SITE C CLEAN ENERGY PROJECT

Component Application Package – Dry Creek Bridge Replacement

For Canadian Navigable Waters Act

CNWA File # 2019-XXXXXX

November 29, 2019

Submitted to:

Transport Canada
Navigation Protection Program
Suite 1100 - 1166 W Pender Street
Vancouver, BC V6E 2R9

Submitted by:

BC Hydro and Power Authority
Site C Clean Energy Project
9th Floor – 1111 West Georgia Street.
Vancouver BC V6E 4M3

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1 INTRODUCTION

The Canadian Navigable Waters Act (CNWA) came into force on August 28, 2019. The CNWA includes a schedule of navigable waters requiring regulatory approval for works that risk a substantial interference with navigation. Works required for construction and operation of the Site C Clean Energy Project (the Project) that occur on, over, under or through navigable waterways as defined by the CNWA must be permitted.

Dry Creek is a tributary to the Peace River and is not a named navigable waterway. However, the Site C Reservoir will inundate some of the Dry Creek lower reaches and the Site C Reservoir will be considered a named navigable waterway as part of the Peace River. The Site C reservoir will inundate the past location of the Dry Creek highway culvert crossing and flow under the proposed bridge. As such the CNWA will apply to the Dry Creek Bridge replacement once the Site C Reservoir is formed.

This application package provides an overview of the Highway 29 realignment focusing on construction of the Dry Creek highway crossing replacement. This application package is one of a number of separate application packages that have or will be submitted for Project works requiring CNWA approvals. The construction phase CNWA application packages have been generally organized into component packages by activity, location or timing, including Dam Site Components, Vegetation Clearing, Highway 29 Bridge Replacements, Reservoir Boat Launches, Transmission Line, and Hudson's Hope Shoreline Protection. Future application packages will be submitted to the Navigation Protection Program (NPP) that describe the other Highway 29 realignment locations and reservoir boat activities over existing or future navigable waterways scheduling during the remainder of the eight year Project construction period.

2 HIGHWAY 29 REALIGNMENT BRIDGE REPLACEMENTS – PRELIMINARY CONSTRUCTION SCHEDULE

The following information on the preliminary construction schedule for each of the Highway 29 bridge replacements is provided for context to support this application that is specific to Farrell Creek.

As described in Section 4 of the Site C Environmental Impact Statement (EIS), Highway 29 connects Hudson's Hope to Fort St. John and runs along the north side of the Peace River. It is a two lane rural arterial undivided highway under the jurisdiction of the BC Ministry of Transportation and Infrastructure (BCMoTI). Creation of the reservoir will require realignment of approximatley 30km of existing highway at Lnyx Creek, Dry Creek, Farrell Creek, Halfway River and Cache Creek. Bridges sited at these locations will have to be replaced. In anticipation of the potential future navigation use, the vertical and horizontal clearance requirements to support navigation, as mandated by the CNWA, have been taken into account in the bridge design.

The preliminary construction schedule for the Highway 29 realignment and bridge replacement is outlined in Table 1.

Table 1: Preliminary Construction Schedule - Highway 29 Bridge Replacements

Bridge	Commencement	Completion
Halfway River	Late Summer / Fall 2019	Fall 2021
Cache Creek	Late Fall / Winter 2019	Fall of 2022
Farrell Creek	Summer 2020	Fall of 2022
Dry Creek	Summer 2020	Fall of 2022

The construction schedule is indicative only and subject to change. The Purpose of the schedule is to illustrate the general sequence of construction activities, but the dates and schedule may change.

Communication protocols are outlined in this work package for informing users of construction activities during the approximate two year construction period for each bridge.

2.1 DRY CREEK BRIDGE CROSSING

The current highway crossing over Dry Creek is a 46 m long culvert (1.8 m diameter). During the Site C environmental assessment process, a number of options for Dry creek were presented. The option put forward for the Environmental Impact Statement for Definition Design was an 11m pipe-arch culvert (Appendix B). Subsequent analysis of geotechnical information collected after the EIS led the designers to revised the culvert to the bridge crossing design shown herein. An application to amend the Site C Environmental Assessment Certificate will be sent out for consideration to the BC Environmental Assessment Office. Referral of the EAC amendment to Transport Canada and others in the technical working group is expected in late 2019 / early 2020.

A location map showing the Dry Creek replacement bridge is included in this submission (Figure 2), inclusive of a 3m x 10m navigation clearance envelope (above the maximum reservoir operating elevation = 461.8m) specification (Figure 1). This boater navigation envelope considers the limited area of future reservoir upstream of the future bridge (Figure 2) and reflects past discussion with Transport Canada[1]. Engineering design drawings, plan and profile views are provided in the Appendix A. The bridge location coordinates are: 56.117778 N; 121.771667 W. The proposed bridge is ~ 160 m upstream of the existing Highway 29 culvert crossing of Dry Creek and 380m upstream of the Peace River confluence .

The proposed bridge is ~145m long and included 3 spans and 2 concrete piers. The navigation envelope is anticipated to be located between Piers 1 and 2.

The method for construction for the new bridge includes realigning a portion of the creek channel into a diversion channel using riprap berms. These berms would located between the future Piers 1 and 2, and be left in place until the reservoir is created. This diversion is needed for isolation from flowing water, over a range of flows, so as to allow pier construction as well as pile cap works at Piers 1 & 2.

The creation of the future Site C reservoir will create a series of safe harbours (inundated rivers and creeks) for boaters and recreational enthusiasts to utilize.[2] Navigation aids will be attached to either side

[1] Memo to Transport Canada from Siobhan Jackson (BCH), RE: Site Clean Energy Project: Navigation Clearances for Highway 29 Bridge Crossings. 11 October, 2011

[2] For the purpose of this review safe harbours are defined as areas in which safe anchorage can be secured during periods poor weather

of bridge piers that surround the navigation channel to support safe vessel passage through the Dry Creek Bridge.

The legal land descriptions of the proposed works are :

- The South East 1/4 of Section 24 Township 82 Range 25 West of the 6th Meridian Peace River District Except Plans 21821
- The South West 1/4 of Section 24 Township 82 Range 25 West of the 6th Meridian Peace River District Except Plan 30367 and 21821

3 PUBLIC BOATER ACCESS

Bridge piers and associated overhead works will mean boater access upstream of the existing Dry Creek culvert is not expected until construction is complete.

4 CONSULTATION

In winter 2019/2020, BC Hydro will be applying to amend the project Environmental Assessment Certificate to modify a portion of the Certificate Alignment (the Revised Alignment) and change the design of the highway crossing across Dry Creek. A technical working group, inclusive of Transport Canada representative(s), is anticipated to be coordinated by the BC Environmental Assessment Office during review of the application for Certificate amendment.

BC Hydro is presenting several Dry Creek crossing provincial permit applications to local Indienous groups during the February 2020 Permitting Forum in Fort St. John. The application approvals are contingent upon the Environmental Assessment Office issuing an EAC amendment for the Dry Creek bridge.

Figure 1. Profile view of Highway 29 crossing over Dry Creek showing navigation envelope.

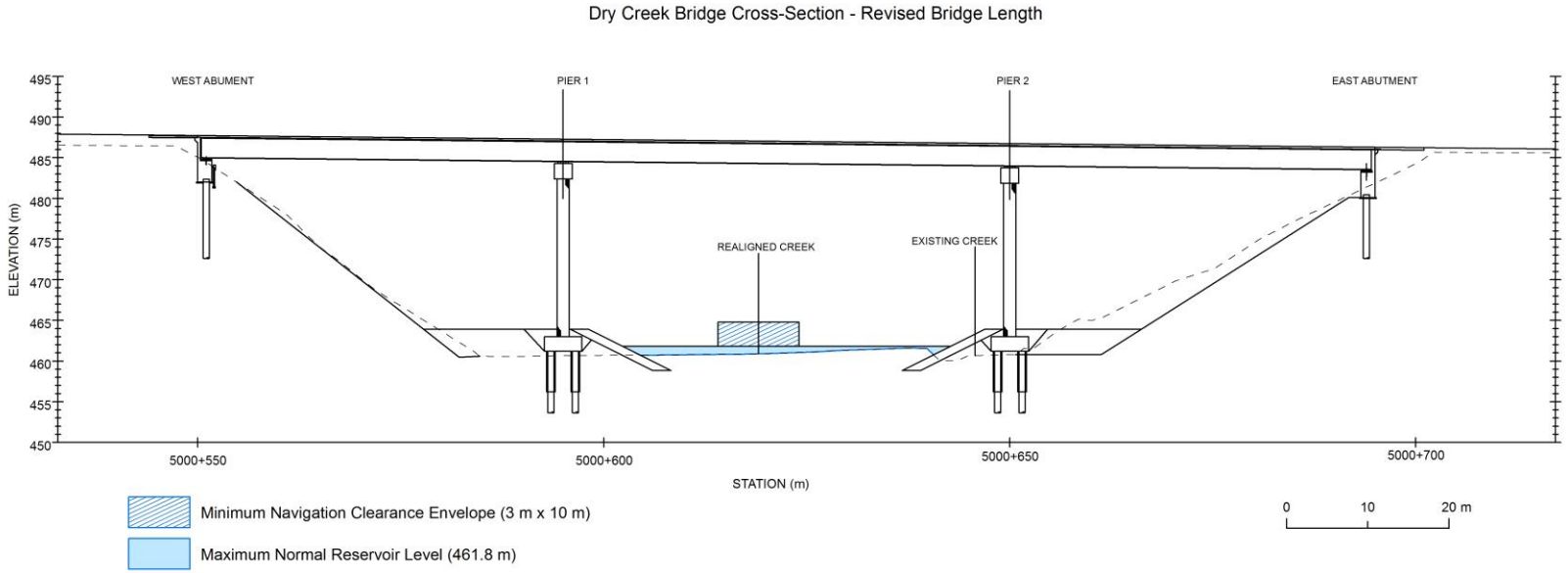


Figure 2. Location of Highway 29 crossing over Dry Creek.

Map Notes:
1. Datum: NAD83
2. Projection: UTM Zone 10N
3. Base Data: Province of B.C.
4. Imagery: 2015 Lidar othophotos.

Legend

- New Highway Realignment Bridge Abutments
- New Highway Realignment Bridge Piers
- New Highway Realignment Bridge
- New Highway Realignment Centerline
- New Highway Realignment Right-of-Way
- Creek Diversion Channel
- High Water Mark
- Berm (733.2 m^2 inside HWM)

1:1,500 0 50 m

BC Hydro

Dry Creek Highway 29
Approval Application
Canadian Navigable Waters Act

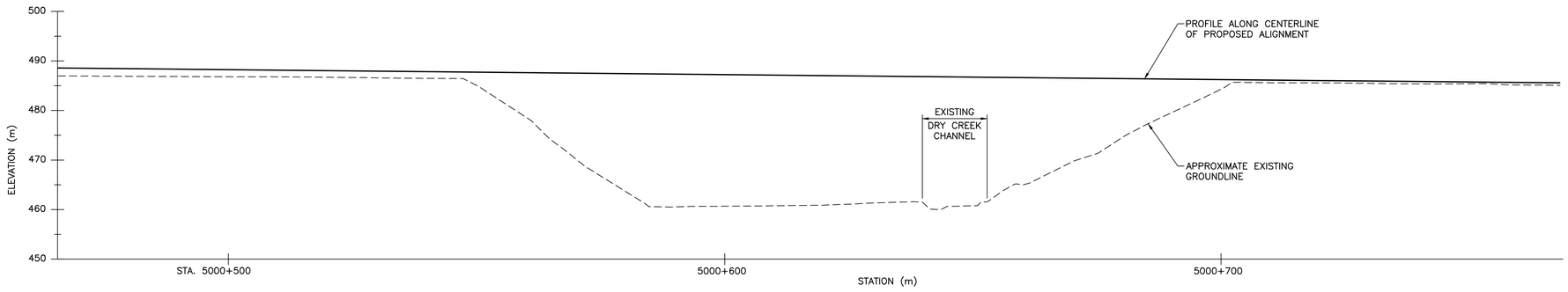
Date	Nov. 13, 2019	DWG NO	1016-N11-00677	R 0

Construction of the Site C Clean Energy Project is subject to required regulatory and permitting approvals.

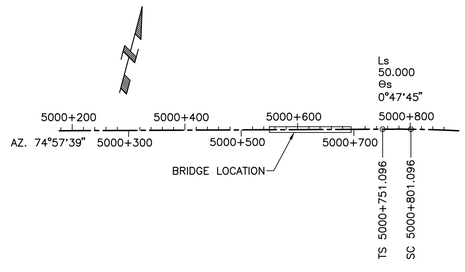
Path: X:\ArcGIS\Projects\Permitting\Federal_Permits\Nav\ProtAct\DryCk_Hwy29_ApprovalApplic_1016_N11_00677.mxd

Appendix A Farrell Creek Engineering Design Drawings, Plan and Profile Views

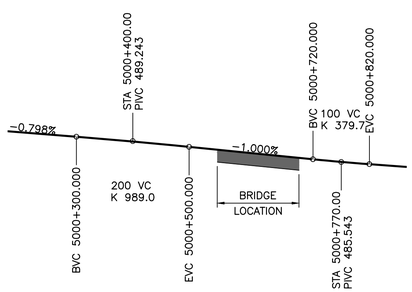
PLAN
SCALE 1:500



PROFILE ALONG CENTERLINE OF PROPOSED L5000 ALIGNMENT
SCALE 1:500



PLAN OF PROPOSED L5000 ALIGNMENT
N.T.S.



PROFILE OF PROPOSED L5000 ALIGNMENT
N.T.S.

NOTES:

1. FOR GENERAL NOTES SEE DRAWING 08660-01.
2. SURVEY BY: TO COME
3. DATUM: GEODETIC.
4. FOR BOREHOLE DATA SEE DRAWING XXX. REFERENCE: GEOTECHNICAL DATA REPORT BY WOOD.

NOT FOR CONSTRUCTION

70% DETAILED DESIGN

Consultant Logo
Klohn Crippen Berger

Rev	Date	Description	Init

REVISIONS

BRITISH COLUMBIA
Ministry of Transportation & Infrastructure
Northern Region

PEACE DISTRICT
HIGHWAY No. 29

DRY CREEK BRIDGE No. 08660
SITE PLAN

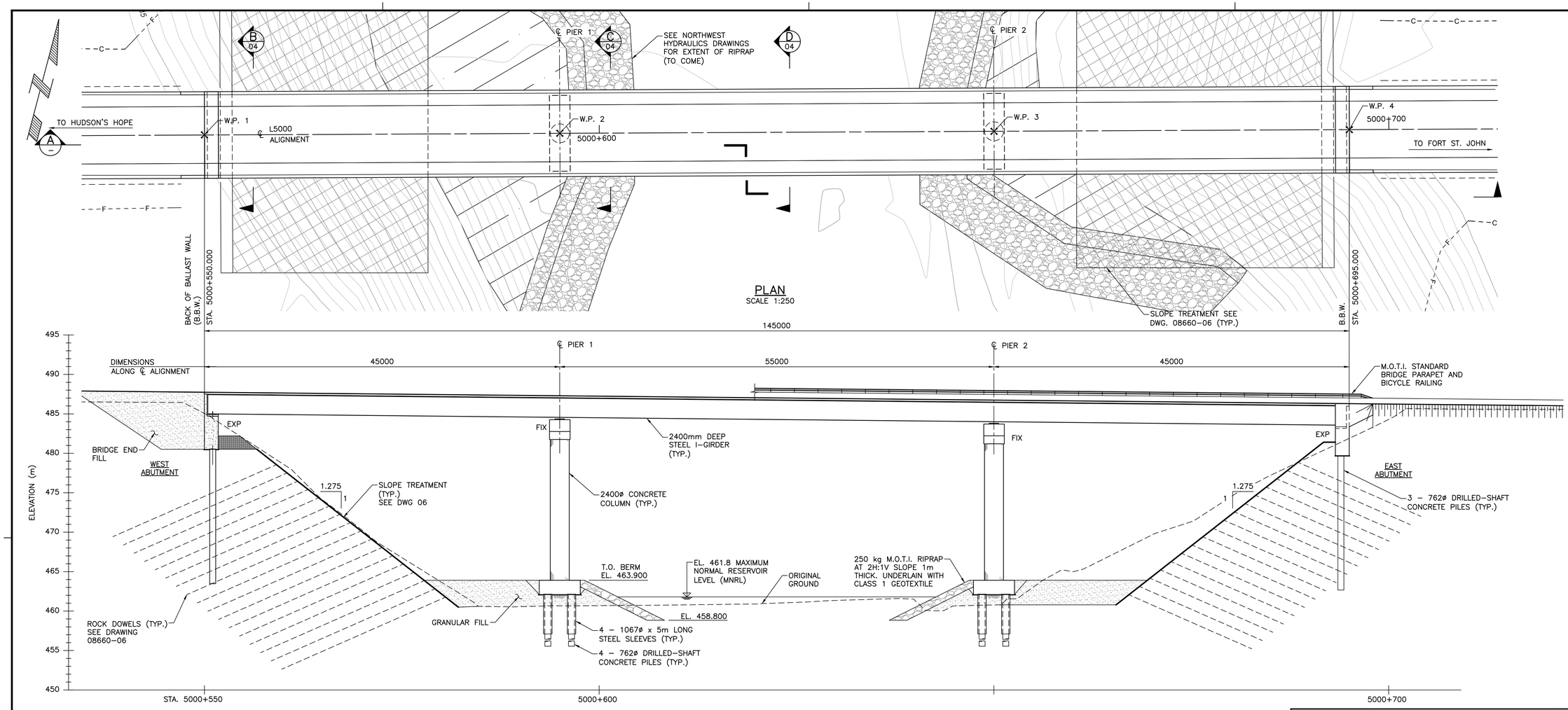
PREPARED UNDER THE DIRECTION OF
ENGINEER OF RECORD
DATE
SEAL

DESIGNED N.K. DATE OCT 2019
CHECKED DATE
DRAWN M.B. DATE OCT 2019
SCALE AS NOTED
NEGATIVE No.

FILE No. | PROJECT No. | REG. | DRAWING No. 08660-02

CANCEL PRINTS BEARING PREVIOUS LETTER

H-308(-3-(07-08))



PLAN
SCALE 1:250

SECTION A
SCALE 1:250

NOTES:

1. FOR GENERAL NOTES SEE DRAWING 08660-01.

NOT FOR CONSTRUCTION

70% DETAILED DESIGN

Consultant Logo

Klohn Crippen Berger

Rev	Date	Description	Init

REVISIONS

BRITISH COLUMBIA | Ministry of Transportation & Infrastructure
Northern Region

PEACE DISTRICT
HIGHWAY No. 29

DRY CREEK BRIDGE No. 08660
GENERAL ARRANGEMENT – SHEET 1

PREPARED UNDER THE DIRECTION OF

ENGINEER OF RECORD

DATE

SEAL

DESIGNED N.K. DATE OCT 2019
CHECKED DATE
DRAWN M.B. DATE OCT 2019
SCALE AS NOTED
NEGATIVE No.

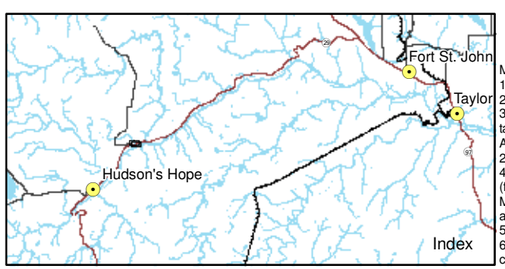
FILE No. | PROJECT No. | REG. | DRAWING No. 08660-03

H-308(-03-(07-08)

CANCEL PRINTS BEARING PREVIOUS LETTER

Appendix B:Dry Creek Culvert Crossing Alignment and Arrangement presented in Site C Environmental Impact Statement

- Figure 4.29 Rev 0 General arrangement of Highway 29 realignment segment at Farrell Creek



Map Notes:
1. Datum: NAD83
2. Projection: UTM Zone 10N
3. Orthophotos created from 1:40,000 photos taken Sept10th 2007; 1:15,000 photos taken Aug 26, 2011; 1:5,000 photos taken Aug 26, 2011; TRIM
4. Proposed maximum normal reservoir level (full supply level-461.8 m) from Digital Elevation Models (DEM) generated from LiDAR data acquired July/Aug 2006.
5. Realignments subject to change.
6. Reservoir elevation = 461.8 m does not consider realignments.

Legend

- Highway 29 Realignment
- Pipe Arch
- Maximum Normal Reservoir Level (461.8 m)

1:5,000

0 0.25 km

BC hydro

SITE C CLEAN ENERGY PROJECT

Figure 4.29
General arrangement of Highway 29 realignment segment at Dry Creek

Date	Nov. 23, 2012	DWG NO	1016-C14-B6158-15	R 0