City of Surrey

Freshet 2007 Urgent Mitigative
Flood Works (M.S. 4807-207C)
As-Constructed Report

June 2007
June 29, 2007
File: 2007016.00.C.05.03

Jeff Arason, P.Eng.
Project Engineer
City of Surrey
Engineering Department
14245 56th Avenue
Surrey, BC
V3X 3A2

Re: FRESHET 2007 URGENT MITIGATIVE FLOOD WORKS (M.S. 4807-207C)
AS CONSTRUCTED REPORT

Dear Mr. Arason:

We are pleased to submit the following "Freshet 2007 Urgent Mitigative Flood Works (M.S. 4807-207C) As Constructed Report". This report outlines the design criteria and issues, property considerations, and estimated costs for the constructed works.

1 BACKGROUND

In April 2007 the Ministry of Public Safety and Solicitor General (PSSG) and the Ministry of Environment (MOE) confirmed the availability of funding to assist local communities prepare for the 2007 Freshet.

In March 2003, Associated Engineering completed a report entitled "Flood Protection Review Fraser River Flood Plain Area". A field investigation, including inventory and inspection, of the existing dyke and flood wall structures was completed as part of the study. The field investigation identified several minor and some major deficiencies. In May 2003, the City was granted Flood Protection Assistance Funding from the Province. Due to limited funding, a limited scope of flood protection upgrades was constructed in 2004.

As a result of the December 2006 Fraser Basin Council report, Flood Construction Levels (FCL) along the lower Fraser River have been adjusted upwards. The current scope of work under the 2007 Urgent Mitigative Flood Works program dealt with some of the flood protection deficiencies remaining after the 2004 works. All upgrades under this program considered the revised 2006 FCLs.
2 CONSTRUCTION

The following work was completed in this contract:

<table>
<thead>
<tr>
<th>Site ID</th>
<th>Chainage</th>
<th>Length (m)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>4+440 → 4+80</td>
<td>30</td>
<td>Steel stop log closing structure across Lindal Cedar Homes driveway (10880 Dyke Rd), including:</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>• Concrete end wall with embedded 150 mm metal channel</td>
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<td></td>
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<td></td>
<td>• Four stop log post base manholes</td>
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<td></td>
<td></td>
<td>• Four stop log intermediate guide posts</td>
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<td></td>
<td>• 18 standard 6.1 m long, 0.3 m high steel stop logs</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Concrete seepage cut-off wall minimum 1.3 m deep below grade</td>
</tr>
<tr>
<td>6</td>
<td>4+540 → 4+660</td>
<td>115</td>
<td>Concrete floodwall including:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• 5 m top elevation</td>
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<td></td>
<td></td>
<td></td>
<td>• Concrete seepage cut-off wall minimum 1.3 m deep below grade</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>• Four catch basins and a 200mm header pipe on land side of wall</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>• 300 mm diameter pipe draining land-side catch basins to the Fraser River. Drain pipe equipped with flap gate</td>
</tr>
<tr>
<td>8*</td>
<td>4+860 → 5+120</td>
<td>260</td>
<td>Earth dyke upgrade including:</td>
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<td></td>
<td></td>
<td>• 4.6 m top elevation</td>
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<td></td>
<td></td>
<td></td>
<td>• 3.2 m minimum dyke crest width</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>• Widening on river side of dyke between stations 4+880 and 5+000</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>• Widening on land side of dyke between stations 5+020 and 5+120</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>• Rock placed on enhanced river side dyke slope between stations 4+880 and 5+000</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• 3H:1V river side slope between stations 4+880 and 5+000</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>City placed riprap further up the Manson Canal, approximately to station 5+040. Due to standing water levels in the Canal and</td>
</tr>
</tbody>
</table>
3 DESIGN CRITERIA

Previous Provincial Flood Construction Levels (FCL’s) in the Fraser River flood plain area of Surrey were 600 mm above the 1994 Computed Flood Profile. The Fraser Basin Council’s December 2006 Lower Fraser River Hydraulic Model report resulted in increased FCL’s in the Fraser River flood plain area. The new FCL’s range from 4.2 m G.S.C. at Elevator Road, to 5 m at Bolivar Creek.

We adopted the FCL as the minimum elevation of our flood protection upgrades. In some cases we constructed to higher elevations to allow for settlement, future FCL increases, and potential future river aggradation.

3.1 GEOTECHNICAL CONSIDERATIONS

We retained Golder Associates Ltd. as geotechnical subconsultants. Golder Associates undertook a geotechnical investigation and provided advice regarding geotechnical design issues. We attach Golder Associates’ findings and recommendations in Appendix C.

3.2 EARTH DYKE

The Provincial "Dike Design and Construction Guide – Best Management Practices for BC" recommends that all new dyke works be designed and constructed using a minimum 4 m dyke crest width, and 3:1 side slopes are preferred. Waterside slopes of up to 2:1 with riprap protection, or landside slopes of up to 2:1 with adequate seepage control may also be acceptable.

The earth dyke should consist of an impermeable layer or dyke core. A gravel running surface should be provided along with side slopes covered in top soil to promote vegetation growth. All proposed earth dyke works in this project are related to upgrading of existing dyke structures. Some of the existing dyke deficiencies included inadequate dyke elevation, narrow dyke crest, and steep side slopes.

Where the site conditions allowed, our designs upgraded existing dykes to the desired minimum dyke crest width, side slopes, and permeability. At site B, we designed a 2.5:1 landside and waterside slope to avoid encroachment onto grassland habitat area. As the dyke is significantly set

* Construction at site 8 varied from Associated Engineering’s design.
back from the river, and would not be directly impinged by flows, riprap is not required at this location. City crews constructed this site to a 3:1 waterside slope, but without any improvements to the existing oversteepened landside slope.

3.3 CONCRETE FLOOD WALL

In areas where physical constraints did not allow construction of an earth dyke, concrete flood walls were constructed.

We analysed our wall design for two structural failure modes; concrete wall strength and overturning. A third failure mode, sliding, was also reviewed. Provided that there is some fill on the footing and behind the wall, sliding would not be the governing failure mode.

Listed below are the assumptions used in the analysis:

- The static water level reaches the top of wall (freeboard is ignored). This assumption will ensure water will overtop the wall before the wall fails. This also provides a level of safety against dynamic forces of moving water on the wall.
- Concrete strength f_c = 30 Mpa, Steel yield f_y = 400 MPa (as specified on drawings)
- Bearing capacity on founding soil = 30 MPa
- A minimum of 300 mm of fill above the top of footing is present on both sides of the wall.

As concrete walls can be problematic to raise, we constructed to a top elevation in excess of the 2006 FCL. At site 6, our final wall elevation is 0.4m higher than the 2006 FCL. At Site 7 we took into account the height of standard stoplogs. In order to accommodate an even multiple of stoplogs, we designed the concrete abutment wall top elevation 0.2 m higher than the 2006 FCL.

In accordance with advice from our geotechnical subconsultants, we extended the shear-key 1 metre deep from the top of the footing. This provides a seepage cut-off to improve geotechnical stability of the floodwall. As the footing was constructed a minimum of 0.3 m below grade, the minimum seepage cut-off wall depth is 1.3 m.

3.4 STOP LOG STRUCTURES

The elevation across the Lindal Cedar Homes driveway to Dyke Road is as much as 1.3 m below the 2006 FCL. During a flood event, this access would need to be closed. This can be accomplished with a stop log closing structure.
The constructed stop log structure consists of a reinforced concrete abutment wall at the east end with an embedded steel guide rail for placement of steel stop logs. Intermediate supports were constructed to accommodate 6.1 m standardized stop log lengths. This length was established during the 2004 works. A standard 6.1 m long stop log can be transported and installed using a typical flatbed truck with a crane attachment. Using a standard length for the majority of the structures also minimizes the number of unique site specific stop logs.

The intermediate stop log supports each consist each of a vertical steel spigot embedded into a steel socket cast into a concrete base in the road. During times of flood risk, the manhole cover would be removed from the intermediate support base, and a steel I-beam-type support would be inserted vertically into the socket. Standard stop logs would be installed between the adjacent intermediate vertical support posts. The west end of the closing structure is formed with a road-level support base in lieu of a reinforced concrete abutment wall. Seaspan plans a barge ramp through this area, thus the Fraser River Port Authority did not want a concrete abutment wall constructed along the eastern portion of their property (11709 Tannery Road), at the western limit of this closing structure. Unlimited permanent works are constructed along the eastern property line of 11709 Tannery Road, temporary flood mitigation works are required at the western limits of the stop log structure.

In accordance with advice from our geotechnical subconsultants, we designed a seepage cut-off wall between adjacent intermediate post bases and the concrete abutment wall. This cut-off wall extends a minimum of 1.3 m below grade. In addition to creating a longer seepage path, this wall also provides lateral support for the water on the river side of the stop-logs.

The steel stop logs were fabricated using galvanized steel C channels and plates.

PROPERTY IMPACTS

The statutory right of ways are not properly defined for some of the dyke and wall locations. We strove to minimize property impacts resulting from the dyke upgrades.

At site 6, the existing dyke right-of-way is along Dyke Road. However, raising the profile of Dyke Road to the FCL is problematic due to expense, and adjoining driveways and utilities. A portion of the existing asphalt yard at 11709 Tannery Road (FRHC’s property leased by Apex Terminals) is set aside for habitat compensation for the adjacent proposed Seaspan barge ramp. The FRHC had no objection to constructing a concrete floodwall at the boundary between the future habitat compensation area and the remainder of the paved yard. The City obtained a temporary access and construction area for this floodwall. Permanent registration of this right-of-way with the Land Titles Office was not completed at the time of floodwall construction.
At site 7, the stop log structure is situated within the road right of way. The stop log structure is designed to minimize property impacts, in particular for private driveway crossings. The earth dyke at site 8 is contained within land owned by the City of Surrey. The Department of Fisheries and Oceans (DFO) is concerned about loss of grass habitat at the slope toe. DFO requires habitat compensation. Suggested habitat compensation includes spraying the river side of the dyke with "eco-blanket", or applying a growing medium and seed to promote grass growth after the freshet. DFO also specified planting scattered willow stakes at a density of 0.75 m centre-to-centre.

5 COMPLETION

The concrete works at sites 6 and 7 were completed by Mutual Construction Ltd. The work was completed between May 8, 2007 and June 5, 2007. The works were substantially completed by May 31, 2007. Construction inspection was completed by Gary Nilsson of Associated Engineering. The daily site reports are attached in Appendix A.

The earth works and riprap at sites 8 and 9 were completed by City of Surrey crews. The City completed its works between May 2 and 24. The record drawings are included in Appendix B.

At site #8, the earth works were not completed strictly in accordance with Associated Engineering’s design. The dyke crest was raised to the 2006 updated FCL, and the dyke crest was constructed to a 3.2 m minimum width. However, as the waterside slope was cut back to 3:1 rather than the designed 2.5H:1V, insufficient room remained within the dyke footprint to flatten the existing landside slope. The existing landside slope ranges from approximately 1.4H:1V to 1.8H:1V, with no known existing seepage control provisions.

Dyke fill material was sourced from a City stockpile at 160th Street and 64th Avenue. This material was previously approved by Levelton Consultants as suitable dyke fill material. The material reportedly has high clay content, but Levelton approved it for dyke bulk fill, if construction occurs during dry weather conditions.

The waterside dyke slope was overlain with a thin layer (approximately 0.5 m) of D50 550 mm riprap. No filter layer was placed underneath the riprap.

Concrete tests were completed for all major pours. Although a 28-day strength of 32 MPa would have been sufficient for our design, we specified a 28-day strength of 35 MPa to achieve a faster curing time. The 7-day compressive strength tests came back with higher than anticipated results, ranging from 29.4 to 42.1, and one 8-day compressive strength result of 48.7 MPa. We specified
June 28, 2007
Mr. Jeff Arason
City of Surrey

6.5% ±1.5% air content. Test results generally fell within this range. However, one pour was as low as 3%. Since this pour was within the footing, it will not be exposed to the same degree of freeze/thaw cycles as the wall itself. Another pour had 4% air content. This result was determined after a significant portion of the concrete had already been discharged. This portion of the wall will not be as resilient against freeze/thaw cycles. However, we do not believe the deficiency warrants replacement of this portion of the wall. Concrete test reports are attached in Appendix D.

Project Engineer
DHUV/stdio

Reviewed by: John van der Eerden, M.Eng., P.Eng.
Project Manager

Enclosures: Appendices A through E
Appendix A – Daily Site Reports
Appendix B – Record Drawings
Appendix C – Geotechnical Advice
Appendix D – Concrete
Appendix E – Site Photos
Appendix A
Daily Site Reports
DAILY CONSTRUCTION REPORT

OWNER          CITY OF SURRY          REPORT NO.          SHEET          OF
PROJECT        2007 URGENT FLOOD MITIGATION WORK          PROJECT NO. 2007  22016
LOCATION       MAISON CANAL          DATE          MAY 21, 2007
CONTRACTOR     CITY OF SURRY          FILE NO.
CONTRACT       CONTRACT NO.

WEATHER: Overcast with rain. High 14°F, low 10°F.

List the LABOUR FORCE (by trade) and the CONTRACTOR'S EQUIPMENT, followed by the REPORT.

1- Foreman
2- Op. Engs
4- Teamsters
2- Fencing Crew

"CREW STARTED TO REMOVE THE GROUND COVER VEGETATION ALONG THE WEST SIDE OF THE MAISON CANAL. THE CLEARING STARTED AT THE END OF THE MAISON FLOOD BOX BIRKRAK AND WILL END AT THE TIE-IN TO THE EXISTING STEEL GIRDERS ALONG THE FISHER RIVER."

"FENCING CREW INSTALLED THE TEMPORARY SECURITY FENCE FOR LUMBER STORAGE AROUND THE LOWER BANDING LIST OF PAVE."
OWNER: CITY OF SURREY
REPORT NO.:
LOCATION: MANSION CANAL & DUKE EAST TO STA. 4-900#
DATE: MAY 3, 2007
CONTRACTOR: CITY OF SURREY
FILE NO.:

WEATHER: OVERCAST WITH SUNNY PERIODS
TEMP. HIGH: 13° C  LOW: 6° C

List the LABOUR FORCE (by trade) and the CONTRACTOR'S EQUIPMENT, followed by the REPORT.

1. FOREMAN
2. OPER. EXCAV
3. LABOURERS
4. TEAMSTERS

- 1- Hitachi 200 Hosp
- 1- CAT 612 Hoe
- 1- CAT 320 Hoe
- 4- CAT 120 Dumps (3- City)
- SURVEY CREW (2)

- COMPLETED THE REMOVAL OF GROUND COVER VEGETATION AND SMALL TREES FROM THE WEST SIDE OF MANSION CANAL AND FERIAL FORESHORE TO EXISTING STEEL WALL.

- STARTED STRIPPING RIVER SIDE OF DUKE FROM STA 4-900 WORKING WEST TO STA 4-990#
- MATERIAL BEING Hauled OFF SITE

- EXCAVATED FOR AND PLACED FILTER ROCK AND RIP-RAP FROM TOE TO HALF WAY UP THE DUKE FACE FROM STA 5-160 TO STA. 5-130#

- LAY-OUT COMPLETED FOR RIVER SIDE CONSTRUCTION FROM STA 4-900 TO STA 4-990#

(Continue report on another sheet, if necessary)

ASSOCIATED ENGINEERING REPRESENTATIVE:

OFFICE COPY
List the LABOUR FORCE (by trade) and the CONTRACTOR'S EQUIPMENT, followed by the REPORT.

1. Foreman 1 - HITACHI 200 Hose
2. OP. Engs 1 - CAT 312 Hoe (not working)
3. Labourers 1 - CAT 320 Hoe
4. Transfers 7 - Tandum Dumps
5. Surveyors (site visit with) (labour foreman)

- Removed topsoil and roots from water side of dyke face, sta 5160 to 5180 all spoil hauled off site.
- Excavated for filter rock and rip-rap along the side slope of dyke to 3.0 m below vegetation line. This spoil also hauled off site.
- Continued placing filter rock and rip-rap between sta's 5160* and 5110*

* The city plan is to excavate to 3.0 m below the vegetation line for the rip-rap toe in the main channel (as per discussion with John on May 1 site visit).

Note: The three city labourers have done very little work on-site for the last two days. A second barge of rip-rap material is due to be delivered to site on Sat, May 15.

(Continue report on another sheet, if necessary)
DAILY CONSTRUCTION REPORT

PROJECT: 2007 URBAN FLOOD MITIGATION WORK
LOCATION: MANSON CANAL AREA STA 1600 TO 44900
DATE: MAY 7, 2007

OWNERS: CITY OF SURREY
CONTRACTOR: CITY OF SURREY / MUTUAL COAST

WEATHER: CLOUDY WITH SUNNY PERIODS
TEMP. HIGH: 15° C
TEMP. LOW: 11° C

List the LABOUR FORCE (by trade) and the CONTRACTOR'S EQUIPMENT, followed by the REPORT.

1. FOREMAN
2. OPERATORs
3. LABOURERS
4. TEAMSTER
5. EARTHMOVER

- Completely exposed the 3 steel drainage pipes at STA 5100 for cutting & capping.
- Contractor continues to haul-in filter rock and place filter rock and rip-rap for Manson Canal area. Tie-in location to meet the existing rip-rap below the pump station outlet.

MUTUAL CONSTRUCTION
1. FOREMAN
2. OPERATORs
3. LABOURERS
4. FENCING SUB.

- Contractor working on damaged concrete floodwall. Sawed out and removed damaged concrete, drilled for and replaced any damaged reinforcing, installed form work and placed concrete for repaired wall (WALL AREA: 20X10.7X0.15).
- Fencing. Contractor replacing damaged fence posts and reinstalling fence fabric from wall repair working downstream.

(Continue report on another sheet, if necessary)

ASSOCIATED ENGINEERING REPRESENTATIVE: [Signature]

OFFICE COPY
DAILY CONSTRUCTION REPORT

OWNER: CITY OF SURREY
PROJECT NO: 2001.002.0100
LOCATION: MAJOR CANAL 5+100′ TO 9+120′
CONTRACTOR: CITY OF SURREY / MUTUAL CONSTRUCTION

WEATHER: Cloudy with sunny periods

TEMP. HIGH 17°C LOW 11°C

List the LABOUR FORCE (by trade) and the CONTRACTOR’S EQUIPMENT, followed by the REPORT:

CITY WORK FORCE
1- FOREMEN (PT. TIME) 1- HITACHI 200 TON
3- LABOURERS (NOT WORKING) 1- CAT 312 (PT. TIME)
2- OP. ENG.’S 1- CAT 320 (PT. TIME)
1- TRANSFER

CREW MOVING RIP-RAP FROM STOCKPILE AT MAJOR CANAL RAMP STATION FOR PLACEMENT ALONG THE TOP SECTION OF CANAL 5+070′ TO 5+130′.

CONTINUED EXCAVATING THE SIDE SLOPE AND RIP-RAP KEYS AT THE END OF THE EXISTING DUCK AND PLACED FILTER ROCK AND RIP-RAP STARTED AT 5+130′ TO TIE IN AT STEEL WALL APPROX. 5+145′.

MUTUAL CONSTRUCTION
1- FOREMAN
2- OP. ENG.’S
8- LABOURERS/CARPENTERS
1- KOMATSU 150 BACKHOE
1- ASPHALT CUMBER
1- TANDEM DUMP
1- TRANSFER

POST AUTHORITY, CITY OF SURREY PROPVED TENANT MENT ON SITE THIS MORNING AND ALL ASSETS ON THE WALL LOCATION, A.E. GROVE CONTRACTOR FIRED POLES ON THIS PROPOSED WALL LOCATION.

ASPHALT CUT FOR WALL CONSTRUCTION, ASPHALT CUT WIDTH IS 4.0 M.
TOTAL CUTTING TO DATE 188 M2, A SMALL AREA IN THE WEST WALL HAS NOT BEEN CUT AS YARD DUMP IS SITUATED IN THE WAY.

(Continue report on another sheet, if necessary)

- Replacing, Rebar and placing of- site (quantity to-day 260 m2)
- Reinforcing Steel delivered on-site to-day
- A.E. Completed layout for stop log post bases at 5+130’

ASSOCIATED ENGINEERING REPRESENTATIVE: D. W. Rawnsley

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DAILY CONSTRUCTION REPORT

OWNER: CITY OF SURRY  REPORT NO.:  SHEET OF:  
PROJECT 2007 URBAN FLOOD MITIGATION WORK  PROJECT NO. 2007-2016 
LOCATION JHANSON CHANNEL AREA S +180' TO 4420'  DATE: MAY 9, 2007 
CONTRACTOR: CITY CREEK MUTUAL CONSTRUCTION  FILE NO:  

WEATHER: SUNNY WITH CLOUDY PERIODS  TEMP. HIGH: 16°C  LOW: 7°C  

List the LABOUR FORCE (by trade) and the CONTRACTOR'S EQUIPMENT, followed by the REPORT. 

CITY CREEK WORKS: 
1. FOREMAN 
2. LABOURERS 
3. TEAIST/TEAISTE 
4. LABOURERS 

- CREW COMPLETED FILTER ROCK AND RIP-RAP FROM STA S +140' TO THE IN AT THE EXISTING STEEL WALL S +180'. 
- REMOVED SMALL TREES, 200' OR LESS AND UNDER BRUSH VEGETATION FROM STA S +140' TO 4420' FOR RIP-RAP PLACEMENT. 

MUTUAL CONSTRUCTION WORKS: 
1. FOREMAN 
2. OPERATING 
3. LABOURERS/ CARPENTERS 
4. TEAIST/TEAISTE 
5. LABOURERS 

- CONTINUES TO REMOVE ASPHALT FOR WALL CONSTRUCTION 40' TO 50' DAY. 
- BENDING REINFORCING STEEL ON-SITE. 
- STARTED THE EXCAVATION FOR WALL SLAB AND THICKENING ON WATER SIDE. STARTED ON THE EAST END OF PROPERTY S + 0', EXCAVATED. 
- INSTALLED CATCH BASIN AT EAST END OF WALL 106' 1/4 EAST OF WEST P. AND 3.6' 1/4 OF C.B. LEAF. 

(Continue report on another sheet, if necessary) 

ASSOCIATED ENGINEERING REPRESENTATIVE: 

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DAILY CONSTRUCTION REPORT

OWNER: CITY OF SURREY
PROJECT: 2007 URGENT Flood Mitigation Work
LOCATION: Site "G" Apex Terminals
CONTRACTOR: Mutual Construction

WEATHER: Sunny & Warm
Temp. High: 17°C Low: 7°C

List the LABOUR FORCE (by trade) and the CONTRACTOR'S EQUIPMENT, followed by the REPORT:

1 - Foreman
1 - Oper. Excav. 1 - Komatsu 150 Backhoe
4 - Laborers 1 - Asphalt Saw
8 - Carpenters
1 - Asphalt Cutter

- Contractor continues to excavate for retaining wall, slab and deepening

- Installed a second catch basin at 65.0' M. East of West P.

- Installed reinforcing steel and form work for first 30.0' M. slab section starting from the East P. and working West.

- Completed cutting asphalt for wall trench (135') 41.0' M.

- City crew stockpiling lock blocks for temporary wall along the east side of Apex Terminals

NOTE:
Contractor instructed to remove the 2006 R.D. leads installed from c.b. to riverside of slab deepening 2 x 30' L.M. of 2006 R.D.

(Continue report on another sheet if necessary)

ASSOCIATED ENGINEERING REPRESENTATIVE: [Signature]

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DAILY CONSTRUCTION REPORT

CITY OF SURREY

WEATHER: Sunny & Warm

TEMP. HIGH: 17°
LOW: 7°

PROJECT: 2007 URBAN FLOOD MITIGATION WORK
LOCATION: S1000 to S4400, S4400 to S4710
DATE: MAY 10, 2007
PROJECT NO.: 2007.002

CONTRACTOR: CITY OF SURREY
FILE NO.

CONTRACT NO.

List the LABOUR FORCE (by trade) and the CONTRACTOR'S EQUIPMENT, followed by the REPORT.

1. Foreman
2. Labourers
3. Operators
10. Teamsters

1 - Hitachi 7200 Hoe
1 - CAT 312 Hoe
1 - CAT 320 Hoe
1 - John Deer 450 CAT
1 - Bomag 317 D3 Roller
10 - Tridem Dumps (2 - City)

- Crew started placing and compacting dyke fill material, River side, S1000 to S4400
- Graded side slope for rock placement
- For side slope in front of Park Parking Lot.
- Hauling-out stock piled clean-up debris
- From side slope S4400 to S4710
- Placed filter rock and riprap along parking lot slope

Note:
- Goudie on-site for sample of dyke fill material
- Will return tomorrow for compaction tests.

(Continue report on another sheet, if necessary)

ASSOCIATED ENGINEERING REPRESENTATIVE:

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DAILY CONSTRUCTION REPORT

Owner: CITY OF SUMLBY  
Report No.:  
Sheet: 1 of 2

Project: 2007 URGENT FLOOD MITIGATION WORK  
Project No.:  
Location: 5400 to 4700 to 4760

Contractor: CITY OF SUMLBY  
File No.:  
Count:  
Contract No.:  

Weather: Sunny & warm  
Temp. high 20°, low 8°

List the LABOUR FORCE (by trade) and the CONTRACTOR'S EQUIPMENT, followed by the REPORT:

- Foreman  
  1. Hitachi 200 Horse

- Operators
  1. Cat 320 Horse
  2. Cat 312 Horse
  3. John Deere 450 Cat
  4. Bomag Roller/Compactor
  16. Tandem Dumps (1-City)

- Contractor continued to work on DUKE CONSTRUCTION
  BACKING-IN, PLACING AND COMPACTION TILL MATERIAL
  FROM STA. 5400+ TO 4700+

- Placing rip-rap on side slope in front of grass section
  OF PARK, STA 4700 TO 4760+

- Road - Cutters on site for density testing this morning

(Continue report on another sheet, if necessary)
DAILY CONSTRUCTION REPORT

OWNER: CITY OF SURREY
REPORT NO.:
PROJECT NO. 2002750
LOCATION: SITE 6 APEX TERMINALS
CONTRACTOR: MUTUAL CONSTRUCTION
DATE: MARCH 11, 2007
WEATHER: SUNNY & WARM
TEMP. HIGH: 20°F, LOW: 8°F

List the LABOUR FORCE (by trade) and the CONTRACTOR'S EQUIPMENT, followed by the REPORT.

1. Foreman
2. Oper. Eng.
3. Carpenters
4. Labourers
5. Teamsters

- Contractor removing asphalt from the west end of proposed wall trench (location 140 M)
- Removes to work at wall slab and thickening excavation 20 M
- Places concrete for first 30 M of wall slab and thickening east end of site (210 M)
- Clearing trees and shrubs as required at the west end of site

Notes:
- Metro testing on site at 9:00 AM. 60% of first load of concrete was already placed in the thickening section of the eastern 30 M section. Test showed low air 3% second truck tested showed 1% for two tests, this truck was marked for future concrete testing to check third truck on site, both Metro tested air 4.6% concrete 4.6% The second truck was rejected and sent off site.

(Continue report on another sheet, if necessary)

ASSOCIATED ENGINEERING REPRESENTATIVE: [Signature]
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ASSOCIATED ENGINEERING

DAILY CONSTRUCTION REPORT

OWNER: CITY OF SURERY  REPORT NO.  SHEET 1 OF 2


LOCATION: SHAPE TO 4+700'  ST 4+800 TO 4+710'

DATE: MAY 14 2007

CONTRACTOR: CITY OF SURERY  FILE NO.

WEATHER: SUNNY WITH CLOUDY PERIODS  TEMP. HIGH 80°  LOW 70°

List the LABOUR FORCE (by trade) and the CONTRACTOR'S EQUIPMENT, followed by the REPORT:

1. Foreman
2. Dozers
3. Laborers
4. Teemsters
5. 1- Bomag Roller/Compactor
6. 1- Hitachi 200 Hoe

- Crew continues to haul-in, place and compact Duke fill material water side Sta 5+000 to 4+900

- Continued to place rip-rap Sta 4+800 to 4+790

- End dumping and machine placement around ties (no filter material)

- Started to steep the land side of Duke Sta 5+000 to 4+900

- Survey crew worked on Duke crest layout from Sta 5+100' to tie-in at park 4+800'

(Continue report on another sheet, if necessary)

ASSOCIATED ENGINEERING REPRESENTATIVE: D. J. Nelson

OFFICE COPY
DAILY CONSTRUCTION REPORT

OWNER: CITY OF SURREY
REPORT NO. SHEET: 2 of 2
PROJECT: 2007 URBAN FLOOD MITIGATION WORK
LOCATION: SITE #6 - APEX TERMINALS
PROJECT NO. 2007-72016
CONTRACTOR: MUTUAL CONSTRUCTION
DATE: MAY 14, 2007
WEATHER: SUNNY WITH CLOUDY PERIODS
TEMP. HIGH: 20°F
LOW: 7°F

List the LABOUR FORCE (by trade) and the CONTRACTOR'S EQUIPMENT, followed by the REPORT.

- Foreman: 1
- CKMATE: 1
- Concrete Pump Truck: 1
- Carpenters: 3
- Concrete Trucks: 3
- Laborers: 4
- Teamsters: 1
- Continued to excavate for wall, slab, and thickening.

- Completed reinforcing placement for the first 30 ft of wall and second 30 ft of slab with thickening.

- Completed form work for second slab and doubled-up form work for wall section.

- Started placing reinforcing for third section of slab on thickening.

- Installed 3 mph of 800 psi concrete from catch basin to river side of slab thickening (C/O, catch basin).

- Placed concrete for second slab and thickening section and first section of wall. The concrete quantity for the slab and thickening is considerably higher than neatline measurement.

- Meteo testing on-site at 1420 for concrete testing.
- Load tested had 6% air, oven concrete also on-site for quality control testing.

(Continue report on another sheet, if necessary)

ASSOCIATED ENGINEERING REPRESENTATIVE: 

SIGNATURE: 

OFFICE COPY
DAILY CONSTRUCTION REPORT

OWNER: CITY OF SURRY
PROJECT: 2007 UPLAND FLOOD Mitigation WORK
LOCATION: SSHO0 TO +4880 ft. +4850 TO +4710 ft.
CONTRACTOR: CITY OF SURRY
DATE: MAY 18, 2007

WEATHER: Sunny, Windy
TEMP: High 22°F, Low 8°F

List the LABOUR FORCE (by trade) and the CONTRACTOR'S EQUIPMENT, followed by the REPORT:

- 1 - Foreman
- 2 - Op. Engs
- 3 - Labourers
- 2 - TERMMSTERS
- 1 - HITACHI 2000 Nm
- 1 - CAT 312 HS
- 1 - John Deere 450 CAT
- 1 - Bomag Roller/Compactor
- 2 - Tandem Dumps

- Crew: HAULING-OUT STOCKPILED CLEARING, SPOIL

- Completed Rip-Rap Placement SSHO0 TO +4760 ft.

- Hauling and placing surplus Dike material, After cutting, Side slopes (SHSO0 TO +4760) to cap existing dike to surface gravel elevation.

- Starting at Tie-in to steel wall at STA 5180 and working up stream.

NOTE:
- Crew will not follow design section for Land Side Dike Construction from SSHO0 TO +4760 ft. Crew will not remove granular material from dike slope. Will only construct to existing tree line. Toe of slope will not install drain rock and filter fabric at toe.

(Continue report on another sheet, if necessary)

ASSOCIATED ENGINEERING REPRESENTATIVE: [Signature]

OFFICE COPY
List the LABOUR FORCE (by trade) and the CONTRACTOR’S EQUIPMENT, followed by the REPORT.

- Foreman
- Komatsu 150 Backhoe
- OP EAG
- Cat 420 Backhoe
- Labourers
- Tandem Dump
- Carpenters
- Truck

- CONTRACTOR STRIPPED WALL AND SANDING SNAP-TIE HOLES
- INSTALLING REINFORCING FOR THIRD SECTION OF SLAB
- INSTALLED REINFORCING FOR SECOND SECTION OF WALL
- CONTINUED SLAB AND THICKENING TRENCH EXCAVATION
- EXCAVATED FOR THE WEST STOP LOG POST BASE
- CUT ASPHALT FOR STOP LOG STRUCTURE AS REQUIRED
- STRAPPED EXCAVATING FOR SITE 7 TIE-IN WALL AT DYE
- HAULING-IN, PLACING AND COMPACTING IMPERVIOUS DYE FILL MATERIAL FOR TRENCH BACKFILL ON THE WATER SIDE OF WALL
- STRAIGHT EXCAVATING FOR STOP LOG WALL TIE-IN AT EXISTING DYE, WATER MAINLINE VALVE BOX 2002, PLUS A SCAN & PIPE SERVICE WAS FOUND DURING SLAB AND THICKENING EXCAVATION WORK STOPPED TILL A DECISION IS MADE AS TO HOW TO DEAL WITH WATER LINES PASSING THE PROPOSED WALL THICKENING

(Continue report on another sheet, if necessary)
DAILY CONSTRUCTION REPORT

OWNER: CITY OF SURREY
PROJECT: 2007 URBAN FLOOD MITIGATION WORK
LOCATION: 5 HIBO TO 4 HIBO
CONTRACTOR: CITY OF SURREY

TEMP. HIGH: 19° C  LOW: 9° C

List the LABOUR FORCE (by trade) and the CONTRACTOR'S EQUIPMENT, followed by the REPORT:

1 - FORERMAN
1 - HITACHI 200 HP

4 - LABOURERS
1 - CAT 312 LG

1 - WELDER
1 - BOOMS, ROLLER/COMBISCRAPER

2 - GRIPS
1 - JOHN DEERE 440 CRAWLER

2 - TRACTOR DUMPS (1 CITY)
1 - WHEELING TRUCK

- CUTOFF SECTIONS OUT OF THE THREE OLD DRAINAGE PIPES 
AT 5TH, 6TH, AND 7TH, AND WELDED ON END PLATES

- CONTINUED TO WORK AT SITE CLEAN UP, HAULING OUT STRANDED BRUSH AND VEGETATION FROM SIDE SLOPE STRIPES

- HAULING SURPLUS DRAIN MATERIAL FROM SIDE SLOPPING BETWEEN
5TH / 6TH TO 7TH / 8TH TO AREA BETWEEN 5TH / 6TH TO 7TH TO RAISE 
RIDGE CREST TO SURFACE GRAVEL ELEVATION.

(Continue report on another sheet, if necessary)

ASSOCIATED ENGINEERING REPRESENTATIVE: 

OFFICE COPY
DAILY CONSTRUCTION REPORT

Owner: CITY OF SURREY
Report No.: Sheet 2 of 2
Project: Sointula (Point) Flood Mitigation Project
Location: Site "O" Apex Terminal Yard
Contractor: MIDWEST CONSTRUCTION
File No.
Contract No.
Weather: Sun/Wind: Cloudy Periods
Temp. High: 19°F Low: 9°F

List the LABOUR FORCE (by trade) and the CONTRACTOR'S EQUIPMENT, followed by the REPORT:
1 - Foreman
1 - Labourer: 150 man-hours
1 - Oper. Eng.
1 - Concrete Pump Truck
7 - Carpenters
3 - Concrete Trucks
4 - Chippers
1 - Tauchen Dump
5 - Terminators

- Contractor doubled-up wall forms for the second 30' (4th section) of wall
- Completed reinforcing steel installation for the third 30' section of slab and thickening
- Installed formwork for slab thickening on third section
- Started to install reinforcing steel for the fourth and final section of slab and thickening
- Moving excavated material to the east end of site and piling and compacting dyke fill material in front of slab thickening
- Placed concrete for second wall section and third section of slab and thickening
- Continued to haul-in dyke material for trench backfilling
- Meted on-site for concrete testing

(Continue report on another sheet, if necessary)

Associated Engineering Representative: [Signature]

Office Copy
DAILY CONSTRUCTION REPORT

OWNER: CITY OF SURREY


LOCATION: 67TH TO 44TH AVE SITE "B" LOCK BLOCK WALL DATE: MAY 17, 2007

CONTRACTOR: CITY OF SURREY

WEATHER: CLOUDY WITH SUNNY PERIODS TEMP. HIGH 17°C LOW 8°C

List the LABOUR FORCE (by trade) and the CONTRACTOR'S EQUIPMENT, followed by the REPORT.

1 - FOREMAN 1 - HITACHI 200 Hog
3 - LABOURERS 1 - CAT 215 Hare
3 - OPERATORS 1 - BOMING - POWER COMPRESSOR
6 - TEAMSTERS 1 - WELDING TRUCK
1 - WELDER 6 - TANDEM DUMP 1 - CITY

- CREW MOVED TO SITE "B" TO START WORK ON THE LOCK BLOCK WALL, REMOVING BRUSH AND VEGETATION FROM THE EAST SIDE OF PROPOSED LOCK BLOCK WALL

- WELDER COMPLETED THE INSTALLATION OF END CAPS ON THE THREE STEEL DRAINAGE PIPE CROSSING THE Dike AT STA 6+180. CITY CREW BRICK-FILLED THE EXCAVATION

- ROADBASE AND COMPACTED Dike MATERIAL PLACED ON Dike surface to Underside of surface gravel elevation from STA 6+180 to 6+200

- CREW CONTINUE TO WORK AT CUTTING THE RIVER SIDE SLOPE TO 3:1 1/2

(Continue report on another sheet, if necessary)

ASSOCIATED ENGINEERING REPRESENTATIVE:

OFFICE COPY
DAILY CONSTRUCTION REPORT

OWNER: CITY OF SURREY
PROJECT: BOYD URBAN FLOOD MITIGATION WORK
LOCATION: SITE 6 & APEX TERMINAL YARD & SITE 7
CONTRACTOR: MUTUAL CONSTRUCTION

DATE: MAY 17, 2007
WEATHER: CLOUDY WITH SUNNY PERIODS

TEMP HIGH: 17° C
LOW: 8° C

List the LABOUR FORCE (by trade) and the CONTRACTOR'S EQUIPMENT, followed by the REPORT:

1. FOREMAN
2. OPERATOR
3. LABOURERS
4. TRAMMERS
5. CITY WATER WORKS CREW

- COMPLETED REINFORCING STEEL INSTALLATION FOR THE FOURTH AND LAST SECTION OF WALL SLAB AND THICKENING.
- STRIPPED WALL FORMS FROM SECOND 30/4M SECTION OF WALL
- INSTALLING REINFORCING FOR THE THIRD 30/4M SECTION OF WALL
- INSTALLED FORM WORK FOR THE LAST SECTION OF SLAB AND THICKENING & THIRD SECTION OF WALL AND SIDE FORMS
- CITY WATER CREW RETRIEVED TOP OF 2004 VALUE AT SITE 7 & PROPOSED STOP LOG WALL
- PLACED CONCRETE FOR FOURTH AND FINAL SECTION OF THE WALL SLAB

- METRO CID SITE FOR COMPL. TESTING

(Continue report on another sheet, if necessary)

ASSOCIATED ENGINEERING REPRESENTATIVE: [Signature]
OFFICE COPY
DAILY CONSTRUCTION REPORT

OWNER: CITY OF SURREY
PROJECT: 2007 URBAN FLOOD MITIGATION WORK
LOCATION: Site 4
CONTRACTOR: MUTUAL CONSTRUCTION

DATE: 19 MAY 2007
FILE NO.: 20072016.00.02.00

TEMP. HIGH __________ LOW __________
WEATHER: Summer Storm

List the LABOUR FORCE (by trade) and the CONTRACTOR'S EQUIPMENT, followed by the REPORT:

FOREMAN (MUTUAL CONSTRUCTION)
Etc.

- Site: 
- Last portion of footing poured yesterday
- Workers coming back to last 30m of wall
- Pour arranged for 12 noon
- Metro testing arranged for 12 noon
- Foreman expressed concern of water in form for second to large for wall thickness, creating weak spots. A corner found at next location

- Plasticizers being added to concrete to 100 slump. This is to make concrete easier to pour into narrow wall.
- Air 4%, lower than desired. Pete (mold) tells 4-5% is close enough.
- Pete reports ordering an extra 1m³ concrete but only minimal quality extra if rest of pour will action prior concerns for this could be.

(Continue report on another sheet, if necessary)

ASSOCIATED ENGINEERING REPRESENTATIVE: DIANE HENDRICKS

OFFICE COPY
DAILY CONSTRUCTION REPORT

OWNER: CITY OF SURREY
PROJECT: 2007 URGENT FLOOD MITIGATION WORKS
LOCATION: SITE B
CONTRACTOR: CITY OF SURREY

DATE: 18 MAY 2007
FILE NO.: 300 3000 006 018 00

WEATHER: SHOWERS
TEMP. HIGH: LOW

List the LABOUR FORCE (by trade) and the CONTRACTOR'S EQUIPMENT, followed by the REPORT.

EQUIPMENT & OPERATOR

SOME OTHER Guy in 3-WV 607

RIP SPREADER PLACED ON MATERIAL SLOPE WITH NO FILTER LAYER
COULD NOT SEE MONITORING WELL above pipe - buried?

(Continue report on another sheet, if necessary)

ASSOCIATED ENGINEERING REPRESENTATIVE: BURNIE HENDRICKS

OFFICE COPY
DAILY CONSTRUCTION REPORT

OWNER: CITY OF SURREY
REPORT NO.: SHEET 1 OF 2

PROJECT: 2007 URGENT FLOOD MITIGATION WORK
LOCATION: S+060 TO S+700
DATE: MAY 22, 2007
CONTRACTOR: CITY OF SURREY
FILE NO.: CONTRACT NO.: WEATHER: OVERCAST WITH SUNNY PERIODS
TEMP. HIGH: 19° C
LOW: 9° C

List the LABOUR FORCE (by trade) and the CONTRACTOR'S EQUIPMENT, followed by the REPORT.

1. FOREMAN
2. OPERATOR
3. LABOURERS

- CITY CREW COMPLETED PLACING RIP-RAP ON THE RIVER SIDE OF DKE FROM STA S100+5 TO S100+10

- HAULING IN PLACING DKE FILL MATERIAL TO BRING DKE TO GRAVEL GRADE

(Continue report on another sheet, if necessary)

ASSOCIATED ENGINEERING REPRESENTATIVE:

OFFICE COPY
PROJECT 2007 URBAN FLOOD MITIGATION URBAN
LOCATION SITE A APEX TERMINAL HARD SITE 2
CONTRACTOR MUTUAL CONSTRUCTION FILE NO.
WEATHER OVERCAST WITH SUNNY PERIODS TEMP. HIGH 19°C LOW 9°C

List the LABOUR FORCE (by trade) and the CONTRACTOR'S EQUIPMENT, followed by the REPORT.
1 - FOREMAN
1 - KOMATSU 150 BACKHOE
1 - PUMP TRUCK
3 - LABOURERS
1 - CONCRETE TRUCK
4 - MEPHISTOS
2 - TEAMSTERS

- CONTRACTOR STRIPPED FORM WORK FROM THE THIRD 30 YD WALL SECTION.
- COMPLETED REINFORCING STEEL PLACEMENT FOR THE FOURTH AND LAST SECTION OF WALL.
- MOVED EXCAVATED MATERIAL TO THE NORTH/EAST END OF LOT FOR STORAGE.
- CONTINUED TO HAUL-IN, PLACE AND COMPACT DAKE FILL, MATERIAL IN FRONT OF WALL THICKENLY AND ABOVE River SIDE SLAB.
- PLACED CONCRETE FOR THE LAST SECTION OF WALL.
- SURVEY CREW ON-SITE TO LAYOUT STOP LOG TIE-IN WALL. THE DESIGN ISSUED MAP WOULD NOT FIT THE EXISTING SITE TOPOGRAPHY AND REQUIRED FIELD REVISION TO FIT EXISTING DAKE.
- MICROTENSION ON-SITE FOR CONCRETE TESTING (6.4% AB)

(Continue report on another sheet, if necessary)
LIST THE LABOUR FORCE (BY TRADE) AND THE CONTRACTOR'S EQUIPMENT, FOLLOWED BY THE REPORT:

1. Foresman
2. Operators
3. Labourers (Not working)
4. Teamsters

- Crew completed placing rip-rap at Stn 4+900 to 4+920.
- Neville-10 Raking and compacting surface gravel Stn 4+160 to 4+900.

(Continue report on another sheet, if necessary)
WEATHER: Sunny with cloudy periods. TEMP. HIGH 17° | LOW 10°

List the LABOUR FORCE (by trade) and the CONTRACTOR'S EQUIPMENT, followed by the REPORT:

1. Formwork
2. Op-eng
3. Teamster
5. Carpenters
3. Labourers

- Contractor stripped formwork from the last section of wall.

- Working at site clean-up

- Continued to haul-in, place and compact dixie fill in the right side of wall excavation.

- Continued to place filter fabric and rip-rap on compacted dixie fill on the river side of wall.

- Started excavation for stop log tie-in wall at site 7.

- Started to construct reinforcing cages for the stoplog forms and stop log wall.

(Continue report on another sheet, if necessary)

ASSOCIATED ENGINEERING REPRESENTATIVE: [Signature]

OFFICE COPY
DAILY CONSTRUCTION REPORT

CITY OF SURREY

REPORT NO.

PROJECT 2007 URBAN FLOOD MITIGATION WORK

LOCATION

CONTRACTOR CITY OF SURREY

DATE MARCH 29, 2007

WEATHER

TEMP. HIGH 20°C LOW 9°C

CONTRACT NO.

LABOUR FORCE (by trade) and the CONTRACTOR'S EQUIPMENT, followed by the REPORT.

1. Foreman
   John Doe

2. OP. ENG.
   John Doe

3. LABOURERS
   Bob Brown
   Tom Smith
   John Doe

EQUIPMENT

1. John Doe's Dozer
2. Tandem Dump Truck
3. CAT 312 Tractor
4. Bomag Roller/Compactor

- City Crew placed a second lift of surface gravel to elev. 4.8' from STA 4+900 to 5+160' (4.8' before compaction)

- Nailing-in and placing DUKE fill material around the west end of Apex Terminal Wall Q/w Rip-Rap cover

- Completed placing rip-rap along the side slope in front of the parking lot
CONTRACT CONTINUES TO WORK AT SITE CLEAN-UP OF CONSTRUCTION MATERIALS FROM SITE "G".

EXCAVATING AND SETTING FROM WORK FOR DURKE TIE-IN WALL AT SITE "7".

EXCAVATED FOR THREE STOP LOG GUIDE POSTS AND THREE STOP LOG BEAMS BETWEEN GUIDE POSTS.

INSTALLED REINFORCING FOR STOP LOG BEAMS.

REASSEMBLING REINFORCING FOR DURKE TIE-IN WALL, SLAB AND THICKENING.

PLACED CONCRETE FOR THE THREE WESTERN GUIDE POST BASES AND FOR THE TWO WESTERLY STOP LOG BEAMS.

NOTE: A 75 MM 960 MM WAS LOCATED CROSSING THE SECOND FROM THE EAST STOP LOG BEAM AT A 45° ANGLE. THE BOTTOM TWO HORIZONTAL BASE WERE CUT AND SPOUT TO ALLOW THE MAIN TUBE CANT IN PLACE WITH A (CONTINUE REPORT ON ANOTHER SHEET, IF NECESSARY) P.O.D. SLEEVE COVERS.

METER ON-SITE FOR CONCRETE TESTING.
OWNED: CITY OF SUBRÉG REPORT NO. SHEET 1 OF 2
PROJECT: 2007 URGENT FLOOD MITIGATION WORK PROJECT NO. 3007-2006
LOCATION: DATE: MAY 25, 2007
CONTRACTOR: CITY OF SUBRÉG FILE NO.
CONTRACT: CONTRACT NO.
WEATHER: SUNNY, WARM TEMP. HIGH LOW

List the LABOUR FORCE (by trade) and the CONTRACTOR'S EQUIPMENT, followed by the REPORT.

City Crew NOT ON SITE TO-DAY

(Continue report on another sheet, if necessary)

ASSOCIATED ENGINEERING REPRESENTATIVE: OFFICE COPY
CONTRACTOR, CONTINUED TO WORK AT STOP LOG BEAM EXCAVATION, AT APPOX 0830 THE BACKHOE HIT AN OX TURNER SERVICE THAT STARTED TO LEAK 60 CM FROM WHERE THE PIPE WAS HIT. THIS CAUSED WATER TO RUN DOWN THE WING WALL EXCAVATION AND INTO THE STOP LOG EXCAVATION. SUPERT TURNER DEPT. CALLED FOR REPAIR AND A TWO MAN CREW ARRIVED ON SITE AT 1045 HRS AND STARTED TO LOOK FOR SERVICE SHUT-OFF VALVE. REPAIR CREW ON SITE THIS AFTERNOON TO FIX LEAK.

- INSTALLING REINFORCING FOR THE SECOND SECTION OF THE DURCIE TIE-IN WALL
- WORKING AT PLUGGING SNAP-TIE HOLES FOR SITE 2 WALL
- STARTED TO INSTALL THE 300' R-4C. STORM OUTFALL PIPE
  3-4M LENGTHS INSTALLED

(Continue report on another sheet, if necessary)
DAILY CONSTRUCTION REPORT

OWNER: CITY OF SURREY
PROJECT: URGENT FLOOD MITIGATION WORK
LOCATION: SITE 6 & APPEX YARD & SITE 7
CONTRACTOR: MUTUAL CONSTRUCTION

DATE: MAY 26, 2007
WEATHER: OVERCAST

TEMP. HIGH: 80°F
TEMP. LOW: 70°F

List the LABOUR FORCE (by trade) and the CONTRACTOR'S EQUIPMENT, followed by the REPORT:

1. FORMWORK
   1. Komatsu 150 Backhoe

2. LABOURERS
   1. Concrete Pump Truck
   2. Concrete Trucks

3. TEAMSTERS

- Contractor continues to work on 3000 PUC storm outfall installation, pipe installed to headwall, location:

- Placed concrete for thicknesses and scabs for pipe tie-in wall at site 7.

- Working at site clean-up, moving excavated spoil to the north/east corner of site 6.

- Installing pipe fill material and rip-rap along the other side of pipe, west end of new wall.

- Metro on-site for concrete testing (air 54%)

(Continue report on another sheet, if necessary)

ASSOCIATED ENGINEERING REPRESENTATIVE: [Signature]

OFFICE COPY
DAILY CONSTRUCTION REPORT

OWNER: CITY OF SURREY
PROJECT: 2007 URGENT FLOOD MITIGATION WORK
LOCATION: SITE 6, APEX YARD & SITE 7, LINDEN CREEK
CONTRACTOR: MULTICON CONSTRUCTION

WEATHER: CLOUDY WITH SUNSHINE, PERIODS
TEMP. HIGH: 15°C LOW: 8°C

List the LABOUR FORCE (by trade) and the CONTRACTOR’S EQUIPMENT, followed by the REPORT.

1. Foreman
   1. Komatsu 150 Bok Hog
2. Oper. Eng
3. Labourers
4. Carpenters

- CONTRACTOR WORKING AT INSTALLATION OF WALL FORMS
  FOR THE DYE TIE-IN WALL
- GRouting SNAP-TIE HOLES FOR SITE 6 WALL
- COMPLETED EXCAVATING FOR THE LAST TWO STOP LOG TERMS
  AND GUIDE POST MANHOLE
- CONTRACTOR IS ASSEMBLING PARTS REQUIRED TO REPAIR THE
  DAMAGED 3½" GAS WATER LINE

NOTE:
- CITY CREW STARTED INSTALLATION OF THE LOCK BLOCK WALL
  ALONG THE EAST SIDE OF APEX TERMINAL YARD
- CITY WATER CREW ON SITE TO REPAIR 2½" GAS WATER MAIN 6-14/D:
  FROM STOP LOG BERM EXCAVATION, WILL NOT REPAIR DAMAGED
  WATERLINE IN EXCAVATION AS THIS AREA IS ON PRIVATE PROPERTY

(Continue report on another sheet, if necessary)

ASSOCIATED ENGINEERING REPRESENTATIVE: [Signature]
OFFICE COPY
DAILY CONSTRUCTION REPORT

OWNER: City of Surrey
REPORT NO.:
SHEET: 1 of 1

PROJECT: 2007 URGENT FLOOD MITIGATION UPGRADE
PROJECT NO. 2007/2.16

LOCATION: Site 6 Apex Yard & Site 7 Mound Yard
DATE: May 29, 2007

CONTRACTOR: Mutual Construction
FILE NO.:

CONTRACT NO.:

WEATHER: Sunny & Warm
TEMP. HIGHEST: 25°C
LOWEST: 12°C

List the LABOUR FORCE (by trade) and the CONTRACTOR'S EQUIPMENT, followed by the REPORT:

1. Foreman
2. Labourers
3. Operators

- Contractor working at site clean-up
- Cement finishing, grouting snap-tip holes on Site 6 wall
- Crew on-site at Osaco hrs to repair the damaged 2% gravel water line at Site 7 where turned on at Osaco hrs. A second leak was found a further 600mm south line shut down and a longer length of 2% ordered and installed, water turned on at 1100 hrs. No leakage.
- Completed doubling-up wall forms for Site 7 'Dyke Tie-in' wall
- Installed reinforcing cages for the last two stop log beams
- Placed concrete for both the dyke tie-in wall and the two remaining stop log beams & saw stop log guide manhole

NOTE:
City crew continue to work at loock block wall construction and re-bar placement along the east side of Apex Terminals (Continue report on another sheet if necessary)
- Metro on-site for concrete testing

ASSOCIATED ENGINEERING REPRESENTATIVE: [Signature]

OFFICE COPY
DAILY CONSTRUCTION REPORT

OWNER: CITY OF SURREY

REPORT NO.: SHEET 1 OF 2

PROJECT: 2007 URBAN FLOOD MITIGATION WORK

LOCATION: SITE "G" APEX YARD \ SITE "7" LINDEL YARD

DATE: MAY 30, 2007

CONTRACTOR: MUTUAL CONSTRUCTION

FILE NO.

WEATHER: SUNNY & HOT

TEMP. HIGH: 25°F

LOW: 14°F

List the LABOUR FORCE (by trade) and the CONTRACTOR'S EQUIPMENT, followed by the REPORT:

1 - Framer
   1 - Komatsu 150 Backhoe

   1 - CAT 27G (Bobcat)

3 - Laborers
   1 - Tandem Dump

3 - Carpenters

1 - Cement Finisher

1 - Mason

- Concrete Finisher working on Site G wall, reaching
  snap - tie holes.

- Contractor stripped form work from Site 7 dyke
  tie - in wall (covered and watered).

- Completed placing and compacting dyke fill material
  on the west side of site 6 wall, placed filter fabric
  and 200 ft. rip - rap.

- Started to install 2000 ft. of C.D. catch basin liner working from
  east to west.

- Crews working at Site clean up.

NOTE:

- City crew continue to place rip - rap along the outside of
  the temporary lock block wall, east side of Apex Yard.

(Continue report on another sheet, if necessary)

ASSOCIATED ENGINEERING REPRESENTATIVE: [Signature]

OFFICE COPY
Appendix B
Record Drawings
CITY OF SURREY

2007 URGENT FLOOD MITIGATION WORKS
Contract M.S. 4807-207C

AE Project No. 20072016
Record Drawings
NOTES:
1. CONCRETE MAINS SCHEDULED ON SOCKETS
2. SOILS FILL INTO SOCKET

SECTION
SHEET 1/10

SECTION 3

SECTION 4

SECTION 7

CUTTING PL TO 3/4" NECESSARY TO FIT SOCKET

CUTTING PL TO 3/4" NECESSARY TO FIT SOCKET
Appendix C

Geotechnical Advice
May 15, 2007

Associated Engineering
Suite 300 – 4940 Canada Way
Burnaby, BC
V5G 4M5

Attention: Mr. Wayne Zhan, P.Eng.

RE: GEOTECHNICAL DESIGN INPUT
MANSON CANNEL DYKE UPGRADE 2007
FRASER RIVER DYKES - TANNERY ROAD AREA
SURREY, BC

Dear Sirs:

Golder Associates Limited (Golder) has completed a review of the geotechnical site conditions at the sites of the proposed dyke upgrades in north Surrey. The geotechnical review is part of the effort for the dyke upgrade work currently underway as part of ‘Urgent Dyke Upgrade’ program by the Province of British Columbia.

The results of our review at the Manson Cannel dyke in north Surrey in the area of Tannery Road is presented below:

Site 8 - Manson Cannel

This area is located just west of Tannery Road in the area to the east of the Manson Cannel Floodbox. The dyke in this area requires placement of a zone of new dyke fill up to 1.0 m thick on the river side of the existing dyke. Inspection of the foreshore area at this section of dyke on May 4, 2007 indicates the dyke and surrounding area is underlain by a compact sand to silty sand. Based on available regional geotechnical data, the sand at the site extends to depth under this section of the Fraser River.
Based on the inspection on May 4, 2007, it is anticipated that the proposed dyke widening can proceed as planned. The new fill will result in estimated settlements of the present dyke structure of some 150 to 200 mm, so an overbuild of 300 mm is suggested. The current dyke section will provide the low permeable zone to minimize seepage through the dyke at this site.

Further, we understand that dyke fills of less than 200 mm are proposed over the Manson Canal floodbox. These thin fills proposed over the floodbox may result in some minor settlement of the floodbox. The settlement should be less than 20 mm but the pipes at the pump station and floodbox should be inspected this summer.

We trust this letter provides the information you require at this time.

Yours very truly,

GOLDER ASSOCIATES LTD.

ORIGINAL SIGNED BY

John A. Hall, P.Eng.
Principal

JAH/8
07-1411-0116
07-1411-0116
Associated Engineering  
Suite 300 – 4940 Canada Way  
Burnaby, BC V5G 4M5  

Attention: Mr. Wayne Zhan, P.Eng.  

RE: GEOTECHNICAL DESIGN INPUT  
SITE 6-APEX TERMINALS DYKE UPGRADE 2007  
FRASER RIVER DYKES TANNERY ROAD AREA  
SURREY, BC  

Dear Sir:  

Golder Associates Ltd. (Golder) has completed a review of the geotechnical site conditions at the sites of the proposed dyke upgrades in north Surrey. The geotechnical review is part of the effort for the dyke upgrade work currently underway as part of ‘Urgent Dyke Upgrade’ program by the Province of British Columbia.  

The results of our review at the Apex Terminal site in north Surrey in the area of Tannery Road is presented below:  

1.0 SITE 6-APEX TERMINAL  

This section of dyke is located at the Apex Terminal yard which is located just east of Tannery Road. We understand that the terminal yard area is at approximately elevation 3.7 m or just below the design flood level at 4.1 m (200 year design flood level). Further, the yard grade is some 2 to 3 m above the elevation of the foreshore river bank area. The yard area is paved and the pavement appears to be in good shape. The yard has been used to store finished wood products and it is understood the bundles of wood have been stacked up to approximately 4 m high.
Based on the site inspection by Golder on May 8th, the yard area appears to be underlain by a dredged sand fill or a clean sand and gravel fill. This material has a high hydraulic conductivity that will allow seepage to the landside or rear to any dyke proposed at this location. Thus, any dyke or wall at the site that is to act as a dyke will require a cut-off zone of clay or equivalent down through the granular yard fills and into the underlying silts. Alternatively, a cut off wall of sufficient depth to reduce the seepage flows and water pressures on the land side of the proposed dyke or wall would provide reasonable protection.

2.0 GEOTECHNICAL DESIGN

For the purpose of the seepage pressure assessment, it has been assumed that the asphalt pavement is at least 75 mm thick and has a minimum density of 22.8 kN/m³. The hydraulic conductivity of the existing dredge materials was assumed to be approximately 1 order of magnitude higher than the asphalt.

The seepage analysis at this site indicates that for the concrete dyke / wall to retain up to 50 cm of water for a sustained period, the dyke concrete wall will require a cut off at least 1.0 m deep. The cut off could be an extension of the wall footing and should be on the river side of the wall. It is noted that if the wall is to retain more than 50 cm of water for a sustained period of time, the stability the wall under these water level conditions and the predicted seepage flow conditions may be compromised. This is a result of the seepage flows under the wall starting to cause internal erosion of the sands that underlie the wall. Consequently, it will be necessary to place a gravel berm 2 m wide and 50 cm thick at the rear of the wall to address the high seepage flows and uplift pressures.

The wall footing may be designed for an allowable bearing capacity of 30 kPa. This does not consider the possibility that under a design earthquake and if the water level under the wall is at the ground surface behind the wall that the underlying soils may liquefy.

We trust this letter provides the information you require at this time.

Yours very truly,

GOLDER ASSOCIATES LTD.

ORIGINAL SIGNED BY

John A. Hull, P.Eng.
Principal

JAH/nv
07-1411-0116
Associated Engineering  
Suite 300-4940 Canada Way  
Burnaby, BC, V5G 4M5  

Attention: Mr. Wayne Zhan, P.Eng.  

RE: GEOTECHNICAL DESIGN INPUT  
SITE 7-DYKE ROAD-DYKE UPGRADES 2007  
FRASER RIVER DYKES-TANNERY ROAD AREA  
SURREY, BC  

Dear Sir:  

Golder Associates Ltd. (Golder) has completed a review of the geotechnical site conditions at the site of the above proposed dyke upgrade in north Surrey. The geotechnical review is part of the effort for the dyke upgrade work currently underway as part of ‘Urgent Dyke Upgrade’ program by the Province of British Columbia.  

The results of our review at Dyke Road / Lindal Cedar mill in north Surrey in the area of Tannery Road is presented below:  

1.0 SITE 7-ROAD TO LINDAL CEDAR  

This site is located east of Apex Terminal and based on available survey data the ground surface (road) at the wall site is at elevation 3.4 m. Further, the 200 year flood elevation at this site is at 4.1 m. The site conditions are based on a few test pits excavated in the area of the proposed wall / dyke. The results of the excavations indicate the site appears to be underlain by a layer of gravel fill and a sand or silty sand which extends to depths of between 1.2 m and 1.7 m. The sand fill is underlain by grey clay and clayey silt. The test pits were stopped in the clay layer.
At this site the upgraded dyke would consist of a temporary dyke / wall structure and would include stop logs supported by 2 or 3 posts. The stop logs would only be installed if the river level increases and requires the road to be closed to minimize flooding to the area south of the site. The dyke / wall structure will require a cut-off element or it may be possible to construct an upstream low permeable zone to lengthen the seepage path under the temporary stop-log wall / dyke structure.

2.0 GEOTECHNICAL DESIGN

The seepage analysis indicates that for the wall to retain up to 70 cm of water for a sustained period, the wall will require a cut off at least 1.0 m deep. The cut off would be an extension of or a continuation of the concrete section extending from the stop log post supports. The cut off wall and the 1.2 m deep post supports would provide the lateral support for the 70 cm of water which is anticipated at on the river at this site. It is anticipated that the pavement at the site which has been removed to construct the wall will be replaced.

The cut-off wall for this section of dyke extends into the clay layer at the site which should reduce seepage forces; however it is noted that if the wall is to retain more than 70 cm of water for a sustained period the Factor of Safety for the wall dyke under these water level conditions and the predicted seepage flow conditions would approach 1.0. Thus, seepage flows under the wall may start to cause erosion of the sands that underlie the wall. Further, in the case where excessive seepage is observed, it is recommended that a gravel berm 2 m wide and at least 50 cm thick be placed at the rear of the wall to manage seepage flows and minimize erosion of the soils from under the wall.

We trust this letter provides the information you require and is consistent with our project needs and project schedule.

Yours very truly,

GOLDER ASSOCIATES LTD.

ORIGINAL SIGNED BY

John Hull, P.Eng
Principal

JAH/nnv
07-1411-0116

Golder Associates
Appendix D

Concrete
<table>
<thead>
<tr>
<th>SPEC NO.</th>
<th>SPECIMEN</th>
<th>TYPE</th>
<th>CURING CONDITION</th>
<th>DATE TESTED</th>
<th>ACREATED</th>
<th>DATED</th>
<th>AVERAGE</th>
<th>AVERAGE</th>
<th>MAXIMUM</th>
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**SPECIFIED STRENGTH** 30 MPa @ 28 DAYS

**CEMENT CONTENT** kg/m³ TYPE GU

**POZZOLAN CONTENT** kg/m³ TYPE FA

**MAXIMUM SIZE AGGREGATE** 20 mm

**BATCH TIME** 07:52

**ADMIXTURES**

**SUPPLIER** OCEAN READY MIX

**MIX NO.** 330PP6

**TRUCK NO.** 703 **TICKET NO.** 1891863

**LOAD VOL.** 12 m³ **CUM. VOL.** 12 m³

**WATER ADDED** 1 **AUTH. BY**

**LOCATION** FLOOD CONTROL WALL FOOTING

**COMMENTS** CONTRACTOR & SUPPLIER WERE NOTIFIED OF LOW AIR CONTENT

**CONCRETE TEMPS 6.0 °C AIR TEMPS 13.0 °C**

**SLUMP** 80 mm **SPEC.** 80 ± 20

**AIR** 3.0 % **SPEC.** 6.5 ± 1.5

**PLASTIC DENSITY** kg/m³

**HARDEDEN DENSITY** kg/m³

**CAST TIME** 09:10

**CAST BY** MTL RG

**CURING CONDITIONS** CURING BOX

**INITIAL CURING TEMP MAXIMUM** 22.0 °C **MINIMUM** 16.0 °C

**METRO TESTING LABORATORIES** PER.
# Concrete Test Report

**Project No.: S-819**

**Client:** ASSOCIATED ENGINEERING (B.C.)

**CC:** ASSOCIATED ENGINEERING (B.C.)

**Attention:** JOHN VAN RIORDAN

**Project:** FRASER RIVER DYKE - URGENT FLOOD WORKS

**Location:** APEX TERMINAL, TANNERY ROAD

**Concrete:** SURREY

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<tr>
<th>Set No.</th>
<th>No. of Specimens</th>
<th>Date Received</th>
<th>Date Cast</th>
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<th>Failure Type</th>
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**Specified Strength:** 30 MPa @ 28 Days

**Cement Content:** 3 kg/m³ Type GU

**Pozzolan Content:** 0 kg/m³ Type FA

**Maximum Size Aggregate:** 20 mm

**Batch Time:** 12:47

**Admixtures:**

**Supplier:** OCEAN READY MIX

**Mix No.:** 330PP6

**Truck No.:** 133  **Ticket No.:** 1882372

**Load Vol.:** 10 m³  **Cum. Vol.:** 10 m³

**Water Added:** 1

**Accepted By:** 2007. Jun.12

**Concrete Temp:** 21.0°C  **Air Temp:** 21.0°C

**Slump:** 150 mm  **Spec:** 80 ± 20

**Air:** 6.0%  **Spec:** 6.5 ± 1.5

**Plastic Density:** 1g/cm³

**Hardened Density:**

**Cast Time:** 14:30

**Casting Conditions:** Curing Box

**Initial Curing Temp:** Maximum 22.0°C  **Minimum:** 16.0°C

**Location:** SECOND FOOTING 30M.

**Comments:** SUPERINTENDENT, SUPPLIER AND OCEAN Q.C. WERE NOTIFIED OF THE TEST RESULT.

**signature:**

**Metro Testing Laboratories**

**Per:**
**CONCRETE TEST REPORT**

**TO:** ASSOCIATED ENGINEERING (B.C.)

**PROJECT NO.** S-019

**PROJECT:** FRASER RIVER DYKE - URGENT FLOOD WORKS  
APEX TERMINAL, TANNERY ROAD  
SURREY

**ATTN:** JOHN VAN RIORDAN

**DATE RECEIVED:** 2007. May. 17  
**DATE CAST:** 2007. May. 16

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**SPCIFIED STRENGTH:** 30 MPa @ 28 DAYS

**Cement Content:** kg/m³ TYPE GU

**POZZOLAN CONTENT:** kg/m³ TYPE FA

**MAXIMUM SIZE AGGREGATE:** 20 mm

**BATCH TIME:** 13:00

**ADMIXTURES:**

**LOCATION**

**NAILS, SECTION 2, FOOTINGS SECTION 3.**

**COMMENTS**

**AUTHOR:** W.G.

**PAGE 1 OF 1 2007. Jun. 15**
TO
ASSOCIATED ENGINEERING (B.C.)
300 - 4940 CANADA WAY
SURREY, BC
V5G 4M5

ATTN: JOHN VAN RIORDAN

PROJECT
FRASER RIVER DYKE - URGENT FLOOD WORKS
APEX TERMINAL, TANNERY ROAD
SURREY

CONCRETE TEST REPORT

PROJECT NO. S-819
CLIENT ASSOCIATED ENGINEERING (B.C.)

ATTN: JOHN VAN RIORDAN

CONCRETE

SET NO. 4
NO. OF SPECIMENS 3
DATE RECEIVED 2007. May. 18
DATE CAST 2007. May. 17

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<th>AVERAGE LENGTH OR SP. (mm)</th>
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<th>FAILURE (MPa)</th>
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SPECIFIED STRENGTH 30 MPa @ 28 DAYS

CEMENT CONTENT kg/m³ TYPE GU
POZZOLAN CONTENT kg/m³ TYPE FA
MAXIMUM SIZE AGGREGATE 20 mm
BATCH TIME 13:53
ADMUXTURES

CONCRETE TEMP 20.0 °C   AIR TEMP 19.0 °C
SLUMP 80 mm SPEC. 80 ± 20
AIR 5.0 % SPEC. 6.5 ± 1.5
PLASTIC DENSITY kg/m³
HARDENED DENSITY kg/m³
CAST TIME 14:40
CAST BY MTL RG CURING CONDITIONS CURING BOX
INITIAL CURING TEMP MAXIMUM 22.0 °C MINIMUM 6.0 °C
LOCATION
FOOTINGS, SECTION 4

COMMENTS

MIX NO. 330665
TRUCK NO. 123 TICKET NO. 1883269
LOAD VOL 10.4 m³ CM. VOL. 10.4 m³
WATER ADDED 1
AUTH. BY
Page 1 of 1 2007. Jun. 15

Metro Testing Laboratories PER...
# Concrete Test Report

**Client:** ASSOCIATED ENGINEERING (B.C.)

**Project:** FRASER RIVER DYKE - URGENT FLOOD WORKS

**Location:** APEX TERMINAL, TANNERY ROAD

**Surrey**

## Test Summary

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<th>Specimen No.</th>
<th>Cure Cond.</th>
<th>Date Tested</th>
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**Specified Strength:** 35 MPa @ 28 Days

**Concrete Temp:** 22.0 °C  
**Air Temp:** 16.0 °C

### Trend Graph

- **Mould Type:** Plastic
- **Plastic Density:** 1.5
- **Hardened Density:** 2.5
- **Cast Time:** 13:05
- **Initial Curing Temp:** 22.0 °C
- **Minimum Curing Temp:** 16.0 °C

## Additional Information

- **Supplier:** OCEAN READY MIX  
  **Mix No.:** 33PF6
- **Truck No.:** 115  
  **Ticket No.:** 1883552
- **Load Vol.:** 10 m³  
  **Cum. Vol.:** 10 m³
- **Water Added:** 

**Location:** WALLS, SECTION 3

**Comments:**

---

**Page 1 of 1**  
**Page 2007, Jun 19**

**AUTHOR:**

---

**Signature:**

---

**Comments:**
# CONCRETE TEST REPORT

**TO:** ASSOCIATED ENGINEERING (B.C.)

**CC:**

**ATTN:** JOHN VAN RIORDAN

**PROJECT:** FRASER RIVER DYKE - URGENT FLOOD WORKS

**APLEX TERMINAL, TANNERY ROAD**

**SURREY**

**SET NO.** 6  
**NO. OF SPECIMENS** 3  
**DATE RECEIVED** 2007. May. 23  
**DATE CAST** 2007. May. 22

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**SPECIFIED STRENGTH** 35 MPa @ 28 DAYS

**CEMENT CONTENT** 15 kg/m³ TYPE GU

**POZZOLAN CONTENT** 15 kg/m³ TYPE FA

**MAXIMUM SIZE AGGREGATE** 20 mm

**BATCH TIME**

**ADMIXTURES**

**MIX NO.** 335DF6  
**TRUCK NO.** 194  
**LOAD VOL.** 0.4 m³  
**CUM. VOL.** 0.4 m³

**WATER ADDED** 1  
**AUTH. BY**

**LOCATION** WALL, WRST SECTION

**COMMENTS**

**SIGNED:**

**PAGE 1 OF 1**  
**2007. JUN. 21**
## CONCRETE TEST REPORT

**PROJECT NO. S-819**

**CLIENT** ASSOCIATED ENGINEERING (B.C.)

300 - 4940 CANADA WAY

BURNABY, BC

V5G 4M5

**TO**

**CC**

ATTN: JOHN VAN RIORDAN

**PROJECT**

FRASER RIVER DYKE - URGENT FLOOD WORKS

APEX TERMINAL, TANNERY ROAD

SURREY

### SET NO. 7

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<th>MAXIMUM LOAD (\text{kN})</th>
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**SPECIFIED STRENGTH**

35 MPa @ 28 DAYS

**CEMENT CONTENT**

\(\text{kg/m}^3\) TYPE GU

**POZZOLAN CONTENT**

\(\text{kg/m}^3\) TYPE EA

**MAXIMUM SIZE AGGREGATE**

20 mm

**BATCH TIME**

13:25

**ADMIXTURES**

12:25

**CONCRETE TEMP**

25.0 °C

**AIR TEMP**

7.0 °C

**SLUMP**

70 mm, SPEC. 80 ± 20

**AIR**

4.6%, SPEC. 6.5 ± 1.5

**PLASTIC DENSITY**

\(\text{kg/m}^3\)

**HARDENED DENSITY**

\(\text{kg/m}^3\)

**CAST TIME**

14:45

**CAST BY**

MTL GV

**CURING CONDITIONS**

CURING BOX

**INITIAL CURING TEMP**

MAXIMUM 22.0 °C

MINIMUM 16.0 °C

**LOCATION**

SITE 7, STOP LOB BEAMS

**COMMENTS**

LOW AIR CONTENT

**SUPPLIER**

OCEAN READY MIX

**MIX NO.**

335966

**TRUCK NO.**

194

**TICKET NO.**

1884276

**LOAD VOLUME**

10.4 m³ CUM. VOL. 10.4 m³

**WATER ADDED**

1

**AUTH BY**

Page 1 of 1

2007. Jun. 21

METRO TESTING LABORATORIES
## Concrete Test Report

**Project No. S-819**  
**Client:** Associated Engineering (B.C.)  
**C.C.:**  
**To:** John Van Riordan  
**Attention:**

### Project: Fraser River Dyke - Urgent Flood Works

**Apex Terminal, Tannery Road**  
**Surrey**

<table>
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<tr>
<th>Specimen</th>
<th>Date of Test</th>
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**Specified Strength:** 30 MPa @ 28 days  
**Concrete Temp:** 23.0 °C  
**Air Temp:** 11.0 °C  
**Slump:** 90 mm Spec. 80 ± 20  
**Air:** 5.4% Spec. 6.5 ± 1.5  
**Plastic Density:** 7.85 g/cm³  
**Hardened Density:** 7.85 g/cm³  
**Cast Time:** 07:48  
**Cast By:** MTL GV  
**Curing Conditions:** Curing Box  
**Initial Curing Temp/Maximum:** 22.0 °C  
**Minimum:** 16.0 °C  

**Location:** Dyke Trench Wall Area "7"  
**Supplier:** Ocean Ready Mix  
**Mix No.:** 330366  
**Truck No.:** 209  
**Ticket No.:** 1884600  
**Load Vol:** 9 m³ Cum. Vol.: 9 m³  
**Water Added:** 1箱  
**Comment:**

---

**Signature:**

Page 1 of 1
2007 Jun 25
# CONCRETE TEST REPORT

**Client:** ASSOCIATED ENGINEERING (B.C.)

**CC:**

**Attn:** JOHN VAN RIORDAN

**Project:** FRASER RIVER DYKE - URGENT FLOOD WORKS

**Concrete:** APEX TERMINAL, TANNERY ROAD

**Surrey**

**Set No. 9**

**No. of Specimens:** 3

**Date Received:** 2007. May. 30

**Date Cast:** 2007. May. 29

## Specimens

<table>
<thead>
<tr>
<th>Specimen No.</th>
<th>Type</th>
<th>Cure</th>
<th>Condition</th>
<th>Date of Test</th>
<th>Age at Test</th>
<th>Average Cube Strength</th>
<th>Maximum Load</th>
<th>Compressive Strength @ 28 Days</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Cylinder</td>
<td>Lab</td>
<td>Jun.05</td>
<td>7</td>
<td>101.6</td>
<td>203.2</td>
<td>334</td>
<td>41.2</td>
</tr>
<tr>
<td>B</td>
<td>Cylinder</td>
<td>Lab</td>
<td>Jun.26</td>
<td>28</td>
<td>101.6</td>
<td>203.2</td>
<td>440</td>
<td>54.3</td>
</tr>
<tr>
<td>C</td>
<td>Cylinder</td>
<td>Lab</td>
<td>Jun.26</td>
<td>28</td>
<td>101.6</td>
<td>203.2</td>
<td>452</td>
<td>55.8 55.0</td>
</tr>
</tbody>
</table>

**Specified Strength:** 35 MPa @ 28 Days

**Concrete Temp:** 22.5 °C

**Air Temp:** 8.0 °C

**Slump:** 120 mm

**Spec.:** 80 ± 20

**Air:** 5.3%

**Spec.:** 6.5 ± 1.5

**Plastic Density:** kg/m³

**Hardened Density:** kg/m³

**Cast Time:** 12:35

**Cast By:** MTL

**Curing Conditions:** Curing Box

**Initial Curing Temp:** Maximum 22.0 °C

**Minimum:** 16.0 °C

**Location:** STOP LOG WALL

**Comments:**

- FIRST AIR TEST=4%. AIR ADDED ON SITE - SECOND AIR TEST=5.3%

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**Supplier:** OCEAN READY MIX

**Mix No.:** 335PF6

**Truck No.:** 195

**Ticket No.:** 1885021

**Load Vol.:** 6 m³

**Cum. Vol.:** 6 m³

**Water Added:** Auth. By

**Page:** 1 of 1

**Date:** 2007. Jun. 27
Appendix E
Site Photos
<table>
<thead>
<tr>
<th>Site 6: Apex Terminals Floodwall</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Forming and reinforcement</strong></td>
</tr>
<tr>
<td>300mm drain through footing</td>
</tr>
<tr>
<td>Expansion joint. Erosion protection on river side.</td>
</tr>
<tr>
<td>Backfilling river side with compacted dyke fill</td>
</tr>
<tr>
<td>Flap gated drainage outlet</td>
</tr>
<tr>
<td>Tie in to adjacent high ground</td>
</tr>
<tr>
<td>Reinforcing for buried seepage cut-off wall</td>
</tr>
<tr>
<td>------------------------------------------</td>
</tr>
<tr>
<td>Excavation for tie-in to existing dyke</td>
</tr>
<tr>
<td>Reinforcement for abutment wing wall</td>
</tr>
<tr>
<td>Stripping on river side of existing dyke</td>
</tr>
<tr>
<td>----------------------------------------</td>
</tr>
<tr>
<td>Placing riprap on enhanced river side slope</td>
</tr>
<tr>
<td>Land side of set-back dyke</td>
</tr>
</tbody>
</table>
### Site 9: Fraser River @ Manson Canal Riprap

<table>
<thead>
<tr>
<th>Stripping existing slope</th>
<th>Filter layer with riprap placed at slope toe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Finished riprap</td>
<td>Filter layer with riprap placed at slope toe</td>
</tr>
<tr>
<td>Riprap placed on Manson Canal slope</td>
<td>Riprap placed on Manson Canal slope</td>
</tr>
</tbody>
</table>