Scope/Work Plans
  - 4.8.2 Deliverables
  - 4.8.3 Staffing
  - 4.8.4 Site Investigation and Field Testing
  - 4.8.5 Material Testing

Under 4.8.4, the proposal shall include a sketch map of the borehole locations, and a chart highlighting the borehole drilling program at specific structures/embankments.

# memorandum

FOUNDATION



Tel. (613) 547 1799  
Fax. (613) 540 5106

**DATE:** March 6, 2003

**TO:** Project Team

**FROM:** Vladimir Weisser

**RE:** GWP 66-99-00 Hwy 62, 17.3km southerly from Cnty Rd. 620;  
GWP 248-99-00 Hwy 62, Beaver Creek Bridge replacement - EOI Evaluation

---

Please review the attached EOI submissions and provide me with the appropriate evaluation by March 21, 2003.

I will email you the evaluation forms for this project.

Thank you for your co operation.

Vladimir Weisser  
Project Engineer

Attachments

**EOI SUBMISSION CHECKLIST**  
**Project Description: Beaver Creek Bridge Replacement**  
**WP: 248-99-00**

10-Mar-03

| Item  | Prime: Stantec<br>Foundations: Peto<br>MacCallum | Prime: TSH<br>Foundations: Jacques<br>Whitford | Prime: MRC<br>Foundations: Golder<br>Associates | Prime: Earth Tech<br>Foundations: Shaheen &<br>Peaker | Prime: UMA Engineering<br>Foundations: Shaheen &<br>Peaker | Prime: Morrison<br>Hershfield<br>Foundations: Golders | Prime: Marshall Macklin<br>Monaghan<br>Foundations: Shaheen &<br>Peaker |
|---|--|--|---|---|--|---|---|
| <u>Transmittal Letter</u>   |  |  |   |   |  |   |   |
| Review to identify any relevance to Foundations   | No   | No   | No  | No  | Yes  | No  | Yes   |
| <u>Attachment 1 - Compliance Matrix</u>   |  |  |   |   |  |   |   |
| Has Geotechnical(Structures & Embankments) with the appropriate complexity been identified?               | Yes  | Yes  | Yes   | Yes   | Yes  | Yes   | Yes   |
| Has the Foundation Consultant firm been identified and is the firm eligible to conduct the work?          | Yes  | Yes  | Yes   | Yes   | Yes  | Yes   | Yes   |
| Is the Key Staff identified the principal contact?  | Yes  | Yes  | No but F Heffernan identified in Org Chart      | Yes   | Yes  | Yes   | Yes   |
| <u>Attachment 2 - Expression of Interest Details</u>  |  |  |   |   |  |   |   |
| Roles - Has the Foundation Subconsultant been identified?   | Yes  | Yes  | Yes   | Yes   | Yes  | Yes   | Yes   |
| <u>Organizational Structure</u>   |  |  |   |   |  |   |   |
| Has the Foundation Subconsultant been identified?   | Yes  | Yes  | Yes   | Yes   | Yes  | Yes   | Yes   |
| Is the Foundation Subconsultant illustrated in the Organizational Chart?                                  | Yes  | Yes  | Yes   | Yes   | Yes  | Yes   | Yes   |
| Is a brief resume of Foundation Key Staff been provided?  | Yes  | Yes  | Yes   | Yes   | Yes  | Yes   | Yes   |
| Has a preapproved laboratory qualified to conduct the laboratory testing for the project been identified? | Yes  | Yes - Confirm Subconsultant                    | Yes- but should also be identified in Org Chart | Yes   | Yes  | Yes   | Yes   |
| <u>Quality Control/Assurance</u> -- Review Foundation related QC/QC                                       | Yes  | No   | Yes   | Yes   | No   | Yes   | Yes   |

## **Sangiuliano, Tony (MTO)**

---

**To:** Weisser, Vladimir (MTO)  
**Subject:** RE: WP 66-99-00, WP 248-99-00, Hwy 62 from Cnty Rd 620 southerly for 17.3 km, Beaver Creek Bridge replacement

Vladimir:

That's fine.

Tony

-----Original Message-----

**From:** Weisser, Vladimir (MTO)  
**Sent:** February 10, 2003 2:11 PM  
**To:** Sangiuliano, Tony (MTO)  
**Subject:** RE: WP 66-99-00, WP 248-99-00, Hwy 62 from Cnty Rd 620 southerly for 17.3 km, Beaver Creek Bridge replacement

Tony,

Our Design Services Officer did not allow me to insert plus unconfined compression testing and consolidation testing wording into the Section 8, as it is not wording recognized by RAQS. The requirements for compression and consolidation testing is however included in the Section 9 instead. I hope this will be OK with you.

Thank you Vladimir

-----Original Message-----

**From:** Sangiuliano, Tony (MTO)  
**Sent:** February 10, 2003 12:17 PM  
**To:** Weisser, Vladimir (MTO)  
**Subject:** RE: WP 66-99-00, WP 248-99-00, Hwy 62 from Cnty Rd 620 southerly for 17.3 km, Beaver Creek Bridge replacement

Vladimir:

Looks good from a foundations perspective. We have added one comment in Section 8 in red: **Soil and Rock Including Testing for Foundation Engineering - Low Complexity** plus unconfined compression testing and consolidation testing

Tony

<< File: EOI Notice Hwy 62 Beaver30128revisedfeb10.doc >>

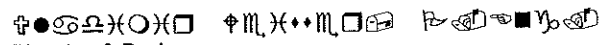
-----Original Message-----

**From:** Weisser, Vladimir (MTO)  
**Sent:** February 10, 2003 9:55 AM  
**To:** Bhatti, Wiker; Ingram, Dale (MTO); Kerr, David; Ng, Ed (MTO); Ogilvie, Kevin; Oomen, Martin; Pearson, Dave (MTO); Poirier, Chris (MTO); Purchase, Bruce; Sangiuliano, Tony (MTO); Sproule, Darwyn (MTO); Telford, Tom (MTO); Webster, Paul (MTO)  
**Subject:** WP 66-99-00, WP 248-99-00, Hwy 62 from Cnty Rd 620 southerly for 17.3 km, Beaver Creek Bridge replacement

Hello Team Members,

I am attaching the EOI wording, for those of you who may require some revisions, please provide me with your comments by 4:30 of today.

Thank you for your cooperation.



Planning & Design  
Ministry of Transportation  
Eastern Region  
Phone: (613) 547 1799  
Fax: (613) 540 5106

<< File: EOI Notice Hwy 62, Beaver30128.doc >>

# EOI Posting Notice

History:

Revised By:

Date Revised:

## Revision Comments:

EOI Submission Due Date: February 28, 2003

EOI Submission Due Time: 1:30 P.M.

## 1 Month Posting

### 1. Consultant Agreement #:

Assignment #: 4005-A-000310

### 2. MTO Project Manager & Phone #:

Shared Services Bureau / Tenders Office, Fax (613) 545-4769

### 3. Issuing Office or Section:

Section: Planning and Design

Region: Eastern

### 4. Project GWP / WP #:

GWP 66-99-00; GWP 248-99-00;

### 5. MTO District/Highway/Bridge Site #:

District: 43, Bancroft

Highway: Hwy 62;

Bridge Site #: 11-34;

Other:

## **6. Project Length/Location:**

- 1) GWP 66-99-00, Hwy 62, from 5.3 km north of Cleveland Road northerly to 300 m south of County Road 620, 17.3 km, County of Hastings, Townships of Tudor and Cashel and Limerick;
- 2) GWP 248-99-00, Hwy 62, Beaver Creek Structure Replacement, County of Hastings, Township of Tudor;

## **7. Project Type (Category):**

PRELIMINARY DESIGN – TPM

Highway Engineering

Drainage and Hydrology Engineering

Bridge Engineering

Foundation Engineering

Environmental

Pavement Design and Road Infrastructure Management

Traffic Engineering

Electrical Engineering

Engineering Materials Testing and Evaluation

Surveying

## **8. Specialties Required:**

HIGHWAY ENGINEERING

Preliminary Design – Functional Planning & Design Studies

DRAINAGE AND HYDROLOGY ENGINEERING

Drainage and Hydrology Design for Highways

BRIDGE ENGINEERING

Design & Evaluation – Complex Structures (multi span)

FOUNDATION ENGINEERING

Geotechnical (Structures and Embankments) -Medium Complexity

## ENVIRONMENTAL

Acoustics & Vibration

Archaeology/Heritage

Class Environmental Assessment Process

Natural Science

Socio-economics/Agriculture

## PAVEMENT DESIGN AND ROAD INFRASTRUCTURE

### MANAGEMENT

Soils and Pavement Investigation – Medium Complexity

Pavement Evaluation and Rehabilitation Strategies - Medium Complexity

## TRAFFIC ENGINEERING

Traffic Management

Traffic Operational Performance Processes

Traffic Signals

## ELECTRICAL ENGINEERING

Minor Electrical Work

## ENGINEERING MATERIAL TESTING AND EVALUATION

Soil and Rock Including Testing for Foundation Engineering – Low Complexity plus unconfined compression testing and consolidation testing

## SURVEYING

Preliminary & Detail Engineering Design

## **9. Description of Project:**

### Highway Engineering

A Preliminary Design Report (PDR) is required for the resurfacing of 17.3 km of Highway 62. This rural highway needs to be upgraded for drainage, geometric, traffic operations, clear zone safety, pavement deficiencies, property access and intersection improvements. A Prioritized Contract Content Review will be

prepared for the project, addressing all the design issues. A separate PDR is required for the temporary detour and replacement of the Beaver Creek Structure.

### **Drainage and Hydrology Engineering**

Roadside drainage investigation and improvements. A complete review of existing centreline and entrance culverts is required to determine their present condition and recommend necessary replacements. A Drainage Report is required addressing drainage assessment and recommendations, including a Stormwater Management Plan.

### **Bridge Engineering**

A Preliminary Design Report for full structure replacements is required for Hwy 62 Beaver Creek Bridge. The Consultant shall provide all Structural Planning and Preliminary Design Services for the removal and replacement of the above noted bridge, including all staging and associated work. A Structural Planning Report together with a Hydraulic Design Report, and a Structural Design Report will be required.

### **Foundations Engineering**

A foundation investigation for the removal and replacement of structure at the Beaver Creek and foundation investigation for the associated detour is required. The Consultant shall provide material sampling and testing; unconfined compression testing and consolidation testing and prepare a Foundation Design Report.

### **Environmental**

The PDR study for the Hwy 62 component will follow the approved

environmental planning process for Group “B” projects under the Class Environmental Assessment for Provincial Transportation Facilities (2000). At the study completion, a Transportation Environmental Study Report (TESR) will be produced.

The PDR study for the Beaver Creek Bridge replacement will follow the Class Environmental Assessment for Provincial Transportation Facilities (2000) process for Group “B” projects. A separate Transportation Environmental Study Report will be prepared for the Beaver Creek Bridge component of the project.

### **Pavement Design and Road Infrastructure Management**

The geotechnical component of this assignment will generally involve: a literature review; a review of historic contract and pavement performance data; a field review(s); an update of pavement evaluations; soils and pavement investigations consisting roughly of one “core and bore” per kilometre, test pits, pavement coring, boreholes and soundings at poor performing areas, realignments and grade revisions; development of preliminary pavement rehabilitation strategy; identification of potential geotechnical issues; participation on study team as required; preparation of summary document(s) for inclusion in PDR(s).

### **Traffic Engineering**

A traffic report is required to document the proposed operational improvements within this work project. Temporary traffic control signals may be required for detour options at the bridge site.

### **Electrical Engineering**

A power supply for temporary traffic control signals and a design of

traffic signals may be required. There may be a requirement for relocation of municipal lighting.

### **Surveying**

There is a recent photogrammetric base mapping available for the entire section of Hwy 62.

A 1999 ground survey is available for Hwy 62 Beaver Creek Bridge location.

The Consultant should demonstrate a recent successful experience on a minimum of two MTO highway projects of similar scope and complexity, provide name of individual firm that will be conducting the survey for this project. Ability to collect 3 dimensional field survey data, process and merge data and extract HDS cross sections from a Ministry compatible digital terrain model for detail design purposes. Ability to densify horizontal and vertical control monumentation and comply with traffic control safety requirements.

### **10. Assignment approximate start and completion dates:**

**Pre-contract engineering phase:** April 2003 to Dec.2003 (PDR, Hwy 62);  
April 2003 to April 2004 (PDR, bridge component)

**Construction administration phase:** N/A  
(tentative timing)

### **11. Method of Acquisition:**

Request for Proposal

### **12. Submit 8 copies of EOI by Mail or Courier to:**

Name: Shared Services Bureau

Address: 355 Counter Street

Postal Bag 4000

Kingston, Ontario

K7L 5A3

Phone #: (613) 545-4881

### 13. Comments:

- 1) When submitting EOI, clearly mark on outer envelope:  
EXPRESSION OF INTEREST  
Agreement # 4005-A-000310  
GWP#66-99-00, GWP#248-99-00  
Failure to submit by the date and time indicated, or failure to submit the required number of copies in the required format, will result in disqualification of the EOI.
- 2) Only the firms registered in RAQS in the Prime Specialty "Highway Engineering, Preliminary Design – Functional Planning & Design Studies" and "Bridge Engineering, Design & Evaluation – Complex Structures (multi span)" identified in this Notice will be considered as candidates for the Prime Consultant position on this assignment.
- 3) ***For a firm to be considered for EOI for this assignment, the firm must have for minimum, the prior registration of their Core Plan and the Generic Category Plan for the Category where the Prime Specialty is located.***
- 4) Companies preparing submissions are advised to refer to "Specialty Criteria" located on the government's website for the specific requirements of the identified "Specialties". ([www.raqs.mto.gov.on.ca](http://www.raqs.mto.gov.on.ca)).
- 5) Provide eight (8) copies of the EOI submission.
- 6) When assessing submissions from companies interested in performing this work, the Ministry will assign weights to the required engineering services specialties according to the following distribution:

|                           |     |
|---------------------------|-----|
| Bridge Engineering        | 18% |
| Highway Engineering       | 22% |
| Traffic Engineering       | 5%  |
| Foundations               | 10% |
| Pavement Design & Road    |     |
| Infrastructure Management | 15% |
| Environmental             | 15% |
| Survey                    | 10% |
| Electrical Engineering    | 5%  |
- 7) ***An EOI submitted for this assignment must also include a completed RAQS Declaration Form (July 2002).*** An original signature/date is required on this form.
- 8) For this EOI submission, proponents must use ***the EOI LONG FORM for PLANNING / ENGINEERING & RELATED SERVICES ASSIGNMENTS (JULY 2002)***, which may be downloaded from the Ministry's RAQS website. Proponents are to include in their submission, the number and type of similar MTO projects that staff have worked on in the past.
- 9) There is a limit of 15 pages allowed for completion of Attachment 2 of the EOI.

- 10) Submitted EOI's using the above LONG FORM will be evaluated on a weighting of 50% for Technical Score and 50% for Past Performance (a firm's corporate Performance Rating-CPR).

***Effective July 2, 2002, a firm's overall CPR will be split into separate CPR for Planning, Engineering and Construction Administration. Depending on an assignment, appropriate CPR will apply for the purposes of short-listing.***

- 11) Disclosure of information relative to the acquisition process will be provided in writing at the award stage to all submitters. For RFP Assignments, the names of all proponents, the successful proponent and the successful proponent's price will be released.
- 12) It is essential that the Hwy 62 PDR Study be delivered by December 2003; the remainder of the assignment shall be completed by April 2004.

Add other Comments as appropriate.

## **Sangiuliano, Tony (MTO)**

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**To:** Weisser, Vladimir (MTO)  
**Subject:** RE: EOI Posting Notice GWP 66-99-00 Hwy 62, GWP 248-99-00 Beaver Creek Bridge; EOI Posting Notice GWP 545-93-00 Hwy 60 Clark's, Kearney Creek Bridges

Vladimir:

We have reviewed the EOI notices as requested and we submit the following comments:

### **I Beaver Creek**

1. Laboratory testing requirements should be included in the EOI notice as follows:

Section 7 - Project Type(Category): **Engineering Materials Testing And Evaluation Services**  
Section 8 - Specialties Required: **Soil and Rock Including Testing for Foundation Engineering - High Complexity**

2. Is there a requirement for a foundation investigation for the detour. If so this should be included in Section 9 Description of Project - Foundations Engineering.
3. The proposed weighting for the Foundations component of 5% is considered too low. A minimum of 10 to 15% is recommended.

### **II Clark's and Kearney Creek Bridges**

1. Laboratory testing requirements should be included in the EOI notice as follows:

Section 7 - Project Type(Category): **Engineering Materials Testing And Evaluation Services**  
Section 8 - Specialties Required: **Soil and Rock Including Testing for Foundation Engineering - High Complexity**

2. Is there a requirement for a foundation investigation for the detour. If so this should be included in Section 9 Description of Project - Foundations Engineering.

We trust these comments are sufficient for your purposes. If you have any questions, please do not hesitate to contact us.

Tony

-----Original Message-----

**From:** Weisser, Vladimir (MTO)  
**Sent:** January 28, 2003 4:30 PM  
**To:** Bhatti, Wiker; Bowers, Robin (MTO); Ingram, Dale (MTO); Kerr, David; Ng, Ed (MTO); Ogilvie, Kevin; Oomen, Martin; Pearson, Dave (MTO); Poirier, Chris (MTO); Purchase, Bruce; Sangiuliano, Tony (MTO); Sproule, Darwyn (MTO); Telford, Tom (MTO); Webster, Paul (MTO)  
**Subject:** EOI Posting Notice GWP 66-99-00 Hwy 62, GWP 248-99-00 Beaver Creek Bridge; EOI Posting Notice GWP 545-93-00 Hwy 60 Clark's, Kearney Creek Bridges

Please respond by Friday January 31, 2003.

<< File: EOI Notice Hwy 60 Clark's, Kearney Br.30128.doc >> << File: EOI Notice Hwy 62, Beaver30128.doc >>

Planning & Design  
Ministry of Transportation  
Eastern Region  
Phone: (613) 547 1799  
Fax: (613) 540 5106

## Sangiuliano, Tony (MTO)

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**From:** Sangiuliano, Tony (MTO)  
**Sent:** January 13, 2003 2:53 PM  
**To:** Weisser, Vladimir (MTO)  
**Subject:** RE: GWP 66-99-00, Hwy 62 from Cnty Rd 620 southerly for 17.6 km; GWP 248-99-00 Hwy 62, Beaver Cr. Bridge; GWP 545-93-00 Hwy 60, Clark's & Kearney Bridge.

Vladimir:

The cost for conducting a total of three preliminary foundation investigations at:

1. Beaver Creek
2. Clark's Creek
3. Kearney Creek

is \$75,000.

Terms of Reference for Foundation Engineering for Preliminary Design are attached.



FDN Terms for  
Preliminary Desi...

-----Original Message-----

**From:** Weisser, Vladimir (MTO)  
**Sent:** January 10, 2003 4:31 PM  
**To:** Bhatti, Wiker; Bowers, Robin (MTO); Ingram, Dale (MTO); Kerr, David; Ng, Ed (MTO); Ogilvie, Kevin; Oomen, Martin; Pearson, Dave (MTO); Poirier, Chris (MTO); Purchase, Bruce; Sangiuliano, Tony (MTO); Sproule, Darwyn (MTO); Telford, Tom (MTO); Webster, Paul (MTO)  
**Cc:** Lee, George (MTO); Robinson, Bob (MTO); Peters, Lloyd (MTO); Prince, Andy (MTO)  
**Subject:** GWP 66-99-00, Hwy 62 from Cnty Rd 620 southerly for 17.6 km; GWP 248-99-00 Hwy 62, Beaver Cr. Bridge; GWP 545-93-00 Hwy 60, Clark's & Kearney Bridge.

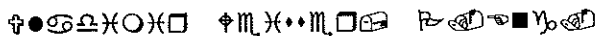
Hello Team Members,

Attached are Minutes from the Project Scoping Meeting. Should you have any comments, please let me know. Further please note that the cost estimate is required by January 16, 2003 and ToF R for EOI Notice by January 20, 2003. Please provide your information as required.

I am attaching also a draft of the EOI posting for your review and input.

Thank you for your co operation.

<< File: EOI Notice Template July 2002.doc >> << File: Minutes 66PIMtg.doc >>



Planning & Design  
Ministry of Transportation  
Eastern Region  
Phone: (613) 547 1799  
Fax: (613) 540 5106

# EOI Posting Notice

History:

Revised By:

Date Revised:

Revision Comments:

EOI Submission Due Date:

EOI Submission Due Time:

## 1 Month Posting

### 1. Consultant Agreement #:

Assignment #: 4005-A-000302

### 2. MTO Project Manager & Phone #:

Shared Services Bureau / Tenders Office, Fax (613) 545-4769

### 3. Issuing Office or Section:

Section: Planning and Design

Region: Eastern

### 4. Project GWP / WP #:

GWP 66-99-00; GWP 248-99-00; GWP 545-93-00

### 5. MTO District/Highway/Bridge Site #:

District: 43, Bancroft

Highway: Hwy 62; Hwy 60

Bridge Site #: 11-34; 43-145; 43-149

Other:

## **6. Project Length/Location:**

- 1) GWP 66-99-00, Hwy 62, from 5.3 km north of Cleveland Road northerly to 300 m south of County Road 620, 17.3 km, County of Hastings, Townships of Tudor and Cashel and Limerick;
- 2) GWP 248-99-00, Hwy 62, Beaver Creek Structure Replacement, County of Hastings, Township of Tudor;
- 3) GWP 545-93-00, Hwy 60, Clark's Creek and Kearney Creek Structures Replacements, County of Nippising, Townships of Airy and Sproule.

## **7. Project Type (Category):**

PRELIMINARY DESIGN – TPM

Highway Engineering

Drainage and Hydrology Engineering

Bridge Engineering

Foundation Engineering

Environmental

Pavement Design and Road Infrastructure Management

Traffic Engineering

Electrical Engineering

Surveying

## **8. Specialties Required:**

HIGHWAY ENGINEERING

Preliminary Design – Functional Planning & Design Studies

DRAINAGE AND HYDROLOGY ENGINEERING

Drainage and Hydrology Design for Highways

BRIDGE ENGINEERING

Design & Evaluation – Complex Structures (multi span)

FOUNDATION ENGINEERING

Geotechnical (Structures and Embankments) – Medium Complexity

#### ENVIRONMENTAL

Acoustics & Vibration

Archaeology/Heritage

Class Environmental Assessment Process

Natural Science

Socio-economics/Agriculture

#### PAVEMENT DESIGN AND ROAD INFRASTRUCTURE MANAGEMENT

Soils and Pavement Investigation – Medium Complexity

Pavement Design – Medium Complexity

#### TRAFFIC ENGINEERING

Traffic Management

Traffic Operational Performance Processes

Traffic Signals

#### ELECTRICAL ENGINEERING

Minor Electrical Work

#### SURVEYING

Preliminary & Detail Engineering Design

### **9. Description of Project:**

#### **Highway Engineering**

A Project Appraisal Report (PAR) is required for the resurfacing of 17.3 km of Highway 62. This rural highway needs to be upgraded for drainage, geometric, traffic operations, clear zone safety, pavement deficiencies, property access and possible relocation of municipal lighting. A separate Preliminary Design Study (PDR) is required for the temporary detour and replacement of the Beaver Creek Structure. A separate PDR study is also required for

temporary detours and replacements of Clark's Creek and Kearney Creek Structures.

### **Drainage and Hydrology Engineering**

Roadside drainage reviewing and improvements. A complete review of existing centreline and entrance culverts is required to determine their present condition and recommend necessary replacements.

### **Bridge Engineering**

Two Preliminary Design Reports for full structure replacements are required for Hwy 62 Beaver Creek Bridge and for Hwy 60 Clark's and Kearney Creeks Bridges. The Consultant shall provide all Structural Planning and Preliminary Design Services for the removal and replacement of the above noted bridges, including all staging and associated work. A Structural Planning Report together with a Hydraulic Design Report, and a Structural Design Report will be required.

### **Foundations Engineering**

A foundation investigation for the removal and replacement of structures at the Beaver Creek and Clark's and Kearney Creeks is required. The Consultant shall provide material sampling and testing and prepare a Foundation Design Report.

### **Environmental**

The PAR study will follow the approved environmental planning process for Group 'C' projects under the Class Environmental Assessment for Provincial Transportation Facilities (2000). At study completion, an Environmental Screening Document will be

produced for the Hwy 62 component.

Both PDR studies will follow the Class Environmental Assessment for Provincial Transportation Facilities (2000) process for Group 'B' projects. Two separate Transportation Environmental Study Reports (TESR) will be completed as a result of the environmental assessment process. A separate TESR report will be prepared for the Hwy 62, Beaver Creek Bridge, and another TESR report will be completed for Hwy 60 Clark's and Kearney Creeks Bridges.

### **Pavement Design and Road Infrastructure Management**

The geotechnical component of the assignment will generally involve: a literature review; a review of contract and pavement performance data; a field review of areas of proposed improvements and identification of potential geotechnical issues; soils and pavement investigations consisting of approx. 1 borehole and 1 core per km of roadway; soils investigations at frost heave and poor performing areas and proposed turning lane improvements; crack survey with cores; development of preliminary pavement rehabilitation strategies to carry forward to detail design; participation in study team as required; preparation of summary document.

### **Traffic Engineering**

A traffic report is required to document the proposed operational improvements within this work project. Temporary traffic control signals may be required for detour options at each bridge site.

### **Electrical Engineering**

A power supply for temporary traffic control signals and a design of traffic signals may be required. There may be a requirement for

relocation of municipal lighting.

### **Surveying**

There is a recent photogrammetric base mapping available for the entire section of Hwy 62, which is expected to be suitable for the road design. A survey request is required for sections of the road, where more detailed survey data will be needed in the detail design stage of the project, i.e. intersections.

A 1999 ground survey is available for Hwy 62 Beaver Creek Bridge location. A ground survey is needed for Hwy 60 Clark's and Kearney Creeks Bridges, to address the related staging requirements.

### **10. Assignment approximate start and completion dates:**

Pre-contract  
engineering phase: April 2003 to Sept.2003 (PAR);  
April 2003 to July 2004 (PDR)

Construction  
administration phase: N/A  
(tentative timing)

### **11. Method of Acquisition:**

Request for Proposal

### **12. Submit 8 copies of EOI by Mail or Courier to:**

Name: Shared Services Bureau

Address: 355 Counter Street

Postal Bag 4000

Kingston, Ontario

K7L 5A3

Phone #: (613) 545-4881

### 13. Comments:

- 1) When submitting EOI, clearly mark on outer envelope:  
EXPRESSION OF INTEREST  
Agreement # 4005-A-000302  
GWP#66-99-00, GWP#248-99-00, GWP#545-93-00  
Failure to submit by the date and time indicated, or failure to submit the required number of copies in the required format, will result in disqualification of the EOI.
- 2) Only the firms registered in RAQS in the Prime Specialty "Highway Engineering, Preliminary Design – Functional Planning & Design Studies" and "Bridge Engineering, Design & Evaluation – Complex Structures (multi span)" identified in this Notice will be considered as candidates for the Prime Consultant position on this assignment.
- 3) ***For a firm to be considered for EOI for this assignment, the firm must have for minimum, the prior registration of their Core Plan and the Generic Category Plan for the Category where the Prime Specialty is located.***
- 4) Companies preparing submissions are advised to refer to "Specialty Criteria" located on the government's website for the specific requirements of the identified "Specialties". ([www.raqs.mto.gov.on.ca](http://www.raqs.mto.gov.on.ca)).
- 5) Provide eight (8) copies of the EOI submission.
- 6) When assessing submissions from companies interested in performing this work, the Ministry will assign weights to the required engineering services specialties according to the following distribution:

|                           |     |
|---------------------------|-----|
| Bridge Engineering        | 25% |
| Highway Engineering       | 20% |
| Traffic Engineering       | 5%  |
| Foundations               | 10% |
| Pavement Design & Road    |     |
| Infrastructure Management | 15% |
| Environmental             | 15% |
| Survey                    | 5%  |
| Electrical Engineering    | 5%  |
- 7) ***An EOI submitted for this assignment must also include a completed RAQS Declaration Form (July 2002).*** An original signature/date is required on this form.
- 8) For this EOI submission, proponents must use ***the EOI LONG FORM for PLANNING / ENGINEERING & RELATED SERVICES ASSIGNMENTS (JULY 2002)***, which may be downloaded from the Ministry's RAQS website. Proponents are to include in their submission, the number and type of similar MTO projects that staff have worked on in the past.
- 9) There is a limit of 15 pages allowed for completion of Attachment 2 of the EOI.
- 10) Submitted EOI's using the above LONG FORM will be evaluated on a weighting of 50% for Technical Score and 50% for Past Performance (a firm's corporate Performance Rating-CPR).

***Effective July 2, 2002, a firm's overall CPR will be split into separate CPR for Planning, Engineering and Construction Administration. Depending on an assignment, appropriate CPR will apply for the purposes of short-listing.***

- 11) Disclosure of information relative to the acquisition process will be provided in writing at the award stage to all submitters. For RFP Assignments, the names of all proponents, the successful proponent and the successful proponent's price will be released.
- 12) It is essential that the Hwy 62 PAR Study be delivered by September 2003; the remainder of the assignment shall be completed by July 2004.

Add other Comments as appropriate.

## FOUNDATION ENGINEERING TERMS OF REFERENCE for Preliminary Design

### 4.8 Foundation Engineering

#### 4.8.1 Project Scope

A foundation investigation for the removal and replacement of structures at the Beaver Creek and Clark's and Kearney Creeks is required

The Foundation Engineering consultant services required for this assignment have been categorised as **medium** complexity, **Geotechnical** speciality.

For Engineering Materials Testing and Evaluation, the consultant shall be qualified to carry out low / high complexity soil and rock testing.

*Or (for medium)*

for performing low complexity soil testing including quick triaxial compression test and consolidation test.

#### 4.8.2 Terms of Reference 'General'

Consultant services shall be provided in accordance with the most recent edition of the Canadian Highway Bridge Design Code in effect for MTO projects, the 'Guideline for Professional Engineers Providing Geotechnical Engineering Services' (1993) published by the Professional Engineers of Ontario and the provisions in these Terms of Reference. The purpose of the consultant's proposal is to demonstrate understanding of the project requirements and for proposal evaluation. The Terms of Reference shall govern where conflicts occur.

The Foundation Engineering consultant services required for this assignment have been categorised as **medium** complexity, **Geotechnical** speciality.

For both direct and TPM assignments, Foundation Engineering consultants and subconsultants respectively that are registered in MTO's consultant acquisition system (RAQS) at complexity ratings in the required speciality that meet or exceed the identified complexity requirement for this assignment are eligible to provide Foundation Engineering services for this project.

Alternatively, for TPM assignments, the TPM prime consultant may propose a Foundation Engineering sub-consultant that is not registered. In this case, the TPM prime consultant must submit sufficient documentation at the EOI stage to demonstrate that subconsultant's capability to meet or exceed the RAQS requirements for the Foundation Engineering speciality and complexity requirements identified for this assignment. The TPM prime consultant is responsible for selecting qualified Foundation Engineering sub-consultants.

In order to ensure consistency and accountability, the designated principal contact identified for Foundation Engineering services by MTO must be the liaison for this project and shall sign, and where required, seal all submissions and correspondence.

Services include, but are not restricted to:

Conducting a site investigation that shall be of sufficient scope to provide adequate subsurface information to justify preliminary recommendations and to permit planning of detail design assignments.

This is normally accomplished by evaluating the available geological and other pertinent subsurface information including the nature of the terrain and the performance of existing structures and/or roads, and making an adequate number of boreholes, soil samples, rock core samples, dynamic cone tests, test pits and soundings (explorations) to supplement existing data, and carrying out laboratory tests on samples to obtain factual information, such as:

- The vertical and horizontal extent of subsurface materials (including both soil and rock) and their pertinent engineering properties.
- Groundwater conditions including groundwater levels perched or otherwise, the location of aquifers, the location and characteristics of artesian groundwater if any, the quantity of flow and the presence or otherwise, of natural gas or chemicals dissolved in groundwater or surface water.

***Minimum requirements for subsurface investigation:***

One borehole is required at each abutment of the proposed structure. Intermediate boreholes are required so that borehole spacing does not exceed 50m. Boreholes shall extend to refusal as defined by material for which Standard Penetration Tests exceeding 100 blows per 0.3m.

Along embankments, a minimum of 2 boreholes shall be advanced at strategically selected locations, with additional borings at representative locations at a maximum 100m spacing. Boreholes should extend to either a minimum depth of the proposed height of embankment or to a 3m thick competent layer that is sufficient to resist instability and excessive settlement, whichever is deeper.

For bidding purposes, where no existing subsurface information is available, it shall be assumed that borehole depths will not exceed 30m. Where competent stratum is not reached within 30m, additional boring shall be negotiated as extra work prior to being carried out.

Sampling is required at 1.5 m intervals to a depth of 15m, and 3m intervals beyond 15m. Sufficient sampling and in situ testing, such as the Standard Penetration Test and MTO Field Vane Test, are required to develop a comprehensive subsurface model. The consultant shall retain samples for a period of 1 year after completion of the project unless otherwise authorized in writing by the Ministry.

Abandoned explorations shall be backfilled, or otherwise restored, to ensure the safety and environmental integrity of the site. Borehole abandonment procedures shall be in accordance with MOE Regulation 903 and the most recent MTO guidelines. In general, boreholes and piezometer tubes shall be backfilled with a suitable bentonite/cement mixture. Test pits shall be backfilled with suitable material and re-vegetated or otherwise protected from erosion. Temporary open holes shall be adequately covered. Holes in roads shall be backfilled as required to prevent future settlement and acceptably patched where pavement surfaces have been damaged. Where encountered, artesian groundwater conditions shall be sealed at their source. Full details of the artesian condition and the sealing operation shall be included in the Preliminary Foundation Investigation Report.

Fieldwork shall be carried out in accordance with the Occupational Health and Safety Act and MTO's Occupational Health and Safety Act Guidelines.

Providing traffic protection to MTO standards during the course of any field investigations.

Surveying the locations and elevations of all boreholes, test pits and soundings, and referring them to fixed reference points and data. Locations are to be identified by MTO co-ordinates

(Northing and Easting). Where MTO co-ordinates are not available locations are to be identified by MTO Station and Offset. The vertical accuracy shall be within 0.1m. Horizontal accuracy shall be within 0.5 m.

***Minimum Laboratory Testing Requirements:***

Laboratory testing shall consist of routine testing of 25% of samples. The consultant shall provide a table detailing the proposed laboratory testing program. Routine lab testing is defined as a suite of natural water content, Atterberg Limit and grain size distribution analyses.

***Borehole Log Preparation and Foundation Drawing:***

Preparing borehole log sheets, figures and drawings in accordance with the Ministry's standards. The Foundation Drawing shall consist of a plan showing the locations of all borings, test pits and soundings. For bridges, a stratigraphic profile shall be included in the Foundation Drawing.

***Minimum Requirements for the Preliminary Foundation Investigation and Design Report:***

A Preliminary Foundation Investigation and Design Report shall be prepared containing the geotechnical information required for the preliminary foundation engineering of the Project including the field and laboratory test results, and the foundation recommendations for the preliminary design of the Project. The Report shall be signed and sealed by two Professional Engineers licensed by the Professional Engineers of Ontario, one of whom shall be that firm's designated principal identified contact for MTO Foundation Engineering projects.

In general, separate Preliminary Foundation Investigation and Design Reports shall be prepared for each bridge structure, and for embankments, a single report shall be prepared. Refer to Section 4.8.3 Project Specific Terms of Reference for reporting requirements.

One (1) digital file (in MTO's current standard word processing program) of the text and any digital drawings available and three (3) hard copies of the Preliminary Foundation Investigation and Design Report shall be forwarded to the Project Manager.

One (1) digital file (in MTO's current standard word processing program and IESCad protocol of the text and any digital drawings available and one (1) hard copy of the Preliminary Foundation Investigation and Design Report shall be forwarded to

Ontario Ministry of Transportation  
Pavements and Foundations Section  
Foundations Group  
Room 223, Building C  
1201 Wilson Avenue  
Downsview, Ontario M3M 1J8

A hard copy of draft Preliminary Foundation Investigation and Design Reports, signed by two Professional Engineers licensed by the Professional Engineers of Ontario, one of whom shall be that firm's designated principal identified contact for MTO Foundation Engineering projects, shall be submitted as per the design schedule. Draft reports shall be marked DRAFT but must be comprehensive and technically complete except for issues that are clearly identified as under development and conceptual.

Where draft Foundation and Investigation Reports are submitted, they will be considered in the evaluation of performance of the Consultant.

The Report shall consist of two parts:

#### Preliminary Foundation Investigation Report

For bridges, the Preliminary Foundation Investigation Report shall present a subsurface model under the plan limits of foundation elements, and at the immediate approaches within 20m of the structure. For embankments, the Report shall include those sections identified under Section 4.8.3.

This portion of the report shall consist of factual information only, with no reference to recommendations or project proposals, and present details of subsurface conditions to justify preliminary recommendations.

The Preliminary Foundation Investigation Report shall consist of

- \* Site Description
- \* Investigation Procedures including site investigation and lab testing procedures
- \* Description of Subsurface Conditions including soil, rock and groundwater conditions.

#### Preliminary Foundation Design Report

The Preliminary Foundation Design Report shall present discussion and recommendations for planning purposes. Recommendations shall be presented in accordance with the requirements of the most recent edition of the Canadian Highway Bridge Design Code in effect for MTO projects. The consultant shall analyse field data and test results and make preliminary recommendations, including but not limited to:

- Structure foundations design (shallow or deep) including anticipated axial resistances, approximate founding elevations of potential foundation options
- Embankment settlement and stability
- Construction concerns of potential geotechnical problems associated with the site, including the need for shoring, dewatering.
- Comment on scope of work required for detail design

The consultant shall identify and present a comprehensive overview of the advantages, disadvantages, costs and risks/consequences of viable alternative foundation schemes in tabular format. The report should conclude a preferred alternative from a foundation technical and cost effectiveness perspective.

Liaising with the TPM team to communicate and integrate preliminary foundation engineering requirements into the planning process.

For bidding purposes, the consultant should expect to attend three team meetings with combined MTO and TPM teams. Requirements to attend more meetings shall be considered as additional work.

#### **4.8.3 Terms of Reference 'Project Specific'**

Hwy 62 is to be upgraded for drainage, geometric, traffic operations, clear zone safety, pavement deficiencies and other reasons. As part of the upgrade, three structures at the Beaver Creek, Clark's Creek and Kearney Creek respectively are to be removed and replaced.

Preliminary Foundation Investigations are required at each of the three site locations. The Foundation Investigations shall be sufficient to provide recommendations for the preliminary design of the structures and any related earth/rock works including detour requirements.

Sufficient subsurface information should be obtained at the structure to permit consideration of integral abutment alternatives. The recommendations should consider the requirements for roadway protection during construction.

A Preliminary Foundation Investigation and Design Report is required for each site.

#### **4.8.4 Reference Documents**

Information from past foundation investigations may be viewed in the GEOCRE Library, Pavements and Foundations Section. For an appointment, call (416) 235-5526.

#### **4.8.5 Proposal Instructions**

The Preliminary Design Plan is to include the following sections:

- 4.8 Foundations Engineering
  - 4.8.1 Scope/Work Plans
  - 4.8.2 Deliverables
  - 4.8.3 Staffing
  - 4.8.4 Site Investigation and Field Testing
  - 4.8.5 Material Testing

Under 4.8.4, the proposal shall include a sketch map of the borehole locations, and a chart highlighting the borehole drilling program at specific structures/embankments.



# Meeting Minutes

Planning and Design Section

613 547 1799  
Fax: 613 540 5106

**Project Description / Purpose of Meeting:**

**GWP 66-99-00, Hwy 62, from 5.3 km north of Cleveland Road northerly to 300 m south of County Road 620, 17.3 km, County of Hastings, Townships of Tudor and Cashel and Limerick;**

**GWP 248-99-00, Hwy 62, Beaver Creek Structure Replacement, County of Hastings, Township of Tudor;**

**GWP 545-93-00, Hwy 60, Clark's Creek and Kearney Creek Structures Replacements, County of Nippising**

**TPM – Project Appraisal Report and Preliminary Design Study**

**PROJECT INITIATION MEETING**

**Work Type:** Road resurfacing, drainage, geometrics, safety, operational and clear zone improvements. Bridge replacements and related traffic detours.

**Date of Meeting:** January 10, 2003

**Meeting Location:** Brd Rm2 – MTO Kingston

**Attendees:**

V.Weisser, P&D  
D.Kerr, Structural  
K.Ogilvie, Environmental  
D.Pearson, Construction  
D.Sproule, District 43  
B.Purchase, Geotechnical  
M.Oomen, Electrical

**Absent::**

W.Bhatti, Surveys  
T.Sangiuliano, Foundation  
P.Webster, Traffic  
B.Robinson, District 43  
D.Ingram, District 43  
T.Telford, Property

THE MINUTES OF THIS MEETING: Please send comments / revisions to the undersigned.

ORIGINAL SIGNED: Vladimir Weisser, Project Engineer: \_\_\_\_\_

**DISTRIBUTION:** Attendees  
E.Ng  
W.Bhatti  
T.Sangiuliano  
P.Webster  
B.Robinson  
D.Ingram  
T.Telford  
G.Lee  
L.Peters  
A.Prince  
R.Bowers

| AGENDA ITEM<br>No. | ISSUE SUMMARY/UPDATES  | RECOMMENDED ACTION(s) |
|--------------------|--|-----------------------|
| 1.0                | <p><b>Project Introduction / Background</b><br/> A Project Appraisal Report (PAR) is required for the resurfacing of 17.3 km of Highway 62. This rural highway needs to be upgraded for drainage, geometric, traffic operations, clear zone safety, pavement deficiencies, property access and possible relocation of municipal lighting. A separate Preliminary Design Study (PDR) is required for the temporary detour and replacement of the Beaver Creek Structure. A separate PDR study is also required for temporary detours and replacements of Clark's Creek and Kearney Creek Structures.</p> <p><b>Project issues</b></p> <ul style="list-style-type: none"> <li>• Necessary drainage improvements, culvert replacements;</li> <li>• Frost heave and poor performing areas;</li> <li>• Review and address entrances, access to the former Jordan Lake Park shall be properly closed;</li> <li>• Visibility concerns at Weslemkoon and Phillips Rd. intersections;</li> <li>• Upgrade intersection geometrics;</li> <li>• Substandard vertical curves;</li> <li>• Review clear zone requirements, upgrade guiderail;</li> <li>• Fully paved shoulders on hills and curves;</li> <li>• Snowmobile traffic crossing the highway;</li> <li>• ATV vehicles using and crossing low volume Provincial Highway;</li> <li>• Potential for temporary traffic signals at bridge replacement sites;</li> <li>• Potential for construction timing restriction in Algonquin Provincial Park related to tourist season;</li> </ul> <p><b>Study Approach</b><br/> Three independent deliverables will be completed during this assignment. The Hwy 62 PAR study will follow class "C" EA process. The study shall be completed in early fall 2003, in order to have contract document ready for 2004 construction season. Two PDR and TESR documents will be prepared for Hwy 62 Beaver Creek Bridge and Hwy 60 Clark's and Kearney Bridges. These documents will be finalized in the second half of the year 2004.</p> |                       |

Dates of Meeting January 10, 2003

| AGENDA ITEM No. | ISSUE SUMMARY/UPDATES  | RECOMMENDED ACTION(s) |
|-----------------|--|-----------------------|
| 2.0             | <b>Type of Consultant Assignment Proposed</b><br>EOI and RFP process is being proposed for the Consultant acquisition.<br>TPM method is being used for preparation of the PAR and PDRs reports. The TPM Consultant will be required to provide services for Preliminary Design Studies in following categories:<br>Highway Engineering,<br>Bridge Engineering,<br>Drainage and Hydrology Engineering,<br>Electrical Engineering,<br>Environmental,<br>Foundation Engineering,<br>Pavement Design and Road infrastructure Management,<br>Traffic Engineering,<br>Surveying. |                       |
| 3.0             | <b>Consultant Acquisition Schedule Proposed</b> <ul style="list-style-type: none"> <li>EOI posting January 29, 2003</li> <li>EOI closing February 21, 2003</li> <li>RFP distribution March 5, 2003</li> <li>RFP closing March 28, 2003</li> <li>Consultant Assigned April 17, 2003.</li> </ul>   |                       |
| 4.0             | <b>EOI submissions evaluation</b><br>Assigned weights to the required engineering specialties:<br>Bridge Engineering 25%<br>Highway Engineering 20%<br>Geotech 15%<br>Foundation 10%<br>Environmental 15%<br>Traffic Engineering 5%<br>Electrical Engineering 5%<br>Survey 5%  | All Sections          |
| 5.0             | <b>Section input</b><br>All Sections to provide Cost Estimate for Consultant activities by <b>January 16, 2003</b> and Terms of Reference for the EOI Notice by <b>January 20, 2003.</b>   | All Sections          |

## Sangiuliano, Tony (MTO)

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**From:** Sangiuliano, Tony (MTO)  
**Sent:** January 13, 2003 2:53 PM  
**To:** Weisser, Vladimir (MTO)  
**Subject:** RE: GWP 66-99-00, Hwy 62 from Cnty Rd 620 southerly for 17.6 km; GWP 248-99-00 Hwy 62, Beaver Cr. Bridge; GWP 545-93-00 Hwy 60, Clark's & Kearney Bridge.

Vladimir:

The cost for conducting a total of three preliminary foundation investigations at:

1. Beaver Creek
2. Clark's Creek
3. Kearney Creek

is \$75,000.

Terms of Reference for Foundation Engineering for Preliminary Design are attached.



FDN Terms for  
Preliminary Desi...

-----Original Message-----

**From:** Weisser, Vladimir (MTO)  
**Sent:** January 10, 2003 4:31 PM  
**To:** Bhatti, Wiker; Bowers, Robin (MTO); Ingram, Dale (MTO); Kerr, David; Ng, Ed (MTO); Ogilvie, Kevin; Oomen, Martin; Pearson, Dave (MTO); Poirier, Chris (MTO); Purchase, Bruce; Sangiuliano, Tony (MTO); Sproule, Darwyn (MTO); Telford, Tom (MTO); Webster, Paul (MTO)  
**Cc:** Lee, George (MTO); Robinson, Bob (MTO); Peters, Lloyd (MTO); Prince, Andy (MTO)  
**Subject:** GWP 66-99-00, Hwy 62 from Cnty Rd 620 southerly for 17.6 km; GWP 248-99-00 Hwy 62, Beaver Cr. Bridge; GWP 545-93-00 Hwy 60, Clark's & Kearney Bridge.

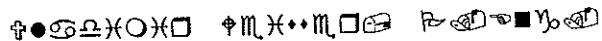
Hello Team Members,

Attached are Minutes from the Project Scoping Meeting. Should you have any comments, please let me know. Further please note that the cost estimate is required by January 16, 2003 and ToF R for EOI Notice by January 20, 2003. Please provide your information as required.

I am attaching also a draft of the EOI posting for your review and input.

Thank you for your co operation.

<< File: EOI Notice Template July 2002.doc >> << File: Minutes 66PIMtg.doc >>



Planning & Design  
Ministry of Transportation  
Eastern Region  
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