2.3.2 TRANSMISSION INTERCONNECTION CONSTRUCTION

The new transmission interconnection would be constructed in a new easement that is adjacent to an existing agricultural disturbance. Access for construction of new towers would be via existing access roads developed for construction of the existing transmission line and used for periodic inspection and maintenance of that line. The existing access roads would be extended to the new tower locations to provide access for construction. A staging and equipment laydown area would also be used. These locations would be selected from sites that are accessible from existing roadways and are currently disturbed, or where disturbance can be minimized. Disturbances for staging and letdown areas would be restored following construction.

The construction sequence would include tower installation, stringing conductors and static wires, and site cleanup.

Tower Installation – Installation of the towers would include vegetation clearance of an area sufficient for pole installation. Holes would be dug with a backhoe, or power auger and a concrete foundation pier would be poured in place. In some cases, rock drills or blasting may be required to excavate a foundation hole to sufficient depth. Where drilling or blasting is required, unsuitable construction debris would be removed and backfilled with suitable material. The poles would be bolted to the foundation piers, steel cross-arm and insulators installed, and the towers prepared for conductor stringing.

- **Stringing Conductors/Static Wires –** Conductor stringing involves a sequence of running pilot lines through prepositioned pulleys located on each tower. A truck-mounted, spooled conductor is then positioned at the beginning of the segment to be strung. Take-up spools, also truck-mounted, are located at the end of the segment to be installed. Pilot lines are pulled through with tension maintained and the conductors follow and are left in position on the towers. Installation is completed by connecting the conductors to the individual insulators while adjusting the conductors sag between towers to predetermined dimensions. In some locations, static wires would also be installed for protection of the transmission line. The static wires would be installed in a manner similar to the conductors.

  The tower installation and conductor stringing operation primarily involve the movement of wheeled vehicles along the new easement. Little disturbance other than excavation for the towers would occur.

- **Cleanup** – Following construction of the line, all residual construction debris would be removed and disturbed areas would be restored as required.

2.4 PROJECT ALTERNATIVES

In addition to the No Action Alternative and the Proposed Action, three other alternatives for specific components of the project were considered: (1) alternate 230-kV transmission interconnection, (2) alternate Benton PUD/BPA transmission interconnection, and (3) an access alternative, including an alternate construction access road and an alternate operation access road. These alternatives are described below.

2.4.1 ALTERNATE 230-KV TRANSMISSION INTERCONNECTION

As an alternative to interconnection with BPA's proposed 500-kV transmission line, the PGF could interconnect with the existing BPA McNary-Big Eddy 230-kV transmission line, which is also located in the BPA right-of-way corridor approximately 0.6 mile north of the plant site. Transmission, configuration and construction would be the same as for the proposed 500-kV transmission line, since the two lines are located in the same transmission corridor. The line interconnecting to the PGF would cross under the 230-kV line and interconnect with the 230/345-kV line. Figure 2-10 shows the 230-kV interconnection.

2.4.2 ALTERNATE BENTON PUD/BPA TRANSMISSION INTERCONNECTION

In addition to the alternate 230-kV transmission interconnection, another alternate transmission interconnection to BPA's McNary Substation has been identified that would involve the addition of a second transmission circuit to the existing Benton PUD line located in the vicinity of the plant site. The route for this alternate interconnection is shown on Figure 2-3.

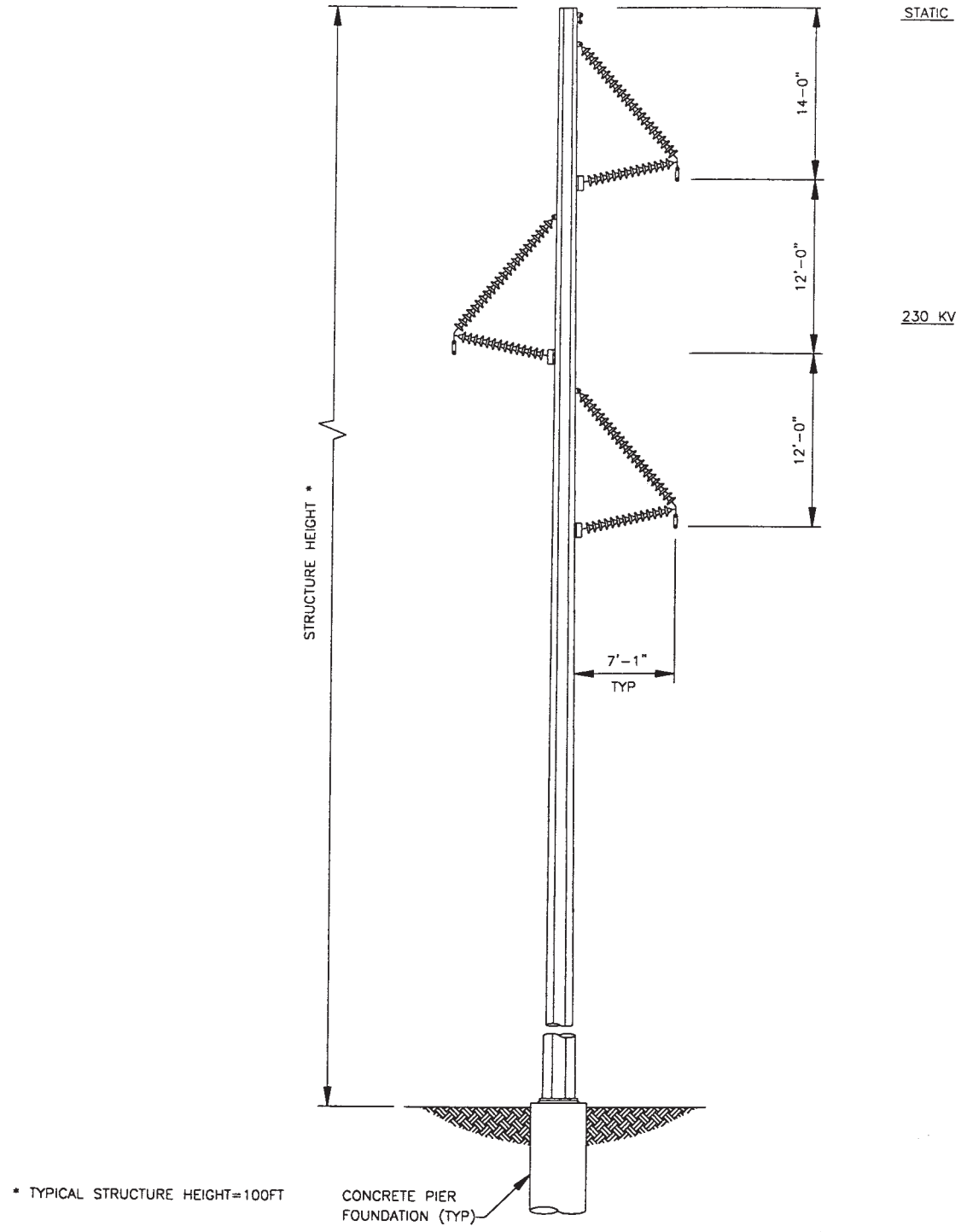
2.4.2.1 Alternate Benton PUD/BPA Transmission Interconnection Configuration

The existing Benton PUD transmission line is a 115-kV circuit carried on wooden towers. From the substation located on Christy Road adjacent to the entrance to the Williams Co. compressor station, this line runs east approximately 2 miles on the south side of Christy Road in an easement adjacent to the road. The line is carried on wooden mono-poles in this segment, with the individual conductors stacked vertically. At a point approximately 2 miles east of the substation, the existing line turns north crossing Christy Road. At this juncture, the line shifts from the wooden mono-poles to wooden "H-frame" towers. The conductors are mounted horizontally on the H-frame towers.

From Christy Road, the existing line runs north approximately 0.4 mile, then turns east. The line continues eastward approximately 2 miles, where it crosses I-82. After crossing I-82, the existing BPUD line turns northeastward towards Kennewick. At this point, the alternate transmission interconnection would turn south, cross the Columbia River on existing towers, and interconnect with BPA transmission in the McNary substation.

Use of the Benton PUD line as an alternate interconnection to the McNary Substation would require overbuilding the existing line with the addition of a second 230-kV circuit. This would entail replacing the existing towers (both mono-poles and H-frames) with similar structures but with the addition of a second set of conductors. The replaced structure would be 100 to 110 feet high. The configuration of the towers with the added 230-kV circuit is shown on Figures 2-11 (mono-poles) and 2-12 (H-frame).

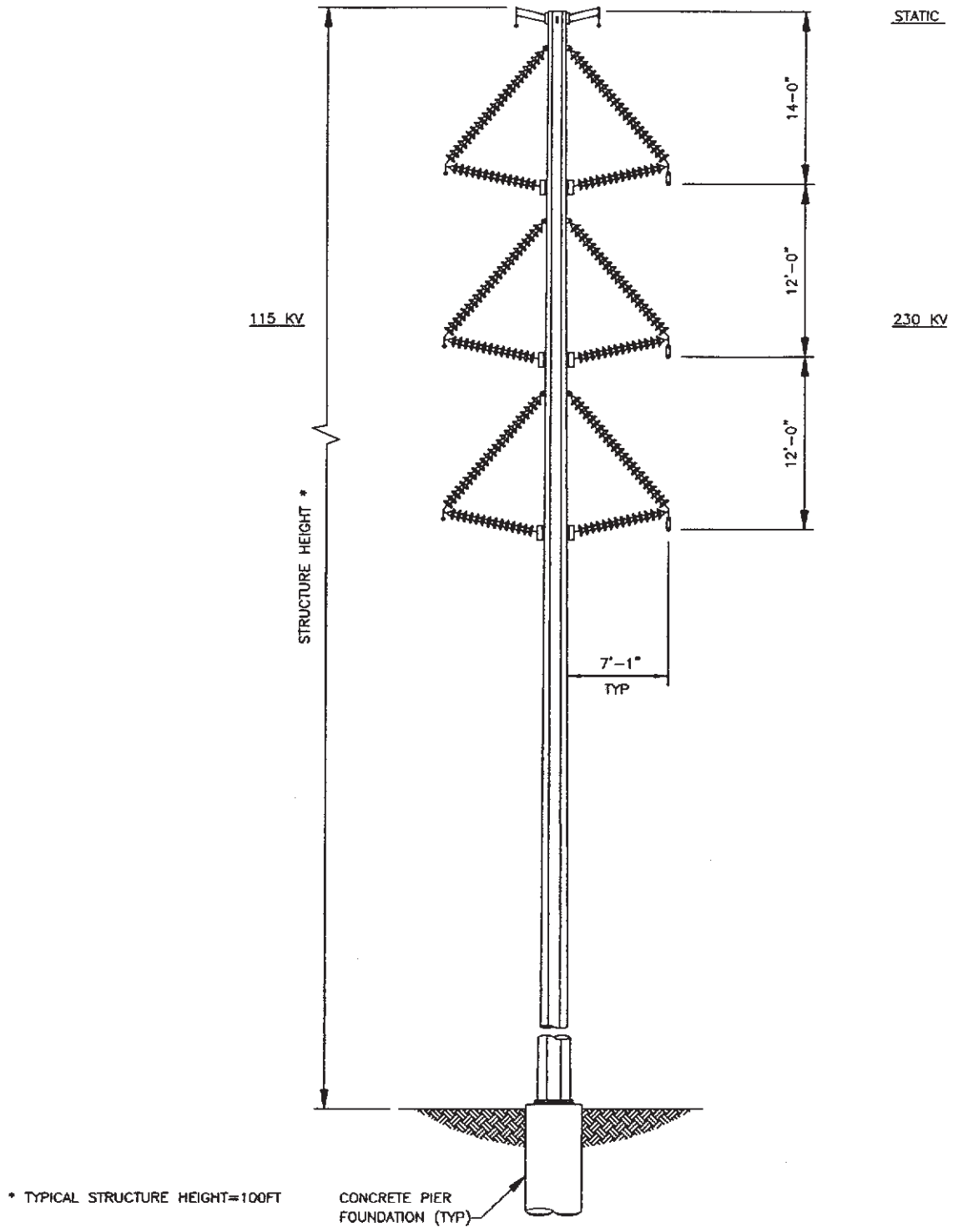
At the Columbia River, the 230-kV circuit that would interconnect the PGF would be tied into another existing BPA transmission line that already crosses the river and terminates at BPA's McNary Substation. It is assumed that BPA may need to replace the conductors of this river crossing with larger conductors for the portion of the line that crosses the river. This upgrade would be performed by BPA.



Source: Black & Veatch

Figure 2-10
Alternate 230-kV Transmission Tower Configuration

Figure 2-10 Alternative 230-kV Transmission Tower Configuration (Continued)

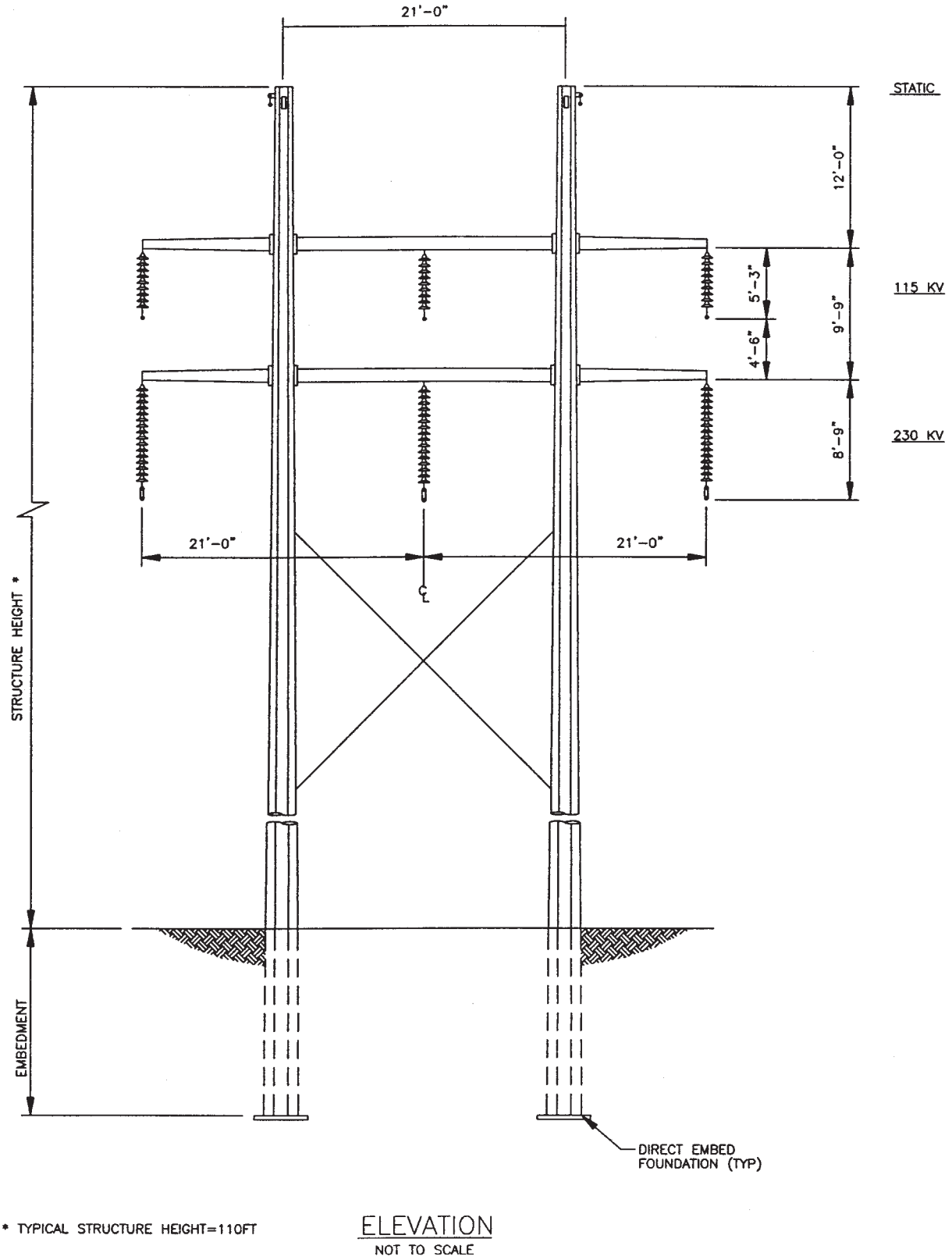


Source: Black & Veatch

Figure 2-11

Mono-pole Tower Configuration (Alternate Benton PUD/BPA Transmission Interconnection)

Figure 2-11 Mono-Pole Tower Configuration (Alternate Benton PUD/BPA Transmission Interconnection) (Continued)



Source: Black & Veatch

Figure 2-12

H-frame Tower Configuration (Alternate Benton PUD/BPA Transmission Interconnection)

Figure 2-12 H-Frame Tower Configuration (Alternate Benton PUD/BPA Transmission Interconnection) (Continued)

2.4.2.2 Construction Sequence

Construction of the alternate Benton PUD/BPA transmission interconnection would require replacement of the existing towers with new towers, restringing the 115-kV circuit, and stringing the new 230-kV circuit. The transmission towers would be placed adjacent to the existing towers within existing right-of-way.

Access for the construction of the new towers would be via existing access roads along the existing right-of-way. For that portion of the line adjacent to wetlands (west of I-82), a construction exclusion zone would be marked to prohibit the movement of equipment or materials in areas where construction activity could result in impacts to wetlands.

Staging and equipment laydown areas would also be required. These locations would be selected from sites that are accessible from existing roadways, currently disturbed, or where disturbance can be minimized. Disturbances for staging and letdown areas would be restored following construction.

The construction sequence would include tower installation, stringing conductors and static wires, and site cleanup.

- **Tower Installation –** The new towers would be installed adjacent to existing towers and include vegetation clearance of an area sufficient for tower installation. Holes would be excavated with an auger/drill. Placement of mono-poles would require installation of a concrete foundation (see Figure 2-11). The H-frame poles (see Figure 2-12) would be placed in the hole and backfilled and compacted with excavated material. Following installation of the poles, the cross-arm members (H-frame) and insulators would be installed and the towers prepared for conductor stringing.
- **Conductor Stringing** – To string the new conductors, pulleys (one for each conductor) would be positioned on the towers. Pilot lines would then be run through a sequence of pulleys. Truck-mounted, spooled conductors would be positioned at the beginning of the segment to be strung, and take-up spools, also truck-mounted, would be located at the end of the segment to be installed. The pilot lines would be pulled through with tension maintained. The conductors would follow, and would be left in position on the towers. Installation would be completed by connecting the conductors to the individual insulators, while adjusting the conductor's sag between towers to predetermined dimensions. In some locations, static wires would also be installed for protection of the transmission line. The static wires would be installed in a manner similar to the conductors.

  The tower installation and conductor stringing operations would primarily involve the movement of wheeled vehicles along the right-of-way. Little disturbance other than excavation for the poles would occur.

  During conductor stringing, the existing line would be taken out of service to facilitate line stringing and movement of the existing circuit to the new tower structures.

- **Existing Tower Removal/Cleanup** – Following stringing of the new conductors, the existing towers would be removed. Holes left by the removal of existing wooden poles would be filled and compacted. Following construction of the transmission line, all residual construction debris would be removed and disturbed areas restored as required.

2.4.3 ACCESS ALTERNATIVE

The proposed access road, which would be used for both construction and permanent operation, would extend Plymouth Industrial Road through the AgriNorthwest grain facility property to the plant site. In the event this access route is not available, alternate access roads (for construction and operation) have been evaluated, as discussed below.

2.4.3.1 Alternate Access Roads Configuration

All local access roads (both designated roads such as Christy Road and informal roads) intersect with SR 14. The Washington State Department of Transportation (WSDOT) has designated SR 14 (see Figure 2-1) a limited access highway. Thus, any access to the plant site must utilize roads that already interconnect with SR 14. Plymouth Road and Christy Road intersect with SR 14, and Plymouth Road connects with Christy Road east of the plant site and south of SR 14 (see Figure 2-1).

Christy Road provides access to the plant site from the east and west. Christy Road intersects SR 14 approximately 4.5 miles northwest of the plant site. From this intersection, Christy Road runs south to the Columbia River, turns east, and runs parallel to the river for approximately 5.5 miles to the community of Plymouth. At Plymouth, Christy Road intersects with Plymouth Road, which heads north under the BNSF railroad tracks and intersects with SR 14 approximately 0.5 mile north of Plymouth and approximately 0.75 west of I-82. Thus, Christy Road and Plymouth Road form a loop; the plant site is approximately in the middle of the loop.

2.4.3.1.1 Alternate Construction Access Road

Having traffic approach the plant site on Plymouth Road/Christy Road from the east would require travel through Plymouth and truckloads small enough to fit under the BNSF railroad tracks just north of Plymouth. Construction traffic approaching on Christy Road from the west would not travel through any local communities.

The plant site has an existing access easement through Plymouth Farm to Christy Road. However, this easement requires crossing the BNSF railroad tracks, which would require amendment of the crossing easement agreement for construction activities. In order to eliminate the railroad track crossing and traffic through communities to reach the plant site, the alternate construction access route was designed to:

- Begin at the westerly intersection of Christy Road and SR 14
- Approach the plant site from the west on Christy Road

- Leave Christy Road before it crosses the BNSF railroad tracks and enters Plymouth Farm at the southwest corner

- Utilize a new road on a temporary easement to the plant site

The route of the alternate construction access road is shown on Figure 2-3.

2.4.3.1.2 Alternate Operation Access Road

Under the access alternative, permanent access to the site for operation workers would be via the existing access to Plymouth Farm. A permanent easement from Plymouth Farm would have to be obtained to make this access available. As part of the access alternative, the currently unpaved portion of the existing road (from just north of the BNSF railroad tracks to the site) would be paved.

2.4.3.2 Construction Sequence

No improvements to Christy Road would be required from its intersection with SR 14 to the point where the alternate construction access road would depart from Christy Road and enter Plymouth Farm. At this point, construction of a new, temporary 24-foot-wide road would be undertaken.

Construction of the temporary road would include the following steps:

- The road right-of-way would be surveyed, underground piping located, vegetation removed, and the road graded and compacted as required. The road would be watered during compaction to aid in compaction and minimize dust emissions. The route is essentially flat, so little if any cut/fill would be required.

- Road base (gravel) would be imported to the site and spread to form an approximate 10-inch-thick layer. This layer would be mechanically compacted as required to support traffic loads.

- Stormwater/erosion control devices would be installed as required along the road alignment.

- Following completion of the PGF construction phase, the temporary construction road would be removed in accordance with the requirements of the landowner (Plymouth Farm). This may include removal of the road base material, repair of any underground piping, and scarifying of the soil to prepare it for further agricultural use.

Prior to commencing PGF operation, the unpaved portion of the alternate operation access road would be paved as discussed in Section 2.4.3.1.2.