

**From:** [ronpower@lowerchurchillproject.ca](mailto:ronpower@lowerchurchillproject.ca)  
**To:** [edover@lowerchurchillproject.ca](mailto:edover@lowerchurchillproject.ca)  
**Cc:** [Ed Bush](#); [Gilbert Bennett](#); [Grant Horwood](#); [John Mulcahy](#); [Lance Clarke](#); [Pat Hussey](#); [Paul Harrington](#); [Peter Tsekouras](#); [Robert Woolgar](#); [Scott O'Brien](#)  
**Subject:** Re: Barnard/Pennecon - Execution Plan  
**Date:** Tuesday, September 15, 2015 8:08:32 AM  
**Attachments:** [MFA-BP-SD-2000-PM-A07-0001-01.pdf](#)

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Ed - fyi - forgot you first time around

Ron Power---09/15/2015 07:37:35 AM---Grant - I just received a copy of Barnard/Pennecon's Execution Plan from Peter. Regarding the orga

From: Ron Power/NLHydro

To: Grant Horwood/NLHydro@NLHYDRO,

Cc: Robert Woolgar/NLHydro@NLHYDRO, Scott O'Brien/NLHydro@NLHYDRO, John Mulcahy/NLHydro@NLHYDRO, Lance Clarke/NLHydro@NLHydro, Pat Hussey/NLHydro@NLHydro, Gilbert Bennett/NLHydro@NLHydro, Paul Harrington/NLHydro@NLHydro, Ed Bush/NLHydro@NLHYDRO, Peter Tsekouras/NLHydro@NLHYDRO

Date: 09/15/2015 07:37 AM

Subject: Barnard/Pennecon - Execution Plan

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**Grant** - I just received a copy of Barnard/Pennecon's Execution Plan from Peter.

Regarding the organization chart, please be sure that it is reviewed by John Mulcahy. It is important that we get the people that were included in the proposal.

Regarding the Planning and Scheduling Manager, I notice that Kaitlin Coombs is proposed. Kaitlin recently applied to us for a Junior Cost Engineer role. I assume that we will not accept Kaitlin for the noted critical role for CH0009.

**Robert** - the organization must be bottomed out before we sign the contract.

All - Going forward, please ensure that I am sent relevant execution material related to CH0009.

Thanks



MFA-BP-SD-2000-PM-A07-0001-01.pdf

**Ron Power, P. Eng.**

General Project Manager

**PROJECT DELIVERY TEAM**

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w. [muskratfalls.nalcorenergy.com](http://muskratfalls.nalcorenergy.com)

You owe it to yourself, and your family, to make it home safely every day. What have you done today so that nobody gets hurt?

----- Forwarded by Ron Power/NLHydro on 09/15/2015 07:18 AM -----

From: Peter Tsekouras/NLHydro

To: Ron Power/NLHydro@nlhydro,

Date: 09/15/2015 06:15 AM

Subject: Fwd: Removal for Astaldi Offices from Intake Cofferdam area

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Sent from my iPad

Begin forwarded message:

**From:** "Peter Tsekouras" <[PeterTsekouras@lowerchurchillproject.ca](mailto:PeterTsekouras@lowerchurchillproject.ca)>

**To:** "Ed Bush" <[EdBush@lowerchurchillproject.ca](mailto:EdBush@lowerchurchillproject.ca)>, "Michael Harris" <[MichaelHarris@lowerchurchillproject.ca](mailto:MichaelHarris@lowerchurchillproject.ca)>

**Subject:** Fw: Removal for Astaldi Offices from Intake Cofferdam area

fyi

**Peter Tsekouras**

Area Construction Manager - Power House Intake & Spillway

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----- Forwarded by Peter Tsekouras/NLHydro on 09/14/2015 02:32 PM -----

From: Grant Horwood/NLHydro  
To: Peter Tsekouras/NLHydro@NLHYDRO,  
Date: 09/14/2015 02:28 PM  
Subject: Re: Removal for Astaldi Offices from Intake Cofferdam area

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*(See attached file: MFA-BP-SD-2000-PM-A07-0001-01.pdf)*

Peter,

Here is BP's initial submission for the execution plan. We just received it this morning so it's not reviewed. You can send any comments you have back to me and i will incorporate them into the mark-up.

Thanks,

**Grant Horwood, P.Eng.**  
**Package Leader - Infrastructure**  
**PROJECT DELIVERY TEAM**  
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Peter Tsekouras---09/14/2015 02:53:33 PM---Hi Grant I have had discussions with Bill Knox and Roy Collier over the last couple of weeks about w

From: Peter Tsekouras/NLHydro  
To: Grant Horwood/NLHydro@NLHYDRO,  
Cc: Ed Bush/NLHydro@NLHYDRO, Mike Collins/NLHydro@NLHYDRO, Robert Woolgar/NLHydro@NLHYDRO  
Date: 09/14/2015 02:53 PM  
Subject: Re: Removal for Astaldi Offices from Intake Cofferdam area

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Hi Grant

I have had discussions with Bill Knox and Roy Collier over the last couple of

weeks about what CH009 will require; however now you have provided details to which I have just asked Astaldi to proceed with a plan to relocate the entire trailer complex before Barnard mobilizes.

Thanks

Also could you please forward the Barnard Pennecon's Execution plan and schedule you mentioned below

**Peter Tsekouras**

**Area Construction Manager - Power House Intake & Spillway**

**PROJECT DELIVERY TEAM**

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Grant Horwood---09/14/2015 01:58:39 PM---Peter, I just received Barnard Pennecon's Execution plan and schedule which indicates a start date o

From: Grant Horwood/NLHydro  
To: Peter Tsekouras/NLHydro@NLHYDRO,  
Cc: Ed Bush/NLHydro@NLHYDRO, Robert Woolgar/NLHydro@NLHYDRO, Mike Collins/NLHydro@NLHYDRO  
Date: 09/14/2015 01:58 PM  
Subject: Removal for Astaldi Offices from Intake Cofferdam area

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Peter,

I just received Barnard Pennecon's Execution plan and schedule which indicates a start date of 7-Oct in the area upstream of the intake. Can you confirm when Astaldi will be relocating their trailers?

**Grant Horwood, P.Eng.**

**Package Leader - Infrastructure**

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Document Front Sheet

<b>NE-LCP Contractor/Supplier</b>	Contract or Purchase Number and Description: CH0009		Contractor/Supplier Name: Barnard-Pennecon Limited Partnership		
	Document Title: Project Execution Plan			Total Number of Pages Incl. Front Sheet 39	
	Contractor Document Number: N/A			Revision Number: 0	
	Supplier Document Number: N/A			Revision Number: 0	
	NE-LCP Document Number: MFA-BP-SD-2000-PM-A07-0001-01			NE-LCP Issue Number: A1	
	Approver's Signature: <i>Kendra McDonald</i>		Date (dd-mmm-yyyy): <i>14-Sep-2015</i>		Review Class:
Comments:				Equipment Tag or Model Number:	

<b>NE-LCP</b>	REVIEW DOES NOT CONSTITUTE APPROVAL OF DESIGN DETAILS, CALCULATIONS, TEST METHODS OR MATERIAL DEVELOPED AND/OR SELECTED BY THE CONTRACTOR, NOR DOES IT RELIEVE THE CONTRACTOR FROM FULL COMPLIANCE WITH CONTRACTUAL OR OTHER OBLIGATIONS.			
	<input type="checkbox"/> 01 – REVIEWED AND ACCEPTED – NO COMMENTS <input type="checkbox"/> 02 – REVIEWED – INCORPORATE COMMENTS, REVISE AND RESUBMIT <input type="checkbox"/> 03 – REVIEWED - NOT ACCEPTED <input type="checkbox"/> 04 – INFORMATION ONLY <input type="checkbox"/> 05 – NOT REVIEWED			
	Lead Reviewer:	Date (dd-mmm-yyyy):	Project Manager:	Date (dd-mmm-yyyy):
	NE-LCP Management:	Date (dd-mmm-yyyy):		
<u>General Comments:</u>				

**Contract CH0009**

**North & South Dams**

**Lower Churchill Project**

**Project Execution Plan**

**(Rev 0)**

**Updated Sep. 13<sup>th</sup>, 2015**

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**Contract CH0009**

**North & South Dams**

**Lower Churchill Project**

**Project Execution Plan Overview**

**(Rev 0)**

**Updated Sep. 13<sup>th</sup>, 2015**

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## **Project Execution Overview**

This Execution Plan is a broad overview indicating Barnard Pennecon LP's (BPLP) intentions, interpretations and expectations for successful contract performance on the Lower Churchill Project - CH0009 - Construction of North and South Dams. Our successful execution of the construction works will involve the effective planning, management and coordination of numerous resources, which we describe below. This execution plan will act as a living document to be added to, amended, and updated as the work progresses. It will act as a guide to our approach to the work and will include detailed narrative, supplemented by three-dimensional and non-three-dimensional layouts and plans included within and listed as attachment. Our goal with this execution plan is to convey our complete understanding of the project and to demonstrate our knowledge of the technical issues involved. As detailed plans for each of the major facets of work on the project are developed and modified, they will be incorporated into this project execution plan.

There are many factors that go into a successful project including schedule and labor management, open communication, and resource organization to name a few, but there are three main pillars that we feel are most important. They are safety, quality, and environmental stewardship. We like to describe it as a three legged stool because without one, the stool is going to fall. Each one of these pillars not only has to start as a philosophy, but it needs to then be incorporated into a plan. Putting it on paper in a plan is not the end though as each plan needs to then be followed and incorporated all the way down to the field level. This is an important step as a plan is only successful if it is followed and integrated within the workforces, management and craft. Outlined below are brief descriptions with regard to each of these pillars and why they are so important to the success of this project. Each has a separate project specific plan which will be referenced and assimilated into our daily activities including JSA's, toolbox meetings, work plans and more.

### **BUILDING A SAFETY CULTURE**

Safety is personal. We believe that we all deserve to work in a safe place and we deserve to go home to our families every day after work. The "we" refers to all people – our employees, our subcontractors, everyone onsite, and the public at large. At Barnard Pennecon LP, we know that each person, from the newest crew member to the CEO, should be equally as accountable for safe work practices and creating a safe work place. In January 2013, Barnard implemented the Speak Up! & Listen Up! Program, which aims to increase and improve communication when a crew sees something unsafe; encourages anyone at any level to reinforce a safe work culture; and confirms that it is okay to give safety feedback to supervisors, managers, or people in other work groups. Intentionally improving the communication of safety throughout each day and at each project and identifying crew members who are most likely to take risks are also part of this commitment for continuous improvement. Based on the success of this program so far, we plan to continue incorporating it into our new projects, and this one is no exception.

Outlined below are some of the elements of our safety program. Please also make reference to our project specific Safety, Health, Injury, and Illness Prevention Program (SHIPP) for more detailed information.

#### **Key Elements of Our Safety Program:**

- Involving our crews in creating Jobsite Hazard Analyses (JHAs, JSAs) for all major work phases.
- Holding daily pre-work safety meetings to cover the work tasks, associated hazards, work procedures, equipment, and required PPE.
- Providing safety training applicable to the project scope of work at documented, weekly tool-box safety meetings.
- Assigning a Safety Educator to each project team.
- Conducting frequent safety evaluations of jobs by our Management Team.
- Establishing safety recognition programs for supervisors – safety awards are presented during tool-

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Lower Churchill Project – Muskrat Falls

CH0009 – North & South Dams

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box safety meetings.

- Mandating new employee orientation and training programs.
- Always following up with corrective measures through our accident and injury reporting system.
- Applying our Safety Violation/Misconduct Enforcement Program.
- Ensuring that insurance company Loss Control Specialists visit our jobsites and make recommendations where warranted.
- Partnering and coordinating with the client for job-wide safety and health efforts.

## QUALITY CONTROL MANAGEMENT

With respect to Quality, we have a no-nonsense approach. We expect a job to be done right the first time. We feel that earning trust by doing what we say we'll do is the only way to conduct business. We take pride in our work and produce a quality product that meets or exceeds each owner's expectations.

In the end, it's our people who ensure that we produce high quality work. In working with Quality Control (QC) inspectors on every project, we know that our focus on Partnering and insistence on teamwork pays off. Our open communication at the field activity level has been noted by all types of construction personnel. This practice lends itself to keeping Quality in the forefront of every individual's work goals.

For each project, we develop a thorough, site-specific Quality Plan based on project specifications and industry standards. Each project-specific plan strives to achieve a uniform and high quality level of workmanship throughout the phases of procurement, fabrication, construction, and final facility testing and delivery. Discussion about Quality Assurance and Quality Control is on the agenda at our daily, weekly and monthly meetings onsite and off. The Quality Plan and interrelated QMS Manual for this project will be incorporated and implemented daily.

## ENVIRONMENTAL STEWARDSHIP

Barnard Pennecon LP isn't just about building. We set out to improve the world we all live in; both through the projects we undertake and the way we approach them. We view compliance with agency and owner requirements as a minimum standard. To view the project as a cut-and-dried assignment, rather than a way to better the world for future generations would be short-sighted. Our teams in the field look at the whole project long-term. We know what type of environment we want to leave for the next generation as well as for the owner. Outlined below are some of the key components of successful environmental compliance and stewardship, all of which are implemented into our Contract Specific Environmental Protection Plan (C-SEPP).

With a Corporate Environmental Director and a designated Environmental Representative on each project, we cover the bases at both management and project levels. Our corporate commitment to the environment includes:

- Meeting or exceeding the requirements of applicable environmental laws, regulations, local rules, and project-specific environmental mitigation measures.
- Executing each project in a manner that minimizes environmental impacts.
- Continually improving the way we manage our environmental responsibilities and addressing these responsibilities with the same level of importance as safety and quality.
- Implementing our Corporate Sustainability Initiative, including reducing greenhouse gas; reducing our carbon footprint at each project; diverting waste from landfills whenever possible; and reducing our resource consumption.

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Lower Churchill Project – Muskrat Falls

CH0009 – North & South Dams

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## **Contract CH0009**

### **North & South Dams**

### **Lower Churchill Project**

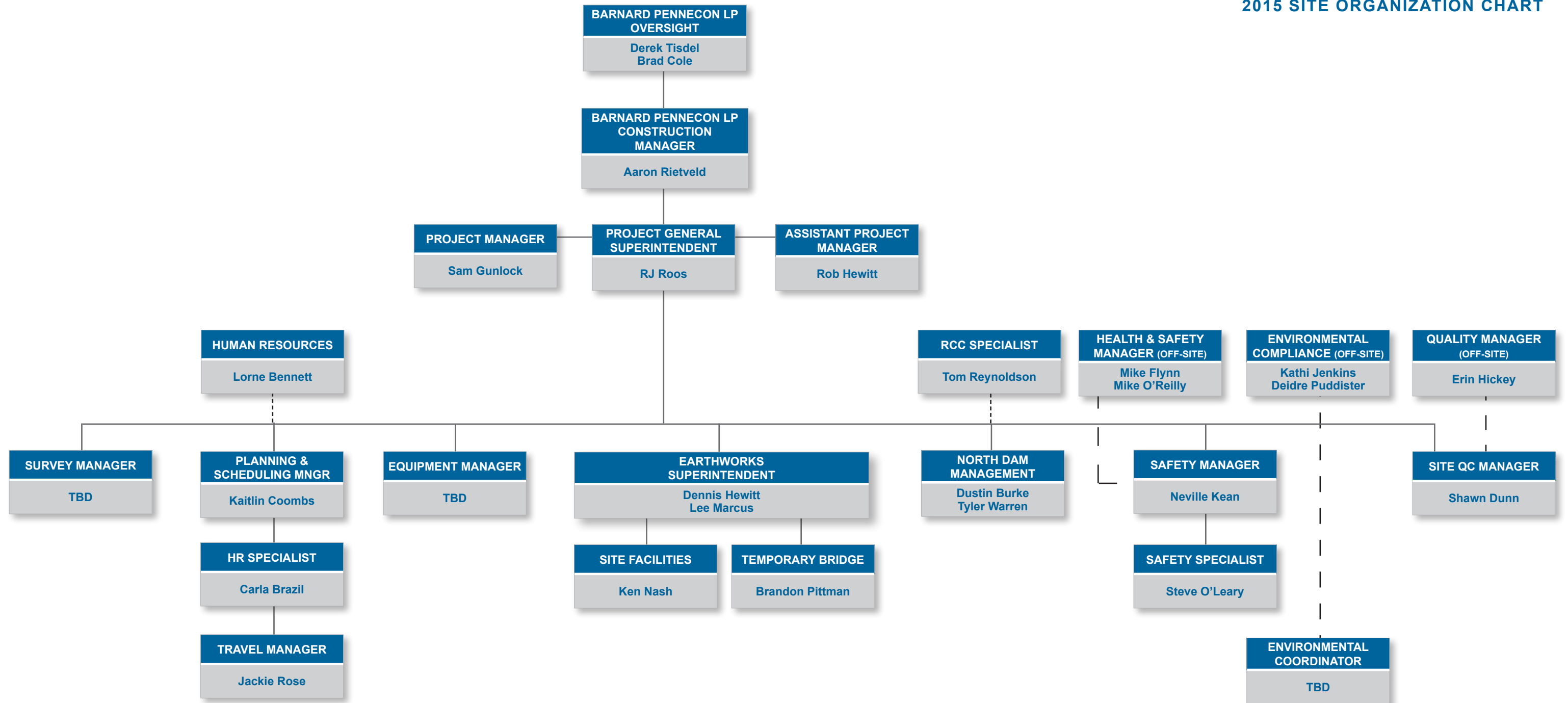
## **Project Organization Chart**

**(Rev 0)**

**Updated Sep. 13<sup>th</sup>, 2015**



**BARNARD  
PENNECON<sup>LP</sup>**  
2015 SITE ORGANIZATION CHART



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Lower Churchill Project – Muskrat Falls

CH0009 – North & South Dams

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## **Contract CH0009**

### **North & South Dams**

### **Lower Churchill Project**

## **Project Schedule**

**(Rev 0)**

**Updated Sep. 13<sup>th</sup>, 2015**

Muskrat Falls NS Dam-Start Aug 2015 WORKING					Muskrat Falls 2015 Schedule						2016						
Activity ID	Activity Name	Original Duration	Start	Finish	2015						2016						
					Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	
<b>Muskrat Falls N&amp;S Dam-Start Aug 2015 WORKING</b>																	
<b>Administrative</b>																	
CH0009-A1010	Contract Award-M1	0	17-Aug-15*		◆ Contract Award-M1												
CH0009-A1050	Mobilization	0	28-Sep-15*		◆ Mobilization												
<b>Mobilization and Materials</b>																	
CH0009-A1200	Order/Procurement Period for Crusher	80	17-Aug-15	18-Nov-15	Order/Procurement Period for Crusher												
CH0009-A1060	Mobilization of Initial Equipment	15	28-Sep-15	14-Oct-15	Mobilization of Initial Equipment												
CH0009-A1260	GD-8 Development	2	06-Oct-15	07-Oct-15	GD-8 Development												
CH0009-A1520	Setup Screen	2	08-Oct-15	09-Oct-15	Setup Screen												
CH0009-A1230	Screen 2E Aggs at GD-8 for Starter Groin	7	10-Oct-15	17-Oct-15	Screen 2E Aggs at GD-8 for Starter Groin												
CH0009-A1210	Screen 2C Aggs at GD-8 for Intake Cofferdam	5	19-Oct-15	23-Oct-15	Screen 2C Aggs at GD-8 for Intake Cofferdam												
CH0009-A1130	Screen 2A/3A for South Dam to O.G.	10	24-Oct-15	04-Nov-15	Screen 2A/3A for South Dam to O.G.												
CH0009-A1500	Setup Crusher	35	02-May-16*	10-Jun-16	Setup Crusher												
CH0009-A1180	Screen 2E/3F Upstream Cofferdam	72	02-May-16	23-Jul-16	Screen 2E/3F Upstream Cofferdam												
CH0009-A1070	Crush Aggregates	172	11-Jun-16	27-Jun-17	Crush Aggregates												
<b>Office and Yard</b>																	
CH0009-A1100	Install Office Trailer Utilities	10	14-Oct-15	24-Oct-15	Install Office Trailer Utilities												
CH0009-A1110	Grade Office Area	5	14-Oct-15	19-Oct-15	Grade Office Area												
CH0009-A1090	Mobilize & Setup Trailers	30	26-Oct-15	30-Nov-15	Mobilize & Setup Trailers												
<b>Spillway Temp Upstream Bridge and Ramps</b>																	
CH0009-A1920	Submit Abutment Design	14	28-Sep-15	13-Oct-15	Submit Abutment Design												
CH0009-A1430	Temp Bridge Design	20	28-Sep-15	20-Oct-15	Temp Bridge Design												
CH0009-A1440	Temp Bridge Submittals	21	21-Oct-15	13-Nov-15	Temp Bridge Submittals												
CH0009-A1910	F/P/S North Abutment	14	26-Oct-15	10-Nov-15	F/P/S North Abutment												
CH0009-A1900	F/P/S South Abutment	28	31-Oct-15	03-Dec-15	F/P/S South Abutment												
CH0009-A1970	Temp Bridge Procurment of Materials	20	14-Nov-15	08-Dec-15	Temp Bridge Procurment of Materials												
CH0009-A1980	Temp Bridge Fabrication	90	08-Dec-15	22-Mar-16	Temp Bridge Fabrication												
CH0009-A1990	Temp Bridge Delivery	10	01-Apr-16*	13-Apr-16	Temp Bridge Delivery												
CH0009-A1190	Assemble Temp Bridge	20	13-Apr-16	06-May-16	Assemble Temp Bridge												
CH0009-A1120	Install Temp Bridge Structure	28	06-May-16	08-Jun-16	Install Temp Bridge Structure												
<b>Intake Channel Cofferdam</b>																	
CH0009-A1590	Overburden Ex	4	07-Oct-15	10-Oct-15	Overburden Ex												
CH0009-A1880	Dental Ex	2	12-Oct-15	13-Oct-15	Dental Ex												
CH0009-A1610	Foundation Cleaning	6	14-Oct-15	20-Oct-15	Foundation Cleaning												
CH0009-A1620	Dental Concrete/Slush Grout	4	21-Oct-15	24-Oct-15	Dental Concrete/Slush Grout												
CH0009-A1700	Intake Zone 1 Placement	8	28-Oct-15	05-Nov-15	Intake Zone 1 Placement												
CH0009-A1740	Intake Zone 2C Placement	8	28-Oct-15	05-Nov-15	Intake Zone 2C Placement												
CH0009-A1800	Intake Zone 3C Placement	4	02-Nov-15	05-Nov-15	Intake Zone 3C Placement												
CH0009-A1830	Intake Zone 3D Placement	15	06-Nov-15	23-Nov-15	Intake Zone 3D Placement												
<b>Starter Groins</b>																	
CH0009-A1290	S.G. Upstream Zone 3 Placement Groin to Elv. 11m	5	07-Oct-15	12-Oct-15	S.G. Upstream Zone 3 Placement Groin to Elv. 11m												
CH0009-A1320	S.G. Downstream Zone 3 Placement Groin to Elv. 11m	5	13-Oct-15	17-Oct-15	S.G. Downstream Zone 3 Placement Groin to Elv. 11m												
CH0009-A1295	S.G. Upstream Zone 2E Placement	2	16-Oct-15	17-Oct-15	S.G. Upstream Zone 2E Placement												
CH0009-A1390	S.G. Upstream Zone 3 Placement to Elv. 15m	4	19-Oct-15	22-Oct-15	S.G. Upstream Zone 3 Placement to Elv. 15m												
CH0009-A1325	S.G. Downstream Zone 2E Placement	2	19-Oct-15	20-Oct-15	S.G. Downstream Zone 2E Placement												

■ Actual Work    ■ Critical Remaining Work  
■ Remaining Work    ◆ Milestone

Muskrat Falls NS Dam-Start Aug 2015 WORKING					Muskrat Falls 2015 Schedule							13-Sep-15 14:29					
Activity ID	Activity Name	Original Duration	Start	Finish	2015					2016							
					Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	
CH0009-A1330	S.G. Excavate & Clean Bedrock between Gro	2	21-Oct-15	22-Oct-15				█									
CH0009-A2000	S.G. Downstream Zone 3 Placement to Elv. 1:	4	23-Oct-15	27-Oct-15				█									
CH0009-A1335	S.G. Zone 1A Placement	4	23-Oct-15	27-Oct-15				█									
CH0009-A2010	S.G. Upstream Zone 2C Placement	2	28-Oct-15	29-Oct-15				█									
CH0009-A2020	S.G. Downstream Zone 2C Placement	2	30-Oct-15	31-Oct-15				█									
CH0009-A2030	S.G. Zone 1 Placement	4	06-Nov-15	10-Nov-15				█									
CH0009-A2040	S.G. Zone 3C Placement	2	11-Nov-15	12-Nov-15				█									
CH0009-A2060	S.G. Armor U/S & D/S Slopes with Zone 3 Cla	6	13-Nov-15	19-Nov-15				█									
CH0009-A2050	S.G. Zone 3 Placement for ramp	10	20-Nov-15	02-Dec-15				█									
<b>Diversion and River Closure</b>																	
CH0009-A1119	Stockpile CD Materials on Starter Groin	17	02-May-16*	20-May-16												█	
CH0009-A1129	Temp. Stockpiling of Till Material	30	02-May-16	04-Jun-16												█	
CH0009-A1350	Remove Cofferdam #2	10	08-Jun-16	20-Jun-16												█	
<b>Cofferdams</b>																	
<b>South Dam</b>																	
CH0009-A1630	Excavate South Dam	24	01-Apr-16*	28-Apr-16												█	
CH0009-A1640	South Dam Foundation Grouting	37	29-Apr-16	10-Jun-16												█	
CH0009-A1690	Construct South Dam to O.G.	10	11-Jun-16	22-Jun-16												█	
<b>Batch Plants and Concrete Production</b>																	
CH0009-A1720	Order/Procurement Period for RCC Plants	90	17-Aug-15	30-Nov-15													
CH0009-A1600	Deliver RCC Plants	25	01-Mar-16*	29-Mar-16													
CH0009-A1410	RCC Batch Plant 1 Setup	45	02-May-16*	22-Jun-16													
CH0009-A1420	RCC Trial Demonstration	5	23-Jun-16	28-Jun-16													
<b>RCC Mix Design</b>																	
CH0009-A1650	RCC Stage II Trial Program	60	16-Sep-15	24-Nov-15													
CH0009-A1710	Trial Batch Material Procurement	5	15-Oct-15	20-Oct-15													
CH0009-A1930	Trial Mix Batches Onsite	21	21-Oct-15	13-Nov-15													
CH0009-A1940	30 Day Breaks	0		19-Dec-15													
CH0009-A1950	90 Day Breaks	0		27-Feb-16													
CH0009-A1960	180 Day Breaks	0		11-Jun-16													
<b>North Dam</b>																	
<b>Rock Plug</b>																	
CH0009-A1490	Rock Plug Excavation-Dry	120	21-May-16	07-Oct-16													
<b>Roads</b>																	

█ Actual Work   
 █ Critical Remaining Work  
█ Remaining Work   
 ◆ Milestone



**Contract CH0009**

**North & South Dams**

**Lower Churchill Project**

**Mobilization & Demobilization Plan**

**(Rev 0)**

**Updated Sep. 13<sup>th</sup>, 2015**

## **Mobilization & Demobilization Plan**

The remote location of this project offers up some unique logistical challenges that require diligent planning and coordination. Barnard Pennecon LP (BPLP) has plenty of experience working in remote areas and is very familiar with the specific challenges this can cause including shipping/delivery of material and/or equipment delays, vendor coordination, inclement weather delays, availability and skill of labor resources, and many more. The best way to handle these challenges is to try to anticipate them and have alternate options whenever possible. It all starts with a good plan, and outlined below is Barnard Pennecon's strategy for a successful start to, and finish of the project.

### **MOBILIZATION**

Barnard Pennecon LP is currently planning/developing the mobilization process for CH-0009. Outlined below are key dates and activities associated with this process:

- **9/1/15** - Site Visit – Muskrat Falls Site (Barnard Pennecon LP)
- **9/2/15 – 9/3/15** - Contractor Team Meetings – St John's, Newfoundland (Pennecon's HQ)
- **9/2/15 – 9/3/15** – Setup of Temporary Construction Planning Office – St John's, Newfoundland
- **9/22/15 – 9/23/15** – Formal Kickoff Meeting - St John's, Newfoundland (LCP Office)
- **9/28/15** (Week Of) – Partial Delivery of Earth Moving Equipment & Crusher
- **10/5/15** (Week Of) – Begin Mobilization/Assembly of Contractor's Field Offices

### **EQUIPMENT**

Barnard Pennecon LP will be mobilizing a fair amount of large equipment necessary for this project. Outlined below are the major components and estimated time frames for their procurement.

- **Office Trailers** – October 5<sup>th</sup>, 2015
- **Screening Equipment** – September 28<sup>th</sup>, 2015
- **Earthmoving Equipment** – September 28<sup>th</sup>, 2015
- **RCC/CVC Plants** – April 1<sup>st</sup>, 2016
- **Crushing Equipment** – April 1<sup>st</sup>, 2016
- **RT Crane** – TBD As Needed
- **Crawler Cranes** – TBD - 2016
- **Concrete Placement Equipment** – TBD As Needed

### **OFFICE TRAILERS**

A field office trailer complex will be located within the company laydown area provided for Contract CH-0009 to support Barnard Pennecon LP. The offices will be able to accommodate approximately 40 staff at one time. Typical jobsite field office facilities will be incorporated including staff offices, conference rooms, rest rooms, and break/lunch rooms. A detailed layout will be submitted for reference at a later date which will incorporate Power/Telecoms/IT layout yet to be determined. Additional information has also been included within the 2015 Season Work Plan.

### **SCREENING EQUIPMENT**

The screening equipment is a critical component of this project as it will be responsible for producing all of the granular material necessary for the cofferdams and permanent dams.. The specific details of the screening plant have been included within the 2015 Season Work Plan, and will be incorporated into the forthcoming Aggregate Processing & Hauling Plan.

**EARTHMOVING EQUIPMENT**

Large equipment will be required for this project including excavators, dozers, loaders, trucks, and much more. Outlined below are some of the anticipated equipment to be used and their expected arrival dates onsite, particularly for the partial season in 2015.

DESCRIPTION	QTY	Anticipated Arrival Date
<b>EXCAVATORS</b>		
Cat 390D w/ Thumb	1	10/2/2015
Cat 349 w/ quick coupler & quick connect for hydraulic hoses	1	9/28/2015
12K # Hammer for 349	1	9/28/2015
Cat 308	1	9/28/2015
<b>DOZERS</b>		
Cat D8T - SU - MS Ripper w/ GPS	1	9/28/2015
Komatsu D155	2	10/1/2015
Komatsu D65EX	1	9/28/15
<b>LOADERS</b>		
Cat 262 Skidsteer	1	9/28/2015
Cat 966 w/ Forks	2	9/28/2015
Cat 980	1	10/1/2015
Cat 988	1	10/14/2015
Cat TL1055	1	9/28/2015
<b>TRUCKS</b>		
Cat 740 End Dump	6	9/28/2015
Cat 745 End Dump	6	9/28/2015
2000 gal Water Truck	1	10/1/2015
Fuel Lube Truck	1	10/5/2015
Mechanic Truck	1	9/28/2015
<b>GRADER</b>		
Cat 14M	1	9/21/2015
<b>COMPACTOR</b>		
Cat CP74 Padfoot	1	10/5/2015
Cat CS74 Smooth	1	10/5/2015
<b>PUMPS</b>		
4" Diesel	1	TBD
12" Diesel	1	TBD
<b>SHORT TERM RENTALS</b>		
Cat 330 long reach	1	10/5/2015
2013 Sandvik QE440 Tracked Screener	1	9/28/2015
<b>PICKUPS</b>		

F150 CREW 4X4	15	9/28/2015
F250 CREW 4X4	10	9/28/2015
<b>OTHER</b>		
Mechanic's Conex	3	10/1/2015
Hydraulic Press Conex	2	10/1/2015
Tools Conex	4	10/1/2015
25KVA Generators	5	10/1/2015
45KVA Generators	2	10/1/2015
185 cfm air compressor	1	10/10/2015

### RCC/CVC PLANTS

The exact details for the RCC/CVC plants to be used are currently being reviewed. Specific details regarding plant type, mixer capacities, anticipated batching rates, etc. will be added here as they are finalized.

### ROUGH TERRAIN (RT) CRANE

A rough terrain (RT) crane will be utilized for assembly of the large excavators after they arrive onsite as well as for various other needs around the site. At this time we only anticipate this crane being needed for a short duration during the 2015 season, to include support of the bridge abutment crews. An RT crane may be used for assembly of other cranes and large equipment as necessary.

### CRAWLER CRANES

At this time it is not anticipated that any crawler cranes will be mobilized in the first season. Cranes are anticipated to be used for various purposes throughout the project and detailed information for anticipated crane use will be included in each work season execution plan.

### CONCRETE PLACEMENT EQUIPMENT

A detailed outline of the concrete equipment necessary for the North Dam will be included in the forthcoming North Dam Execution Plan, as well as be included in other applicable work execution plans. It is anticipated that a small concrete pump truck will be utilized for the bridge abutments placements this season. Once final bridge abutment design has been received, the 2015 season execution plan will be revised to include the concrete equipment as needed.

### DEMOBILIZATION

A detailed demobilization plan is forthcoming. At this time it is anticipated that at least a portion of the large equipment and temporary infrastructure will remain onsite through the warranty period before being completely demobilized from the site.

**Contract CH0009**

**North & South Dams**

**Lower Churchill Project**

**2015 Season Work Plan**

**(Rev 0)**

**Updated Sep. 13<sup>th</sup>, 2015**

## **2015 Season Work**

Barnard Pennecon LP will start the 2015 work season by developing a strong working relationship with the Lower Churchill Project team. We are dedicated to surpassing expectations to provide a safe, high quality, and cost effective final product. We recognize the importance of working with all the constituents involved in this large scale project and we plan to accomplish this with our dedicated and knowledgeable team. The remainder of the 2015 work season will be a busy one for the BPLP team as preparations and planning will continue for the CH-0009, North & South Dam Construction project. With that said, the team is planning to accomplish a significant amount of work in the remaining work window this season.

### **Some of the major planned work activities include:**

- Order/Procurement of the Crusher/Screen/Wash Plant
- Mobilization of Initial Earth Moving Equipment
- Setup of the Screen and Screening of Aggregates from Borrow Area GD-8
- Processing and Hauling of Till Material from Borrow Area TD-7
- Site Prep for Construction Office Trailers
- Mobilization & Setup of Office Trailers
- Overburden Excavation/Foundation Cleaning for Temporary Bridge Abutments
- Form/Pour/Strip North & South Abutments for Temporary Bridge
- Intake Cofferdam Overburden/Dental Excavation & Foundation Cleaning/Prep
- Construction of Intake Channel Cofferdam
- Order/Procurement of RCC/CVC Plants
- Order/Procurement of Crusher
- RCC/CVC Trial Mix Designs
- Starter Groin Construction

### **ORDER/PROCUREMENT OF CRUSHER/SCREEN/WASH PLANT**

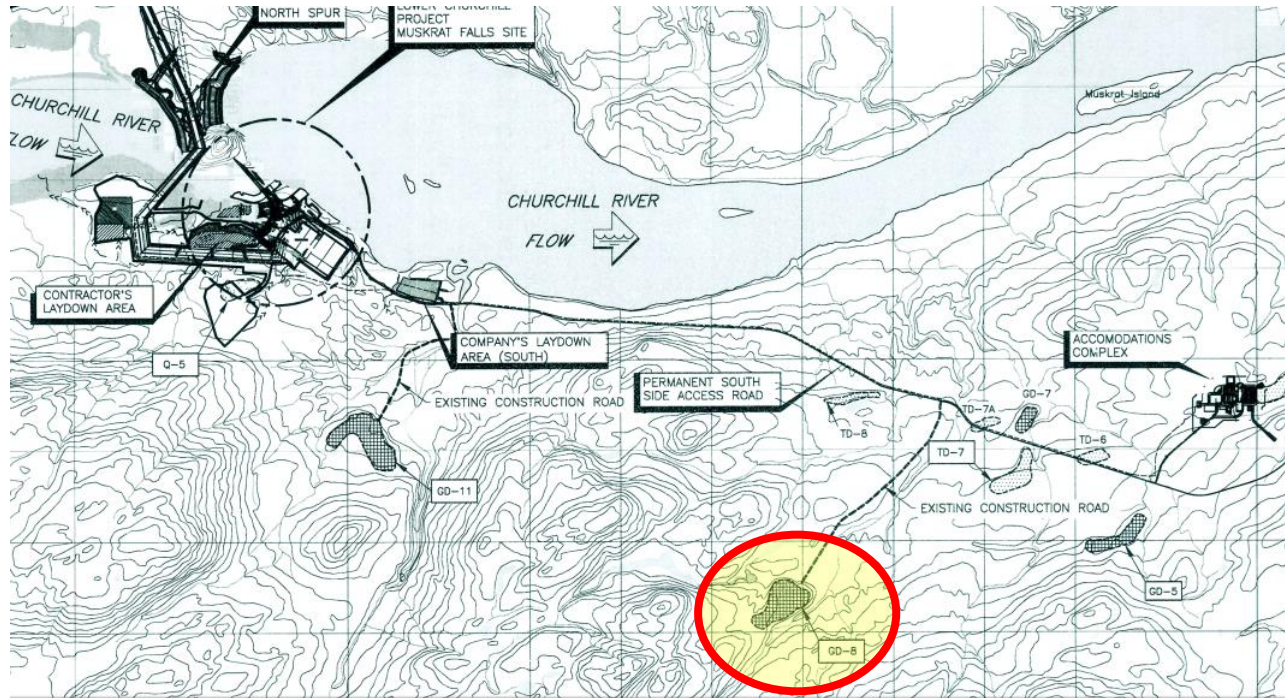
Procurement of the equipment required for the crushing/screening/production of aggregate is a critical part of kicking this project off. Being able to process the materials needed for the cofferdams and permanent dams are all dependent on getting the proper equipment onsite and ensuring a smooth setup/commissioning. The specific equipment being procured for this season has been outlined below with further details provided in the forthcoming Aggregate Processing and Hauling Execution Plan.

### **MOBILIZATION OF INITIAL EARTH MOVING EQUIPMENT**

In order to be able to perform the work being scheduled for this season, it will require a quick procurement and detailed logistical plan for mobilization of equipment to the project site. Barnard-Pennecon LP does own some of the equipment necessary for the project and will have to purchase and/or lease some of the equipment. This process will be managed by our off-site equipment management team with the support of our onsite staff. An expeditious planning effort is currently under way to ensure the team will have a successful start to the project, beginning with having the needed equipment onsite to be able to perform the work. See attached Mobilization & Demobilization Plan and Large Equipment Utilization Plan for more information regarding the specific equipment anticipated to be used for this project.

### **SETUP OF THE SCREEN & SCREENING OF THE AGGREGATES FROM BORROW AREA GD-8**

A screen will be utilized to process the material from Borrow Area GD-8. This material will be used for the starter groins and cofferdam construction during the first season. A temporary screen will be setup within GD-8 and a small crew will run the equipment to process the material to the specifications given for this project.

**Location of GD-8 Borrow Area:**

The crew for this operation will consist of the following:

- Sandvik QE440 Scalping Screen Unit – 1 Operator
  - This operator will be responsible for the operation and maintenance of the screen.
- CAT 349 Excavator– Screen Feed – 1 Operator
  - This operator will be responsible for feeding the screen unit. This will consist of digging into the borrow area and loading the feed hopper on the screen.
- CAT 980 Loader – Haul Truck Loader – 1 Operator
  - This operator will be responsible for loading of the haul trucks with the processed material out of the screen. They will also be responsible for getting rid of any oversized/waste material.
- Operator Foreman
  - This foreman will be responsible for the overall screening operation. They will be in communication with the cofferdam construction crews with relation to what material is needed. In addition, they will also be responsible for leading the screen feed operator into which areas to continue excavation based on the resulting screened products, maintaining safe road access to the borrow area as well as the overall safety and productivity of the crew.
- CAT 740 - Haul Trucks – Est. quantity of 5 Teamsters
  - The teamsters will be responsible for hauling the material from GD-8 to the intake cofferdam construction area near laydown area F and the starter groin for the upstream cofferdam. Overall the haul is approximately 11 km to either location.

**Model of Scalping Screen Unit to be Used:**

## Sandvik QE440 scalping screen unit in Action

Technical specification sheet



The material being processed through the screening plant will be loaded into CAT 740 haul trucks and brought down to the intake cofferdam and starter groin locations where the material will be utilized for construction of these cofferdams. A detailed layout of the screening operation will be included in this section once survey of the existing conditions can be performed.

### Example of Till Borrow Process:

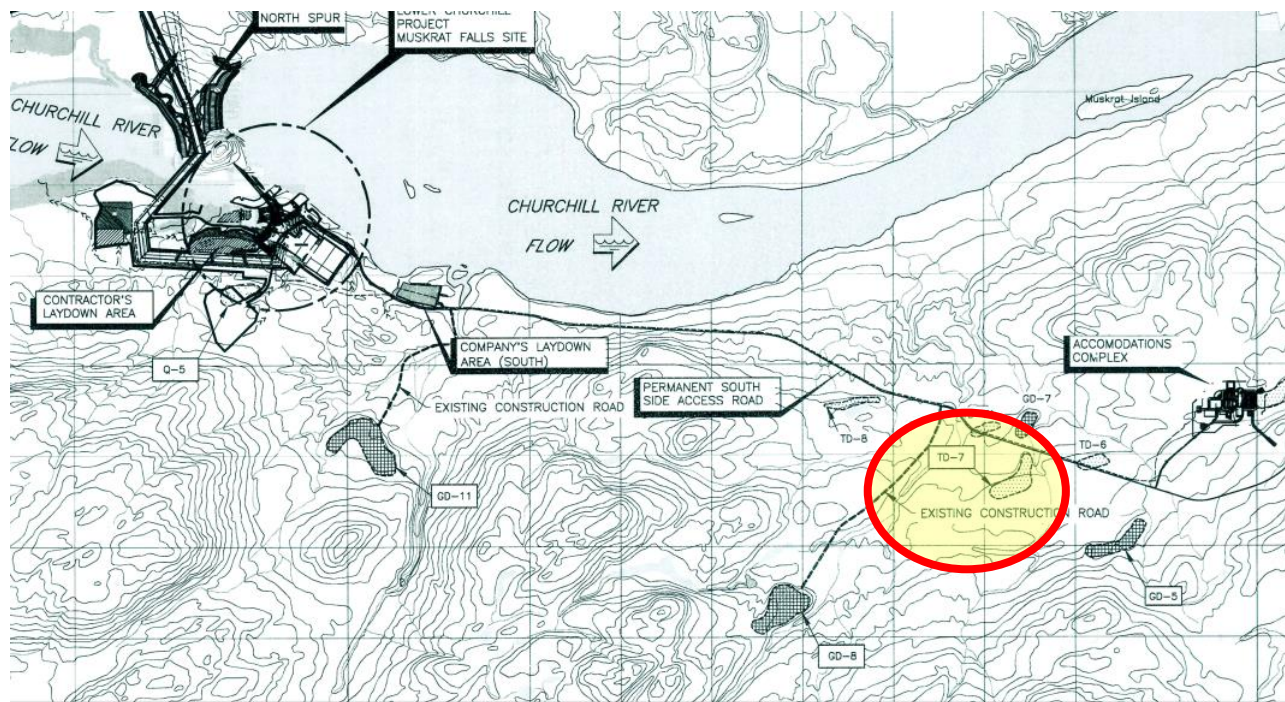




**PROCESSING AND HAULING OF TILL MATERIAL FROM BORROW AREA TD-7**

Processing of the impervious till material to be used for the cofferdams will be performed in a similar manner as to the granular material from borrow area GD-8 except for without a screen. The CAT 349 excavator will dig up the material from the pit and load directly into a CAT 740 articulated haul truck. This haul truck will then move the material from the borrow area down to the construction area it is needed. A detailed layout of the till borrow operation will be included in this section once survey of the existing conditions can be performed.

**Location of TD-7 Borrow Area:**



**SITE PREP FOR CONSTRUCTION OFFICE TRAILERS**

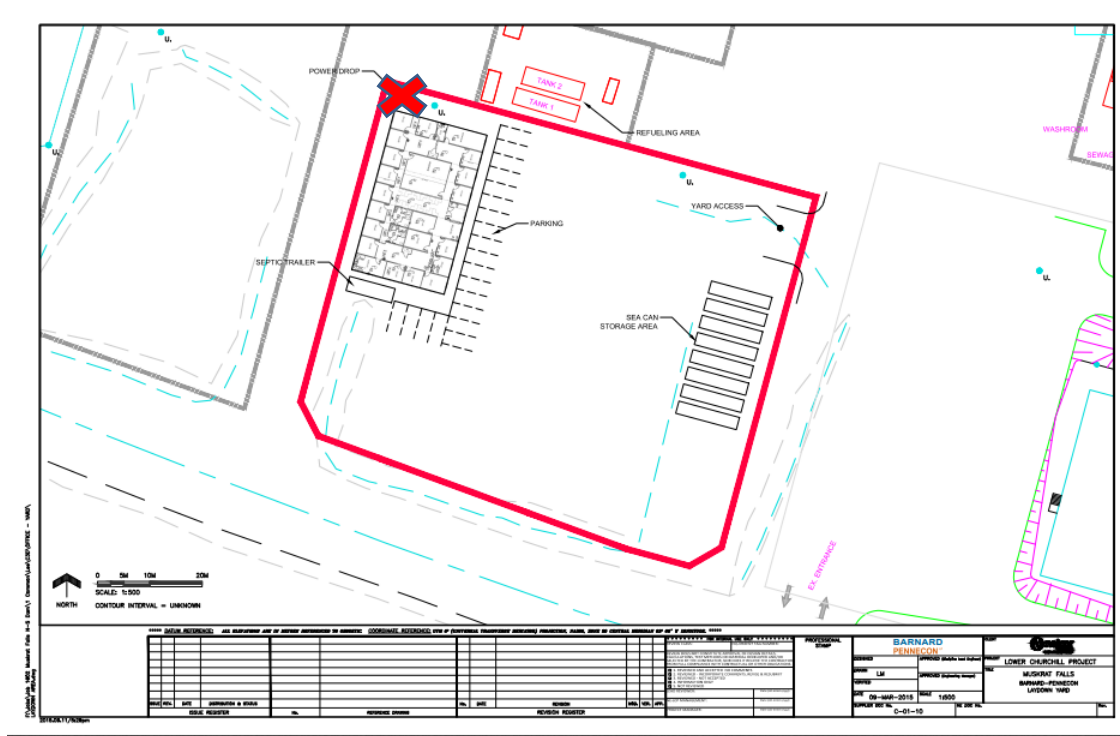
Construction office trailers are currently being procured for setup in the company laydown area reserved for CH-0009. Site preparation will include fine grading of this area and installation of utilities required for the offices. A detailed layout of the office trailers as well as the connection points of the utilities and line diagrams will be submitted as the details are finalized.

**View of Company Laydown Area Provided for CH-0009:**

This area will need to be surveyed in the near future to determine anticipated final grading. It will then be prepped to subgrade with a dozer and additional subbase and/or small rock fill will be brought in and spread as needed to prepare a suitable surface for office installation. Additional fine grading and road base material will also be used to prepare a suitable parking area for contractor's vehicles.

As discussed with Nalcor in the LCP St. John's office on 9/3/15, coordination is needed for the layout of the power and IT/Telecoms required for the temporary office complex to be constructed within the area shown above. Details and line diagrams are currently being worked on for the office complex utilities but it is BPLP's understanding based on this meeting that a standard single phase, pole-mounted transformer will be provided in the northeast corner of the laydown area (shown as the red X below) as well as a fiber connection point for internet purposes in the existing onsite communications trailer within the company laydown yard. It will be BPLP's responsibility to provide installation and maintenance of all needed wiring from the pole into our office complex. Details for drawings, permitting, etc. are being based on this understanding.

**Utility Connection Point (included in Appendix A: Reference Drawings):**



**MOBILIZATION & SETUP OF OFFICE TRAILERS**

A temporary contractor's field office complex will be provided within the company laydown provided for the CH-0009 contract. At this time it is anticipated that an office complex will be provided to support approximately 40 individuals from BPLP's management staff. It will have typical construction field office amenities including staff offices, reception area, washrooms, conference rooms and a kitchen/break room. A preliminary floor plan has been included below. The details for the layout of the complex and associated temporary infrastructure within the footprint of the company laydown area will be submitted separately for approval and informational purposes.

The office complex will be installed utilizing BPLP's own management and labor resources. Ken Nash, who was involved with Nalcor's CH-0002 Accommodations Complex project will be leading this operation for Barnard Pennecon LP and craft labor will be utilized for the fit-up and installation of the trailers.

The anticipated sequence of events for office complex installation is as follows:

**1. Mobilize Management to Site**

- Ken Nash as well as additional individuals from BPLP's management staff will mobilize to the site to begin preparations for 2015 work.

**2. Prepare and Occupy Temporary Single Wide Office for Use While Larger Complex is Being Constructed**

- A temporary single wide trailer will be utilized onsite in the interim while the larger complex is being fabricated/mobilized/assembled. All necessary occupancy permits, etc. will be handled and the trailer will be utilized as a construction management coordination center prior to occupancy of the larger complex. This office will also serve

as dry shack/break room for craft employees prior to mobilization of other facilities. The existing wash car in the refueling area will be used temporarily until BPLP’s own facilities can be mobilized.

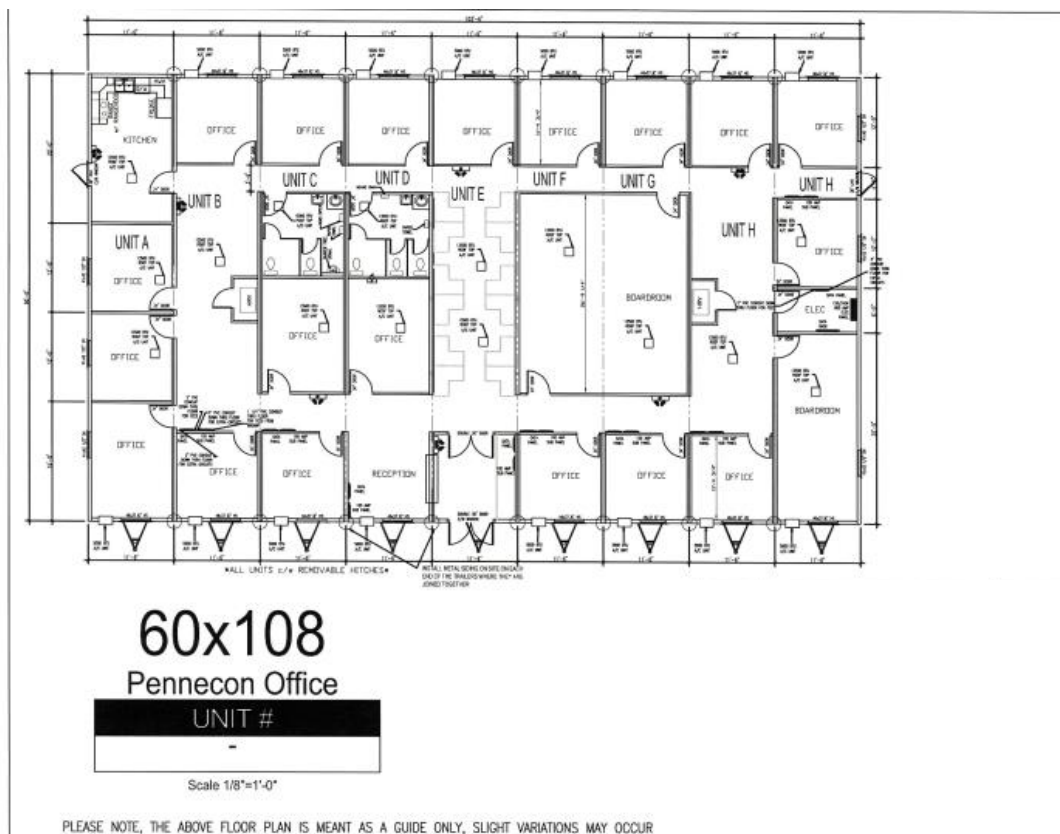
**3. Begin Assembly of Larger Office Complex**

- Mobilization to site for the office complex will begin approximately 2 weeks after a purchase order has been given to the supplier. Delivery will typically be of individual trailer units with 9 total units to be installed. Units will be backed into place and leveled/jacked as necessary for each. Finish work for integrating the modular structure together will happen concurrently with the fabrication/mobilization process.

**4. Complete Assembly of Larger Office Complex**

- Once all units have been delivered and installed, fit-out of the offices will occur as well as occupancy/permitting requirements fulfilled. Management staff will begin occupying the office spaces as soon as they are available. The smaller single wide trailer will then be repurposed as a small office nearer the work activities.

**Floor Plan of Barnard-Pennecon’s Field Office Complex:**



**OVERBURDEN EXCAVATION/FOUNDATION CLEANING FOR TEMPORARY BRIDGE ABUTMENTS**

The temporary bridge abutments are a key part of the 2015 season plan. It is crucial that Barnard Pennecon  
2015 Season Work Plan

LP get these designed, approved, and construction started in this first season so that the temporary bridge itself can be constructed prior to the 2016 spillway water diversion milestone date. There is very little overburden excavation necessary to get to bedrock on which the bridge abutments will be constructed upon for the south abutment. The north abutment will be constructed on the existing RCC Cofferdam (Elev. 26.0). The south abutment will be constructed on rock. Final details for the bridge abutments will be provided in this section after the design has been finalized by AMEC.

#### FORM/POUR/STRIP NORTH & SOUTH ABUTMENTS FOR TEMPORARY BRIDGE

After the final design for the bridge abutments has been finalized and approved, the details for form/pour/strip will be included here.

#### INTAKE COFFERDAM OVERBURDEN/DENTAL EXCAVATION & FOUNDATION CLEANING/PREP

Overburden excavation will begin for the intake channel cofferdam as soon as the area is cleared of material/equipment from other contractor's onsite. It is anticipated this work will be performed concurrently with the starter groin.

Initial excavation of the overburden for the intake cofferdam will begin at the north end and progress south. Excavators will dig the excess material and load into haul trucks to be taken to the designated waste stockpile area onsite. Dozers will be available to push the material as needed to make loading more efficient. Small excavators with smooth lip buckets will be used to scrape the excess soil from the rock surface to the extent practical, prior to a jet/vac truck being used for a final cleaning of the rock surface. A composite crew of laborers and operators will wash the material and suck up the excess with the jet/vac truck, leaving a clean rock surface ready for dental concrete, dry pack, and/or slush grout as necessary.

#### **Preliminary Foundation Cleaning:**



**Final Foundation Cleaning:**



**Clean Foundation Surface:**



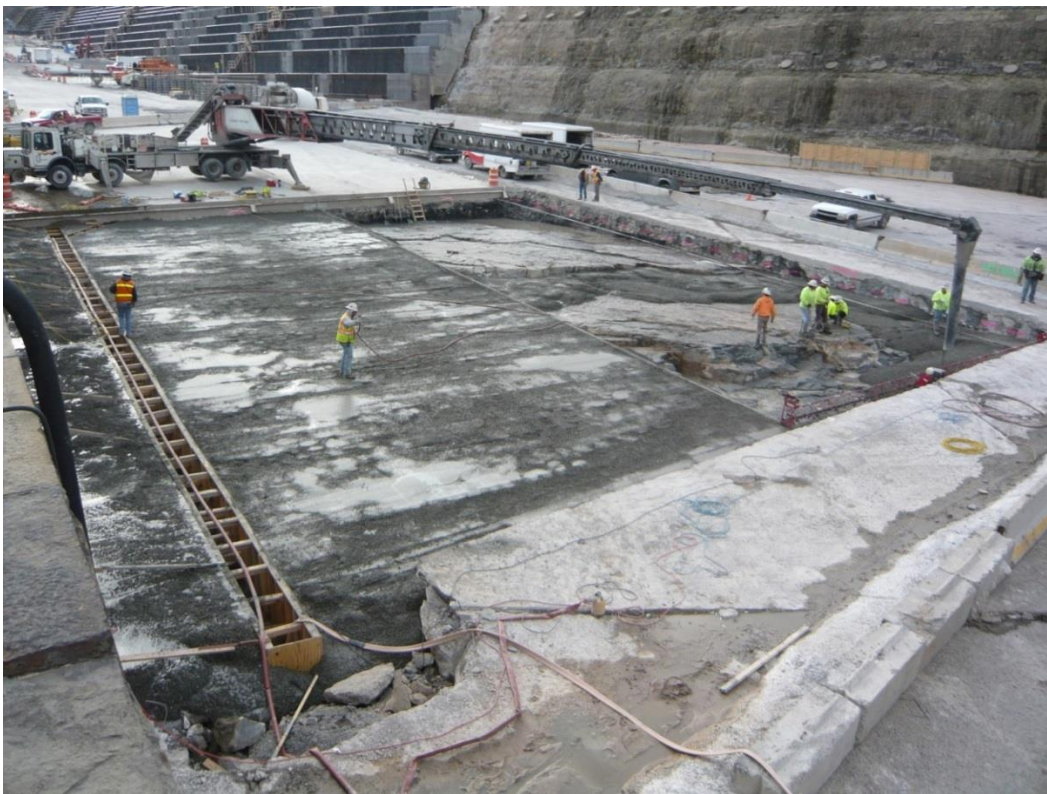
Depending on the rock surface and the direction of the engineer onsite, the next step will require different

approaches. If dental excavation is required to reach sound rock, an excavator with a hydraulic hammer will be used to break the unsound rock prior to haul off of the material. This work will be performed to the acceptance of the onsite engineer. The foundation cleaning/prep procedure will be performed again after the engineer is satisfied that sound rock has been reached.

Once sound rock has been reached, the onsite engineer will determine if and what additional surface preparation procedures should take place including dental concrete, slush grout, and/or dry pack. Definitions for each are as follows:

- Dental concrete is conventional concrete used to shape surfaces, fill irregularities, and protect weak rock. Dental concrete shall be used to fill cavities, potholes, shear and faults zones and to correct downstream dipping foundations, foundations steeper than 70 degrees and higher than 1.5 metres and overhangs, all as directed by the Engineer.
- Dry pack is a pre-mixed mortar consisting of a high strength mix of Portland cement and specially graded aggregates packaged in dry powder form to be mixed with water. Dry pack may be required to fill cavities, shear zones and faults of small size, excavated and cleaned according to this Section of Technical Specification. In addition, dry pack may be used for local treatment of the foundation in the presence of water seepage.
- Slush grout consists of Portland cement slurry, with or without fine aggregates. It is applied over rock or concrete surfaces that are to be covered subsequently with concrete or embankment, usually by brooming it in place to fill surface voids and fissures.

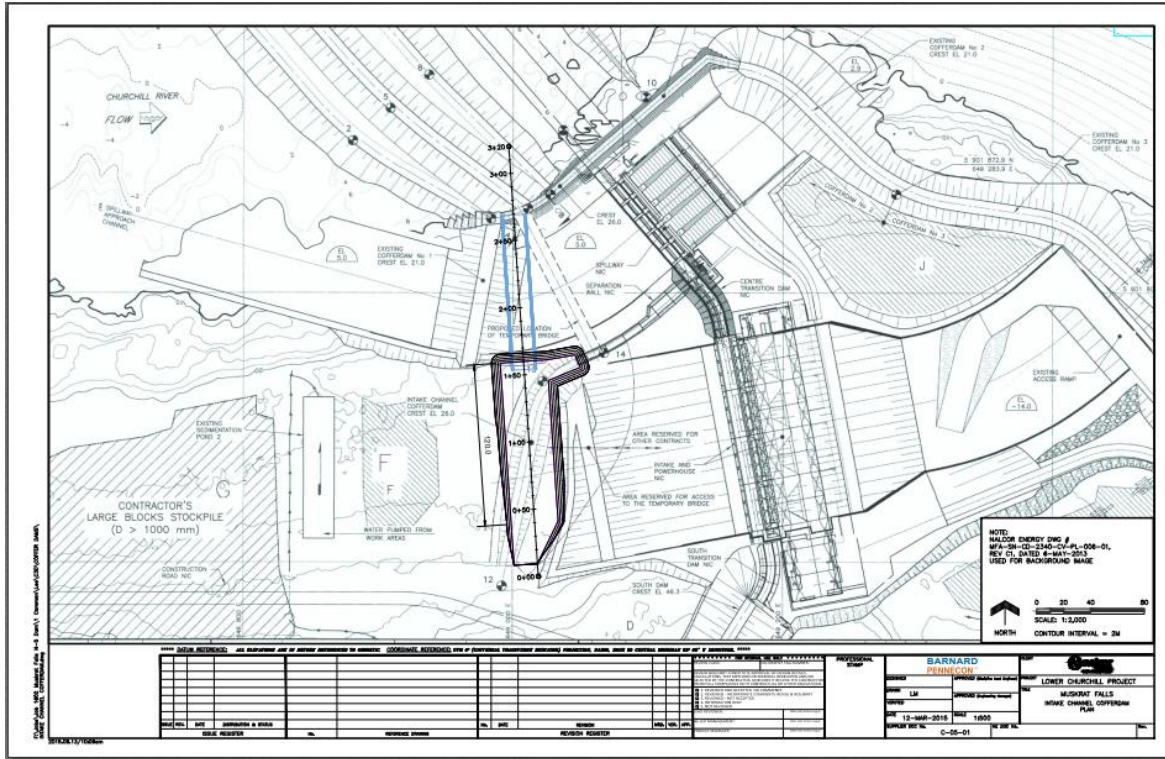
**Dental/Leveling (concurrent as shown) Concrete Placement:**



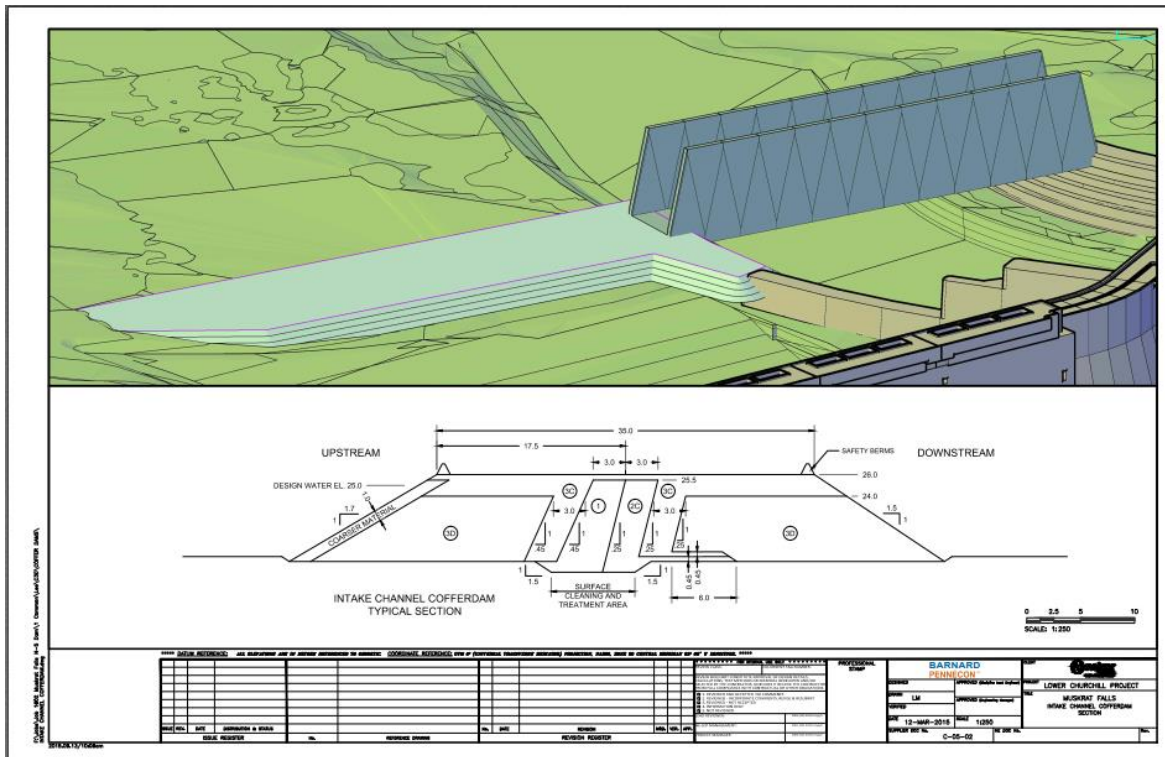
All or some of these procedures will be utilized based on the existing surface condition after excavation and as per the direction of the engineer, prior to the start of the cofferdam construction. Crew sizes and means and methods will vary based on the condition/extent of foundation preparation needed.

**CONSTRUCTION OF INTAKE CHANNEL COFFERDAM**

**Revised Layout of Intake Channel Cofferdam (included in Appendix A: Reference Drawings):**



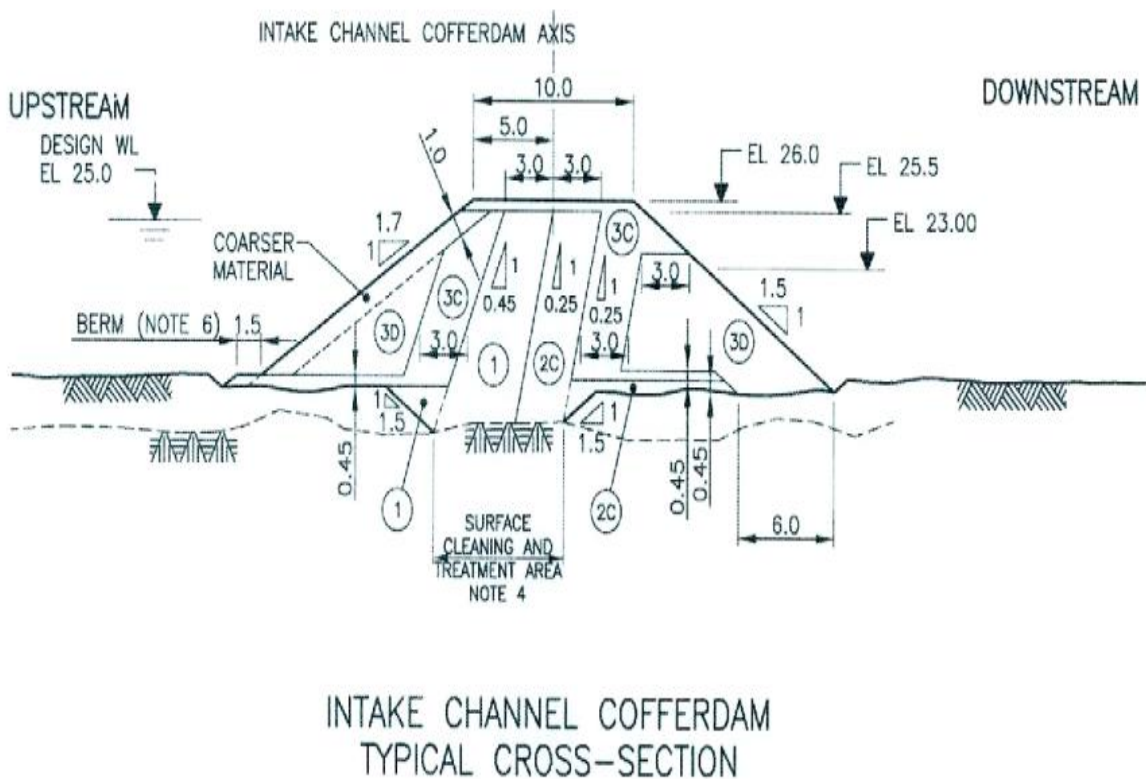
**Section View of Intake Channel Cofferdam (included in Appendix A: Reference Drawings):**





Constructing the intake channel cofferdam essentially consists of three main components, the large rock fill (Types 3C & 3D), the granular fill layer (Type 2C), and the till core layer (Type 1). Because the intake channel cofferdam can be constructed in the dry, the single large cofferdam can be constructed at once rather than using the groin method needed for the upstream cofferdam at the north dam work area. Barring any unforeseen equipment, labor, and/or weather delays, it is anticipated that this cofferdam can be completed in 2015, though it does not need to be to meet the schedule milestones.

**Section View from Drawing MFA-SN-CD-2340-CV-SE-0002-01:**



Construction will proceed after foundation preparation is complete. Crews will start loading and hauling the rock fill from Stockpile Area A. Crews will excavate and haul the material directly to the intake channel cofferdam area. A dozer will begin pushing the material to start the upstream and downstream 3C areas first in 450mm thick lifts. Excess material will be pushed into the 3D area which will be filled/compacted in 900mm lifts. This will happen subsequently with the Type 1 Till and the Type 2C Granular fill placement and compaction. This allows the cofferdam as a whole to begin to be constructed uniformly and grow in elevation collectively.

**Example of Dry Cofferdam Construction Procedure:**

Barnard Pennecon's layout of the intake cofferdam varies slightly from the layout shown on Drawing MFA-SN-CD-2340-CV-PL-0005-01. It was within BPLP's proposal to shift the alignment slightly to better fit the layout of our temporary bridge, specifically the south abutment. Moving the alignment allowed for incorporation of the south abutment into the intake channel cofferdam. This differs from the originally shown alignment which would have been to construct the bridge on top of the separation wall being constructed by others. This also shortened the bridge slightly. See anticipated layout of the bridge in correlation to the cofferdam above (and in the reference drawings in Appendix A). Final details are still being designed for the bridge but information relating to the cofferdam will be added here as it is finalized.

The intake cofferdam will be constructed using essentially two crews. One crew will be loading, hauling and placing granular and till materials. The second crew will be loading, hauling, and placing the rock fill for the construction of the intake channel cofferdam. Both of these crews will move back and forth between the upstream cofferdam starter groin and the intake cofferdam as needed to optimize efficiency and productivity.

The first crew will consist of the following labor & equipment:

- Operator Foreman
- Grade Checker
- 5 Teamsters in Haul Trucks
- Loader Operator
- Dozer Operator (x2)
- Roller Operator

- 
- Water Truck Driver (as required)

The second crew will consist of the following labor & equipment:

- Operator Foreman
- Grade Checker
- 5 Teamsters in Haul Trucks
- Roller Operator
- Excavator Operator
- Dozer Operator (x2)
- Loader Operator
- Water Truck Driver (as required)

#### ORDER/PROCUREMENT OF RCC/CVC PLANTS

Exact details and layout for the RCC/CVC plants is forthcoming and is anticipated to be provided by 10/15/15 to allow enough time for any power supply requirements provided by company to be provided prior to use by BPLP.

#### RCC/CVC TRIAL MIX DESIGNS

The results for the Stage 1 RCC mix designs have been received for informal use by Barnard-Pennecon with regard to further mix design development. Evaluation and consultation with Barnard Pennecon's RCC Consultant, Tom Reynoldson is currently underway and a detailed mix design program outline will be submitted for review.

#### STARTER GROIN CONSTRUCTION

The starter groin is a key component to the 2015 work season plan. Having it as complete as weather will permit will make for a productive start to 2016. Currently, BPLP is planning to construct the starter groin in 2015 so that the downstream cofferdams can be removed to pass river water and the upstream cofferdam can be constructed in order to meet the river diversion milestone in 2016. Crews will have to perform this work this season while the water of the Lower Churchill River is historically low because access to this area is accomplished from the west side of the existing Cofferdam #1.

The starter groin is essentially the start of the upstream cofferdam necessary for construction of the North RCC Dam and therefore the diversion of the Lower Churchill River. It is a large piece of the cofferdam that will connect the existing RCC cofferdam and dry (currently) portion of the spillway to the upstream cofferdam/north dam work area. It will serve two main purposes; to act as a launch ramp for continuation of the upstream cofferdam construction and future north dam work and to act as an access point once the temporary bridge is in place across the spillway. It is crucial to have this in place this season to meet the 2016 river diversion date due to typical spring season flows of the Lower Churchill River.



**Footprint of Starter Groin Location:**

Crews will start with loading and hauling the rock fill from Stockpile Area A. We will construct the upstream groin section first with the trucks backing up and dumping to a dozer pushing the zone 3 material into the river. As the dozer progresses the groin, a berm will be left on each side of the groin that is the height of the truck axel and we will also leave a berm at the end of the groin for when the truck backs to the end of the groin. The groin will be constructed to 1 m above water elevation to start. Once the upstream groin has progressed to a point where it is progressing to the east, we will shift the rock fill crew to the downstream groin and place this groin in the similar fashion as the upstream one tying into the previously placed groin. While the rock fill crew is working on the downstream groin, we will utilize an excavator to clean out the existing rock fill between the groins. A long reach excavator may be utilized to clean the zone 1 foundation contact area. Once the contact area is cleaned out, we will place the upstream zone 2E material to the same elevation as the rock fill. By the time the upstream zone 2E is complete, the downstream groin should be tied in to 1 m above water elevation, so the crew placing zone 2E will move to the downstream and continue placement. At this point, the rock fill crew will return to the upstream groin and finish placing the zone 3 and zone 3 class 2 up to elevation 15. Once the downstream 2E is complete, that crew will place the zone 1A till. The dozer will push the material in a downward motion to create a mud-wave, leaving a berm at the leading edge to protect the crews. As the till is being placed, the rock fill crew will return to the downstream groin to finish placing the zone 3 class 2 up to elevation 15. After the zone 1A till is completed, we will continue placing and compacting the zone 2C on the upstream and downstream sections of the groins up to elevation 15. Once this is complete, the zone 1 will be placed and compacted up to elevation 14.55. After the zone 1 is complete, the rock fill crew will place and compact the remaining zone 3C above the zone 1 till. After this is complete, the rock fill crew will place the zone 3 for the access ramp up to elevation 26.

As described above, the starter groin will be constructed using essentially two crews. One crew will be loading, hauling, and placing the rock fill and the second crew will be loading, hauling, and placing the granular or till.. Both crews will move back and forth between the upstream cofferdam starter groin and the intake cofferdam as needed to optimize efficiency and productivity.

Lower Churchill Project – Muskrat Falls

CH0009 – North &amp; South Dams

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The first crew will consist of the following labor & equipment :

- Operator Foreman
- Grade Checker
- 5 Teamster in Haul Trucks
- Excavator Operator
- Loader Operator
- Dozer Operator (x2)
- Roller Operator
- Water Truck Driver (as required)

The second crew will consist of the following labor & equipment:

- Operator Foreman
- Grade Checker
- 5 Teamsters in Haul Trucks
- Roller Operator
- Excavator Operator
- Dozer Operator (x2)
- Loader Operator
- Water Truck Driver (as required)

**Example of Wet Cofferdam Construction Procedure:**



**Example of Dual Groin Cofferdam Construction Procedure:**



P.O. Box 99, Bozeman, MT 59771 ○ (406)586-1995 ○ FAX (406)586-3530

Lower Churchill Project – Muskrat Falls

CH0009 – North & South Dams

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## **Contract CH0009**

### **North & South Dams**

### **Lower Churchill Project**

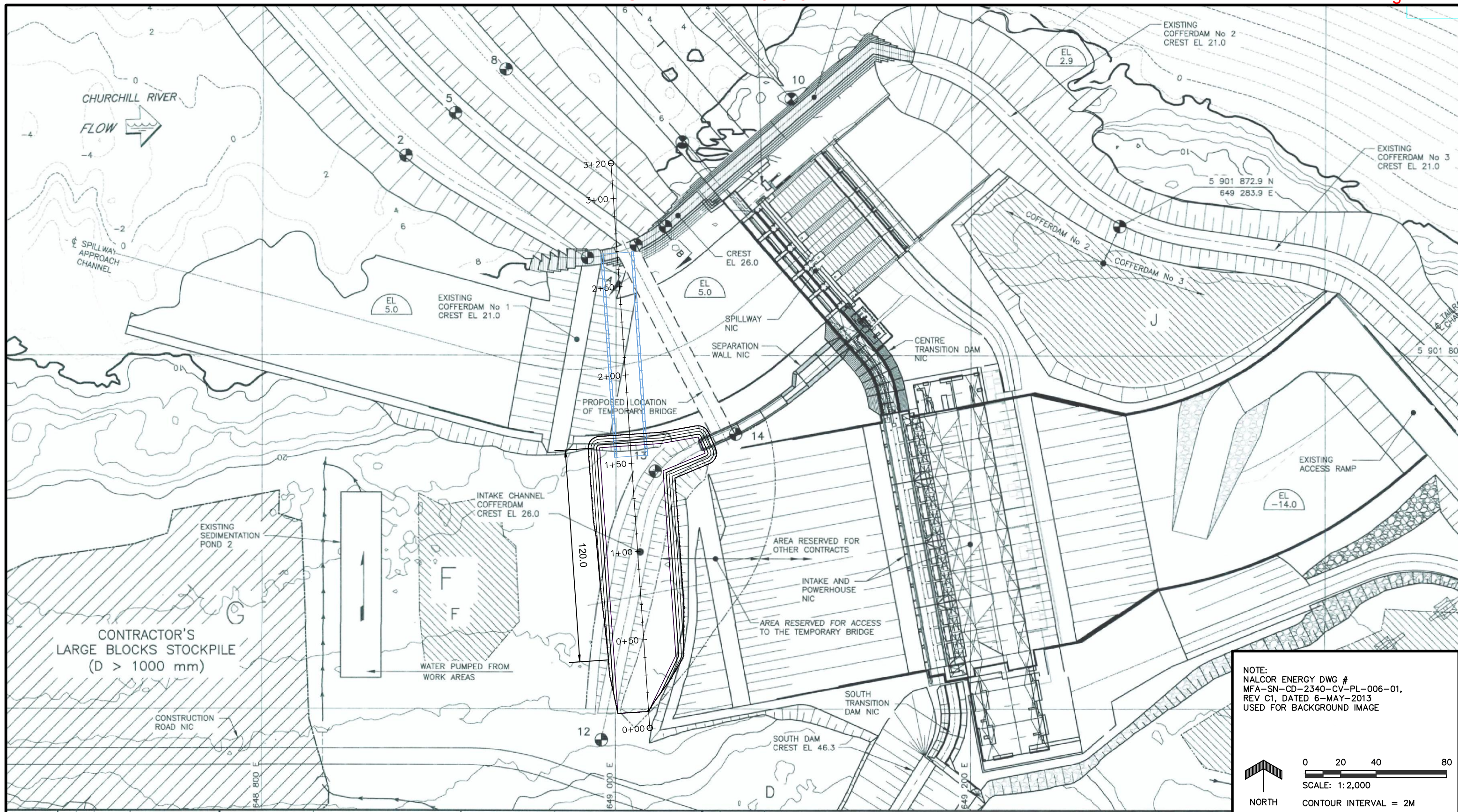
## **Appendixes**

**(Rev 0)**

**Updated Sep. 13<sup>th</sup>, 2015**







NOTE:  
 NALCOR ENERGY DWG #  
 MFA-SN-CD-2340-CV-PL-006-01,  
 REV C1, DATED 6-MAY-2013  
 USED FOR BACKGROUND IMAGE

0 20 40 80  
 SCALE: 1:2,000  
 CONTOUR INTERVAL = 2M

NORTH

\*\*\*\*\* DATUM REFERENCE: ALL ELEVATIONS ARE IN METRES REFERENCED TO GROUND. COORDINATE REFERENCE: UTM 6° (UNIVERSAL TRANSVERSE MERCATOR) PROJECTION, NAD83, ZONE 20 CENTRAL MERIDIAN 63° 00' W LONGITUDE. \*\*\*\*\*

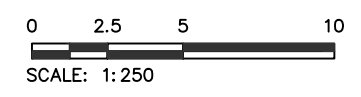
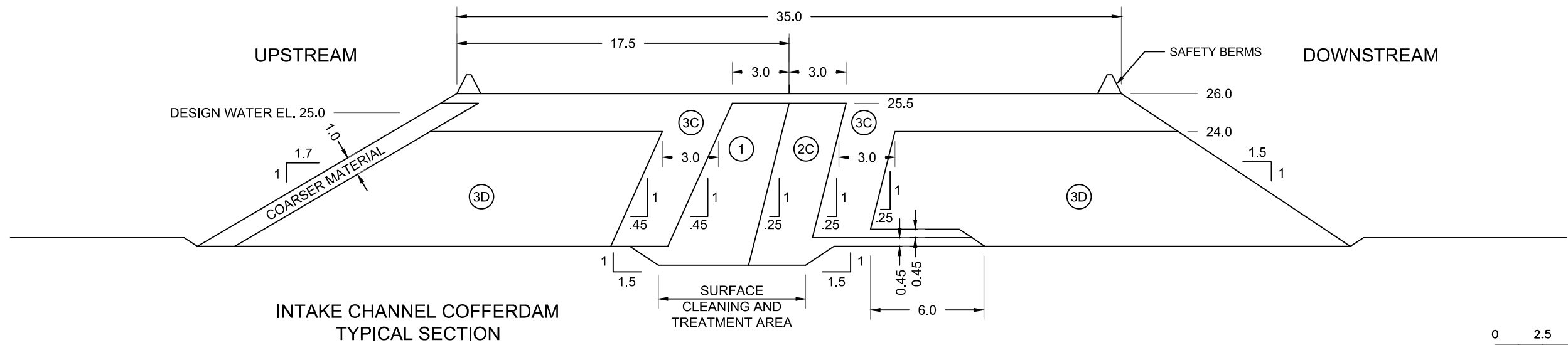
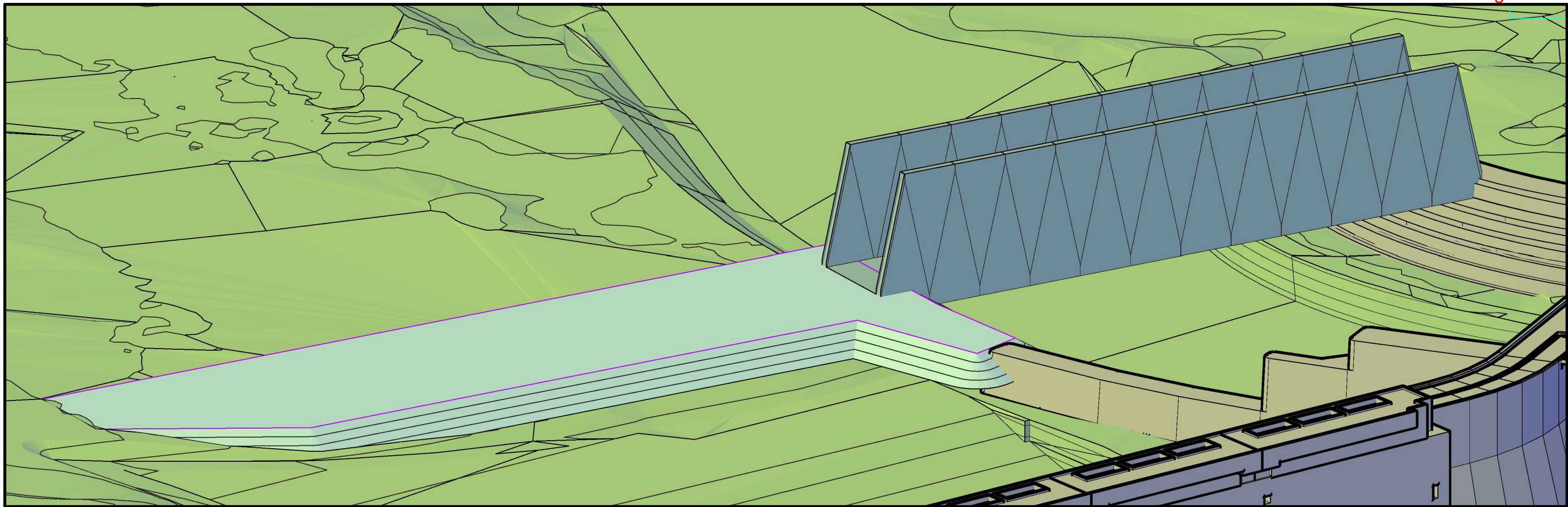
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 3. REVIEWED - NOT ACCEPTED  
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 5. NOT REVIEWED  
 LEAD REVIEWER: Date (dd-mm-yyyy):  
 NE-LCP MANAGEMENT: Date (dd-mm-yyyy):  
 PROJECT MANAGER: Date (dd-mm-yyyy):

PROFESSIONAL STAMP  
**BARNARD PENNECON**  
 DESIGNED: APPROVED (Deadline Lead Engineer)  
 DRAWN: LM APPROVED (Engineering Manager)  
 VERIFIED:  
 DATE: 12-MAR-2015 SCALE: 1:500  
 SUPPLIER DOC No. C-05-01 NE DOC No.

CLIENT: **nalcor energy**  
 PROJECT: LOWER CHURCHILL PROJECT  
 TITLE: MUSKRAT FALLS INTAKE CHANNEL COFFERDAM PLAN  
 Rev.

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\*\*\*\*\* DATUM REFERENCE: ALL ELEVATIONS ARE IN METRES REFERENCED TO GROUND. COORDINATE REFERENCE: UTM 6° (UNIVERSAL TRANSVERSE MERCATOR) PROJECTION, NAD83, ZONE 20 CENTRAL MERIDIAN 68° 00' W LONGITUDE. \*\*\*\*\*

ISSUE	REV.	DATE	DISTRIBUTION & STATUS	No.	DATE	REVISION	MOD.	VER.	APP.
ISSUE REGISTER				No.	DATE	REVISION REGISTER	MOD.	VER.	APP.

***** FOR INTERNAL USE ONLY *****	
REVIEW CLASS:	EQUIPMENT TAG NUMBER:
REVIEW DOES NOT CONSTITUTE APPROVAL OF DESIGN DETAILS, CALCULATIONS, TEST METHODS OR MATERIAL DEVELOPED AND/OR SELECTED BY THE CONTRACTOR, NOR DOES IT RELIEVE THE CONTRACTOR FROM FULL COMPLIANCE WITH CONTRACTUAL OR OTHER OBLIGATIONS.	
<input type="checkbox"/> 1. REVIEWED AND ACCEPTED - NO COMMENTS <input type="checkbox"/> 2. REVIEWED - INCORPORATE COMMENTS, REVISE & RESUBMIT <input type="checkbox"/> 3. REVIEWED - NOT ACCEPTED <input type="checkbox"/> 4. INFORMATION ONLY <input type="checkbox"/> 5. NOT REVIEWED	
LEAD REVIEWER:	Date (dd-mm-yyyy):
NE-LCP MANAGEMENT:	Date (dd-mm-yyyy):
PROJECT MANAGER:	Date (dd-mm-yyyy):

PROFESSIONAL STAMP

<b>BARNARD PENNECON</b>	
DESIGNED	APPROVED (Deadline Lead Engineer)
DRAWN LM	APPROVED (Engineering Manager)
VERIFIED	
DATE 12-MAR-2015	SCALE 1:250
SUPPLIER DOC No. C-05-02	NE DOC No.

<b>naicor</b>	
CLIENT	PROJECT LOWER CHURCHILL PROJECT
TITLE	MUSKRAT FALLS INTAKE CHANNEL COFFERDAM SECTION
Rev.	

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