
Presented by
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16 April 2014
Presentation Overview

- Site description and project background
- Project management system — Integration and tracking tools
- Work Breakdown Structure (WBS)
- Cost Estimate — Integration Workbook
- Risk Management Plan (RMP)
- Schedule
- Monthly Financial Tracking Report (MFTR)
- System outputs
- Lessons learned
Site Description and Project Background

Legend:
- Remediation Area
- Waterlot Boundary
- Phase 1 Remediation Area
- Phase 2 Remediation Area

Source: Google 2011
Site Description and Project Background (cont.)

- Multiple-phase project (2011/12 to 2015/16)
  - Phase 1A - Under-pier Erosion Protection System ($7M)
  - Phase 1B - Open-water Remediation ($50M)
  - Phase 1C - Habitat Compensation ($4M)
  - Phase 2 - Under-pier Remediation ($26M)

- Separate design and construction contracts for each phase
Project Management System: Integration and Tracking Tools

- Work Breakdown Structure
- Cost Estimate – Integration Workbook
- Risk Management Plan
- Schedule
- Monthly Financial Tracking Report
INPUTS

Contracts, Change Orders, Monthly Progress Reports, SIGMA

Risks

Tasks

Schedule

OUTPUTS

Monthly Financial Tracking Report/EVR

Actual Costs

Cost Estimate/Integration Workbook

Monthly OTOBOS/SIGMA Reporting, FCSAP Funding Requests/Updates, Liability Reporting, etc.

OUTPUTS

INPUTS

Feedback Loop

EVR = Earned Value Report
NPMS = National Project Management System
OTOBOS = On-Time On-Budget On-Schedule
Work Breakdown Structure

• For initial planning and future fiscal year (FY) estimates
  
  - Identify tasks and associated costs per FY
    
    • Construction: use design estimate/work breakdown and project schedule
    • Consultants: subdivide tasks for various consultants, use project schedule
    • PWGSC: estimate human resources needs and disbursements
    • Contingency: include risk management contingency (RMC) from RMP
Work Breakdown Structure (cont.)

• For current FY
  - Update tasks and associated costs per FY
    • Construction: use contract unit price breakdown after award, change orders, and estimate at completion (EAC) from MFTR
    • Consultants: update monthly with new work plan tasks/costs and EAC from MFTR
    • PWGSC: update human resources needs and disbursements from MFTR
    • Contingency: update with current RMC from RMP
Cost Estimate – Integration Workbook

• Incorporate costs from various sources
  - WBS sheets from each FY
  - RMC amounts from RMP and Pre-Approved Amount for Anticipated Amendments (PAAA) sheets
  - Construction
    • Forecast: unit-price tables and volumes from design estimates
    • Actual: tender amount and change orders
  - MFTR: feedback loop to update estimates with actual costs

• Plans and tracks all costs for entire project over multiple FYs
Risk Management Plan

• Development of RMP
  - NPMS template and risk taxonomy

• Risk categories
  - PWGSC
  - Consultants
  - Construction
    • Phase 1A - Sheetpile wall
    • Phase 1B - Open-water remediation
    • Phase 1C - Habitat compensation
    • Phase 2 - South jetty under-pier remediation
Risk Management Plan (cont.)

- Identify risks and potential consequences
- Likelihood and impact
  - Schedule, functionality, and quality effect
  - Determines overall risk grading
## Risk Management Plan (cont.)

### Risk Assessment Matrix (3x3)

<table>
<thead>
<tr>
<th>Impact (consequence/severity)</th>
<th>Likelihood (probability/frequency)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>High</strong></td>
<td>Low (normal or unlikely)</td>
</tr>
<tr>
<td><em>(we couldn’t function or our mandate would have to change)</em></td>
<td><strong>Considerable</strong></td>
</tr>
<tr>
<td></td>
<td><em>(management and monitoring required)</em></td>
</tr>
<tr>
<td><strong>Medium</strong></td>
<td>Low (normal)</td>
</tr>
<tr>
<td><em>(we could still function)</em></td>
<td><strong>Accept risks</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Risk may be worth accepting with monitoring</strong></td>
</tr>
<tr>
<td><strong>Low</strong></td>
<td>Medium (likely)</td>
</tr>
<tr>
<td><em>(normal)</em></td>
<td><strong>Accept risks</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Extensive management</strong></td>
</tr>
</tbody>
</table>

Source: Public Works and Government Services Canada, Risk Management Template
Risk Management Plan (cont.)

- Inherent risk allowance
  - Quantifies cost if risk took place
  - Engineer’s estimates for construction risks

- Risk response
  - Avoidance
  - Prevention
  - Reduction
  - Transfer/share
  - Acceptance
Risk Management Plan (cont.)

- Controls and risk response strategy
- Risk allowance percentage
  - Based on likelihood, impact, and response
- Residual risk estimate
- Calculation of RMC
  - For each phase of construction (PAAA)
  - Included in WBS
## Risk Management Plan – Example Risk

- **Phase 1B - Changes in transport and disposal costs**
  - Price could increase due to changes in market conditions after tender, or due to changes in regulatory requirements or facility availability

<table>
<thead>
<tr>
<th>Likelihood</th>
<th>Impact</th>
<th>Inherent Allowance</th>
<th>Response</th>
<th>Response Strategy</th>
<th>%</th>
<th>Residual Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medium</td>
<td>High</td>
<td>Pre-tender $4,769,762</td>
<td>Reduction</td>
<td>• Monitor facilities and market pricing</td>
<td>80%</td>
<td>Pre-tender $3,815,810</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Post-tender $3,179,842</td>
<td></td>
<td>• Cost contingencies included to protect against impacts of change in market pricing</td>
<td>75%</td>
<td>Post-tender $2,384,880</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total $7,949,604</td>
<td></td>
<td>• Timely completion of work</td>
<td></td>
<td>Total $6,200,690</td>
</tr>
</tbody>
</table>
Risk Management Plan – Contingency Over Time

Phase 1B Open-water Dredging Construction Costs

Actual Costs

- $35,000,000
- $30,000,000
- $25,000,000
- $20,000,000
- $15,000,000
- $10,000,000
- $5,000,000
- $0

Date

- February-13
- March-13
- April-13
- May-13
- June-13
- July-13
- August-13
- September-13
- October-13
- November-13
- December-13
- January-14
- February-14

Phase 1B Contingency
Phase 1B Cumulative Earned Value
Schedule

• Development
  - Identify project phasing, tasks, durations, and milestones with sufficient detail over multiple FYs
  - Integration with the FCSAP cycle

• Maintenance
  - Monthly review and updates based on design and consultant/contractor schedules
  - FY task changes are reflected in the WBS through the feedback loop
## Monthly Financial Tracking Report

- **Inputs:** Consultant monthly progress reports, contract and contract change order data, and SIGMA commitments and actuals
- **Outputs:** OTOBOS metrics, value of work done, year-to-date invoiced (actual), and EAC (forecast)

<table>
<thead>
<tr>
<th></th>
<th>Physical Progress Complete (%)</th>
<th>Total Commitment (SIGMA)</th>
<th>Updated Budget Cost at Completion (BAC) (from WBS)</th>
<th>YTD Expenditure - Estimated Value of Work Done (VWD) - Actual Cost for Work Performed (ACWP)</th>
<th>YTD Amount Invoiced (SIGMA)</th>
<th>Financial Progress VWD/BAC (%)</th>
<th>Updated Forecast - (EAC)</th>
<th>Financial Variance at Completion (BAC-EAC)</th>
<th>Financial Variance at Completion (BAC-EAC)/ BAC (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Totals</td>
<td>91%</td>
<td>47,518,703</td>
<td>47,875,186</td>
<td>42,151,295</td>
<td>38,843,077</td>
<td>88%</td>
<td>44,970,481</td>
<td>2,904,705</td>
<td>6.1%</td>
</tr>
<tr>
<td>Total Funding</td>
<td></td>
<td>47,243,000</td>
<td>47,243,000</td>
<td>47,243,000</td>
<td>47,243,000</td>
<td>47,243,000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Budget Variance</td>
<td>(275,703)</td>
<td>(632,186)</td>
<td>5,091,705</td>
<td>8,399,924</td>
<td>2,272,519</td>
<td>4.8%</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Totals:** 47,243,000

**Variance:**
- Total Budget Variance: (275,703)
- Total Funding: (632,186)

**Financial Variance:**
- Total Budget Variance: 4.8%
Monthly Financial Tracking Report (cont.)

• Contract Earned Value Reporting
  - Inputs: Contractor cash flow forecast (baseline) based on contract unit price breakdown, Contractor Progress Claims, Contractor Schedule
  - Outputs: Cost variance, schedule variance, EAC, earned value, and estimated completion date
Monthly Financial Tracking Report (cont.)

Planned Value Updated as at 5th February, 2014

- BCWS (PV): Budgeted Cost of Work Scheduled / Planned Value - Original 10 Apr, 2013
- ACWP (AC): Actual Cost of Work Performed / Actual Cost
- BCWP (EV): Budgeted Cost of Work Performed / Earned Value
- Actual Cost Projection

Original Planned Value
10th April, 2013

Status Date
31st January, 2014

Projected Actual Cost (AC)

Revised Planned Value (PV)
5th February, 2014

Estimate at Completion
EAC = $33,891,280
31st March, 2014

Earned Value Parameters:

- BAC: Budget at Completion (5 Feb, 2014 Updated Value on Contract)
- EAC: Estimate at Completion (BAC-AC)
- ETC: Estimate to Complete (BAC-AC)
- VAC: Variance at Completion (BAC-AC)
- SV: Schedule Variance at Updated PV (EV-PV)
- CV: Cost Variance (EV-AC)
- CR: Cost Performance Index (EV/AC)
- SR: Schedule Performance Index on Updated PV (EV/PV)

- Scheduled Start Date
- Scheduled Completion Date (PCD - Planned Completion date)
- Latest Updated Schedule Completion Date (Tervita - Demob Completion)
- Estimated Laggard at Status Date (Days)
- Estimated Laggard at Completion (Days)
- Estimated Completion Date (ECO - Estimated Completion Date)

Public Works and Government Services Canada
Travaux publics et Services gouvernementaux Canada
System Outputs

- FCSAP funding submission
- Annual liability estimates for TB public accounts
- Annual Federal Contaminated Sites Inventory update
- Project approval: PCRA, IIP, IMB, RPIB, EPA
- NPMS deliverables: Project Management Plan
- FCSAP reporting: expenditures/forecasts
- Banking day submissions: quarterly
- Project monitoring board review: quarterly
- Monthly SIGMA OTOBOS report
- FY end expenditure forecasts
Lessons Learned

- Regular updates to RMP are essential to financial tracking
- Improve integration with internal financial systems - SIGMA
- Identifying human resources required
- Adapting NPMS tools to meet project needs
- Achieving consistency between tools
- Financial tracking system critical for project success and reporting requirements