TENNESSEE VALLEY AUTHORITY

1101 Market Street, Chattanooga, Tennessee 37402

NNP-24-003

July 10, 2024

10 CFR 50.10(c)
10 CFR 50.12(b)

ATTN: Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-001

Clincr River Project
NRC Docket No. 99902056

Subject: **Response to Excavation Exemption Request Audit and Information Needs**

Reference:

1. Request for Exemption 10 CFR 50.10(c) to Allow Excavation at the Clinch River Nuclear Site Prior to Construction Permit Issuance (ML23335A100)
2. Clinch River Nuclear Site – Excavation Exemption Request Audit and Information Needs (ML24060A069)

By letter dated November 20, 2023 (Reference 1) (Agencywide Documents access and Management System (ADAMS) ML23335A100, the Tennessee Valley Authority (TVA) submitted a request for exemption from Title 10 of the *Code of Federal Regulations* (10 CFR) 50.10(c), pursuant to 10 CFR50.12, “Specific Exemptions.” TVA requested an exemption, pursuant to 10 CFR50.12(b), to allow the conduct of certain excavation support activities at the Clinch River Nuclear site prior to the issuance of a Construction Permit, which Nuclear Regulatory Commission accepted January 31, 2024 (ML24009A168).

To support the agency’s obligations under the National Environmental Policy Act, and to promote a better understanding of the detailed analysis and bases underlying the exemption request, the NRC staff identified information needs (Reference 2) to assist in the development of its Environmental Assessment.

The Enclosure to this submittal provides the information requested in Reference 2.

There are no new regulatory commitments associated with this submittal. Please address any questions regarding this request to Mr. Ray Schiele, Senior Manager Licensing, New Nuclear Program, at rjschiele@tva.gov.

Sincerely,

Scott W. Hunnewell
Vice President, New Nuclear Program

Enclosure:

Response to Excavation Exemption Request Audit and Information Needs

cc (Enclosure):

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Enclosure

Response to Excavation Exemption Request Audit and Information Needs

In Attachment 1 of the Audit Plan, the NRC identified information needs to support the exemption request. The following discussion addresses the topics identified in Attachment 1 of the Audit Plan to the extent possible, given the best available information based on preliminary planning.

1. Excavation site and related areas

   a. Location of proposed reactor building excavation/footprint

      The Clinch River Nuclear (CRN)-1 Reactor Building (RB) excavation and installation of the initial ground support system will occur at the location depicted on Figures 1 and 2. The footprint of the proposed CRN-1 RB is fully within the Power Block Area depicted in Tennessee Valley Authority's (TVA) Clinch River Early Site Permit Application (ESPA) Environmental Report (ER) (Refer to ER Figure 2.1-3, CRN Site Layout) and the Nuclear Regulatory Commission (NRC) Final Environmental Impact Statement (FEIS) (Refer to FEIS Figure 2-2, Clinch River Nuclear Site Utilization Plan) supporting issuance of Early Site Permit (ESP)-006.

      Figure 1 provides an overlay of the location of the CRN-1 RB excavation and the anticipated disturbance area with the disturbed area evaluated in the ESPA ER and the NRC ESP FEIS. Figure 2 depicts the excavation and anticipated disturbance area in relation to surface water resources in the vicinity of the CRN-1 RB excavation.

   b. Location/footprint of temporary disturbance

      TVA anticipates the activities associated with CRN-1 RB excavation and installation of the initial ground support system would result in permanent and temporary disturbances to occur fully within those areas previously evaluated as disturbed areas in TVA's ESPA ER (Refer to ER Figure 3.1-2, CRN Site Cleared Areas) and the NRC ESP FEIS (Refer to FEIS Figure 2-2, Clinch River Nuclear Site Utilization Plan) supporting issuance of ESP-006. The primary estimated area of disturbance depicted on Figures 1 and 2 is approximately 30 acres, and represents those areas anticipated to be disturbed to support excavation activities. In addition, a 9-acre area encompassing the potential discharge location is also depicted on Figures 1 and 2. The actual disturbance would be limited to a few acres within a single drainage feature somewhere within this 9-acre area. The majority of this area would remain undisturbed during the RB excavation.

   c. Location/description of laydown areas

      TVA has not yet determined the specific location of laydown areas associated with CRN-1 RB excavation and installation of the initial ground support system. However, it is anticipated that laydown areas will be in close proximity to the excavation location, within the anticipated extent of the primary disturbance area associated with the CRN-1 RB excavation depicted in the previously mentioned figures, and within those areas previously evaluated as disturbed areas in TVA's ESPA ER (Refer to ER Figure 3.1-2, CRN Site Cleared Areas) and the NRC FEIS (Refer to FEIS Figure 2-2, Clinch River Nuclear Site Utilization Plan) supporting issuance of ESP-006.

d. Location/description of access roads

The existing offsite and onsite access roads at the CRN Site are unchanged from those depicted in Figure 2.2-2 (CRN Site Land Cover Types) of the ESPA ER and Figure 2-38 (CRN Site Aerial Map) of the NRC ESP FEIS. TVA will utilize the existing offsite and onsite roads to access the CRN-1 RB excavation area. No new roads are needed to support RB excavation or installation of the initial ground support system. However, the portion of the existing access road on the west side of the CRN-1 RB excavation within the anticipated extent of disturbance associated with the CRN-1 RB excavation (depicted in Figures 1 and 2) will be relocated and remain within the primary disturbance area depicted on Figures 1 and 2.

e. Location of concrete batch plant

TVA does not intend to utilize a concrete batch plant during RB excavation or installation of the initial ground support system. Concrete required during this period (crane pad, etc.) will be procured through a local concrete vendor.

f. Location of spoils/stockpiling area(s)

TVA has not yet determined the specific location of spoils/stockpiling areas associated with CRN-1 RB excavation and installation of the initial ground support system. However, it is anticipated that spoils/stockpiling areas will be in proximity to the excavation location, within the anticipated extent of the primary disturbance area associated with the CRN-1 RB excavation depicted in Figures 1 and 2, and within those areas previously evaluated as disturbed areas in TVA's ESPA ER (Refer to ER Figure 3.1-2, CRN Site Cleared Areas) and the NRC ESP FEIS (Refer to FEIS Figure 2-2, Clinch River Nuclear Site Utilization Plan) supporting issuance of ESP-006.

g. Location of nearest noise receptor

Noise impacts during preconstruction and construction activities were described in Section 4.4.1.1 of the ESPA ER and Section 4.8.2 of the NRC ESP FEIS. The nearest residences were described as being located across the Clinch River arm of the Watts Bar Reservoir on three sides of the CRN Site peninsula. According to the ESPA ER, if construction activities occur within 500 feet of the CRN Site boundary or the offsite areas (distance at which estimated dBA for equipment [other than pile driver] is less than 65 dBA), or noise levels become excessive, the nearby residences could be temporarily impacted by construction noise above the acceptable levels.

Since the ESP proceeding, TVA has identified that three additional residences have been constructed on the south side of the Clinch River arm of the Watts Bar Reservoir. Additionally, TVA has developed a site utilization plan that delineates areas impacted by construction of CRN-1. Based on this new information, the nearest noise receptors are residences located along Blackburn Lane, east of the CRN-1 RB excavation. The distance between the CRN-1 RB excavation and the nearest noise receptor (a residence on Blackburn Lane) is approximately 2,500 feet.

Other potential noise receptors include recreators on the reservoir that boat in the waters adjacent to the CRN Site. The reservoir is approximately 1,700 feet from the CRN-1 RB excavation at its closest point.

h. Location/description of any temporary or permanent improvements needed to support excavation

As described above, Figures 1 and 2 depict the conceptual footprint of disturbances related to the CRN-1 RB excavation and installation of the initial ground support system in relation to the areas previously evaluated as disturbed areas in the ESPA ER.

Generally, the activities associated with the CRN-1 RB excavation will utilize site improvements planned to support overall site preparation and pre-construction activities related to CRN-1, and other activities planned for the CRN Site that are not associated with CRN-1 and that do not require engagement with the NRC. TVA anticipates minimal temporary or permanent improvements will be needed to specifically support CRN-1 RB excavation and installation of the initial ground support system.

Improvements necessary to support CRN-1 RB excavation and installation of the initial ground support system will include the installation of temporary utilities including power, lighting, communications, and a settlement basin, and will be within the anticipated extent of the primary disturbance area associated with the CRN-1 RB excavation depicted in Figures 1 and 2, and within those areas previously evaluated as disturbed areas in TVA's ESPA ER (Refer to ER Figure 3.1-2, CRN Site Cleared Areas) and the NRC ESP FEIS (Refer to FEIS Figure 2-2, Clinch River Nuclear Site Utilization Plan) supporting issuance of ESP-006. It is anticipated that utilities supporting all onsite activities would be located along existing onsite roads.

In addition, TVA will maintain a supply of non-potable water onsite to washdown the sides of the excavation for inspection purposes. Multiple options exist to provide non-potable water to the site, including using trucks to fill onsite non-potable water tanks or re-establishing the municipal connection of the existing fire protection system. Reestablishing the connection to the fire protection would not require any land disturbance activities.

TVA will provide potable (i.e., bottled) water to the site during CRN-1 RB excavation and installation of the initial ground support system. Sanitary waste will be managed using portable toilets, minimizing requirements for sanitary water. A licensed contractor would be used to service the portable toilets, thereby precluding adverse impacts to the quality of nearby water bodies.

i. Location/description of most recent wetland and habitat information (e.g., maps)

Wetland delineations on the CRN Site were conducted by TVA for the CRN Programmatic Environmental Impact Statement (PEIS) between January and June 2021 to determine wetland presence, extent, and condition. The 2021 wetland assessment included a review of delineations conducted between 2011 and 2015 within the CRN project area, verification and update of previously mapped wetland features and their condition, and mapping of wetlands not previously documented. Wetland determinations

were conducted in accordance with United States Army Corps of Engineers (USACE) methods which require documentation of hydrophytic vegetation, hydric soils, and wetland hydrology. Broader definitions of wetlands, such as those provided by Executive Order (EO) 11990, the United States Fish and Wildlife Service (USFWS), and TVA Environmental Review Procedures, also were considered in the 2021 wetland determinations for the project area. TVA used the Tennessee Rapid Assessment Method (TRAM) during the 2021 delineations to evaluate wetland conditions. TRAM quantifies wetland function and ranks wetlands into three categories, including low, moderate, or exceptional resource value, based on six metrics coordinating to indicator functions.

There are 5 wetlands in the vicinity of the CRN-1 RB excavation that could potentially be impacted by excavation of the CRN-1 RB. These wetlands are provided in the following table.

Wetlands Delineated in the Project Area (2021)			
Wetland ID	**Wetland Type[1]**	**TRAM Category[2]**	**Total Wetland Acreage**
W010	PFO1E	Moderate	0.36
W011	PEM/PSS1E	Low	0.48
W012	PEM1E	Low	0.07
W013	PEM1E	Low	0.13
W014	PEM1E	Low	0.15
		TOTAL	1.19

1) Classification codes as defined in Cowardin, L. M., Carter, V., Golet, F. C., and LaRoe, E.T., 1979. Classification of Wetlands and Deepwater Habitats of the United States. Performed for U.S. Department of the Interior, Fish and Wildlife Service, Office of Biological Services, Washington, D.C.: E = seasonally flooded/saturated; P = Palustrine; EM1 = emergent, persistent vegetation; SS1 = scrub-shrub broad-leaved deciduous; FO1 = forested broad-leaved deciduous

2) TRAM Category as defined by Tennessee Department of Environment and Conservation (TDEC), 2017. Tennessee Rapid Assessment Method for Wetlands. Nashville Tennessee: Division of Water Resources, Natural Resources Unit: Low – low resource value; Moderate – moderate resource value

Figure 2 provides a map showing the surface water resources in the vicinity of the CRN-1 RB excavation. This map includes wetland and surface water resources and the anticipated extent of disturbance associated with the CRN-1 RB excavation.

j. Location/description of surface water resources (e.g., maps)

In 2021, TVA updated the surface water resource delineations and functional assessments for streams and ponds located on the CRN site in conjunction with the preparation of the PEIS. There is one ephemeral stream, identified as EPH09, in the vicinity of the CRN-1 RB excavation. As noted above, a map showing the surface water resources in the vicinity of the CRN-1 RB excavation is provided as Figure 2. This map includes wetland and surface water resources and the anticipated extent of disturbance associated with the CRN-1 RB excavation.

k. Site drainage patterns, discharge locations

The portion of the CRN Site in the immediate vicinity of the CRN-1 RB excavation lacks identified drainage features because this area was substantially disturbed by the Clinch River Breeder Reactor Project (CRBRP). TVA anticipates creating a settlement basin in the vicinity of the CRN-1 RB excavation to store water that would need to be removed from the excavation. This settlement basin will be within the anticipated extent of the primary disturbance area associated with the CRN-1 RB excavation depicted in Figures 1 and 2, and within those areas previously evaluated as disturbed areas in TVA's ESPA ER (Refer to ER Figure 3.1-2, CRN Site Cleared Areas) and the NRC ESP FEIS (Refer to FEIS Figure 2-2, Clinch River Nuclear Site Utilization Plan) supporting issuance of ESP-006. Specific plans for discharge from the settlement basin are not yet known. However, an area encompassing the potential discharge location is depicted on Figures 1 and 2. Figure 2 includes wetland and surface water resources in the vicinity of the CRN-1 RB excavation and the anticipated extent of disturbance associated with the CRN-1 RB excavation. The actual disturbance would be limited to a few acres within a single drainage feature somewhere within this footprint. The majority of this area would remain undisturbed during the RB excavation.

l. Geologic characteristics

The geologic conditions at the CRN Site are described in Section 2.6 of the ESPA ER and Section 2.8 of the NRC ESP FEIS. In conjunction with the potential future deployment of CRN-1, supplemental geotechnical borings were conducted to obtain additional information for the Construction Permit Application (CPA) Preliminary Safety Analysis Report. Supplemental confirmatory borings within specific safety-related structures were performed to inform the design regarding foundation requirements and the potential for specific karst features. New information obtained from these borings confirmed the geological characteristics of the CRN Site described during the ESP proceedings, including structural geology and subsurface conditions, and provided no new or different understanding of the geology of the CRN Site from that previously documented in the ESPA ER and the NRC ESP FEIS.

m. Surface and groundwater connections/interaction

Groundwater flow direction in the region is generally from the topographic highs of the ridges to the topographic lows of the valley. Synoptic groundwater level measurements show a similar flow direction at the CRN Site from the topographic highs in the northeast to the topographic lows toward the Clinch River arm of the Watts Bar Reservoir in the southwest.

Figures depicting seasonal potentiometric surface contours and approximate groundwater flow direction are provided as Figures 3, 4, 5, and 6 in the Figures section of this document.

n. Radiologic characteristics

There are no operating plants on or adjacent to the CRN Site. Thus, TVA does not anticipate construction workers will be exposed to radioactive materials during CRN-1 RB excavation and installation of the initial ground support system.

o. Changes to direct Area of Potential Effects (APE) since the ESP FEIS and TVA PEIS

The onsite direct APE for development of the CRN Site and construction of CRN-1 is unchanged from that described and documented in the ESPA ER and the NRC ESP FEIS. TVA has completed consultation on the CRN-1 project and, therefore, is not consulting separately on the early excavation effort. As a result, TVA has not defined a separate APE for the CRN-1 RB excavation and installation of the initial ground support system described in the exemption request. The offsite APE described in the NRC ESP FEIS resulted from the proposed addition of a bypass flow system through an existing part of the Melton Hill Dam structure to maintain a minimum flow to support power operations. The offsite APE is not applicable to the excavation or the exemption request. The applicability of the offsite APE to the proposed CRN-1 project will be addressed in TVA's Environmental Report associated with the CPA.

All activities associated with the exemption request are within the onsite direct APE.

To avoid and minimize impacts to archaeological resources at the CRN Site, TVA has executed a Programmatic Agreement (PA) with the Tennessee State Historic Preservation Officer (TNSHPO) to address the management of cultural resources affected by the CRN Site small modular reactor project (*Programmatic Agreement between the Tennessee Valley Authority and the Tennessee State Historic Preservation Office regarding the management of historic properties affected by the Clinch River SMR Project*). The PA stipulates the steps that TVA would take to make needed changes to the APE as project plans develop; identify historic properties in the APE; evaluate the project's potential effects on historic properties; and seek ways to avoid, minimize, or mitigate adverse effects on historic properties.

The PA records the terms and conditions agreed upon to resolve potential adverse effects of the undertaking and remains in effect until construction of the project is complete or the project is otherwise terminated. In accordance with the stipulations of the PA, TVA would seek ways to avoid or minimize adverse project impacts on National Register of Historic Places (NRHP)-eligible archaeological sites, and if avoidance or sufficient minimization are not possible, TVA would mitigate the adverse effects in accordance with the stipulations of the PA. TVA would consult with the TNSHPO and federally recognized tribes throughout the process.

Invited concurring parties to the PA are the Eastern Band of the Cherokee Indians and the United Keetoowah Band of the Cherokee Indians in Oklahoma.

p. Changes to indirect APE since ESP FEIS and TVA PEIS

The onsite indirect APE for development of the CRN Site and construction of CRN-1 is unchanged from that described and documented in the ESPA ER and the NRC ESP FEIS. TVA has completed consultation on the CRN-1 project and, therefore, is not

consulting separately on the early excavation effort. As a result, TVA has not defined a separate APE for the CRN-1 RB excavation and installation of the initial ground support system described in the exemption request.

q. Changes to identified historic properties since TVA Programmatic EIS
The CRN-1 RB excavation and installation of the initial ground support system is confined to a small portion of the CRN-1 site previously disturbed during the construction activities associated with the former CRBRP.
There are no NRHP-listed, eligible, or potentially eligible historic properties or archaeological sites that could potentially be impacted by CRN-1 RB excavation and installation of the initial ground support system, and none of the activities associated with the exemption request would overlap, intersect, or otherwise impact historic and cultural resources (eligible or ineligible for listing in the NRHP).

r. Changes to identified historic properties' eligibility since TVA Programmatic EIS
No listed/eligible/potentially eligible properties were identified in this area by TVA's surveys.

s. Description of archaeological or built environment surveys since U.S. NRC ESP FEIS or the TVA PEIS
No such surveys have been performed other than those completed for the NRC's ESP FEIS and TVA's PEIS.

t. Description of any wildlife surveys and known threatened and endangered species
Vegetation field surveys of the CRN Site and associated offsite areas were conducted by TVA between September 2020 and June 2021 for the CRN PEIS. Field surveys were conducted across the entire CRN Site, the associated 161-kV offsite transmission line corridor and within proximity of the proposed offsite barge facility expansion area. No trees or caves are present within the proposed excavation area. Therefore, there is no suitable bat roosting habitat present.
The ESPA ER describes one approximately 1.4-acre disturbed cedar glade located in the center of the southern part of the CRN Site within the existing 161-kV transmission line right-of-way and the presence of several native species found in cedar glade habitat on other areas of the site. The 2020-2021 surveys confirmed this glade is still present. This glade is located approximately 400 ft northeast of the proposed excavation area and would not be affected by the excavation activities. No threatened or endangered plant species are present within the proposed excavation area.
Terrestrial wildlife and habitat field surveys of the CRN Site and associated offsite areas were conducted by TVA between January and May 2021 and in November 2023. During these surveys, two active osprey nests were located on large transmission line structures close enough to the proposed excavation area that excavation activities could occur within the nest disturbance buffers. Avoidance, minimization, and mitigation practices implemented in coordination with U.S. Department of Agriculture Wildlife Services to comply with EO 13186 (Responsibilities of Federal Agencies to Protect

Migratory Birds), such as removal and/or relocation of nests, creation of alternative osprey nesting platforms, or installation of deterrents to provide nesting opportunities away from the site are being conducted by TVA on an ongoing basis in conjunction with CRN Site management practices to reduce potential presence of osprey nests within lands potentially disturbed by construction activities.

The following table lists the federally and state-listed terrestrial species potentially present in Roane County within 5 miles of the CRN Site, whether there is potentially suitable habitat for these species within the proposed excavation area, and whether members of the species have been observed within the proposed excavation area. Greater details regarding threatened and endangered species at the CRN Site are available in TVA's *Clinch River Nuclear Site Advanced Nuclear Reactor Technology Park Final Programmatic Environmental Impact Statement* (2022).

Federally and State-Listed Terrestrial Species Documented within Roane County and Within 5 miles of the CRN Site, Suitable Habitat Within Proposed Excavation Area, and Species Documentation Status Onsite

Common Name	Scientific Name	Federal Status[2]	State Status[2]	State Rank[3]	Habitat Present Onsite?	Species Documented Onsite?
Amphibians						
Four-toed salamander	*Hemidactylium scutatum*	-	D	S3	Yes	No
Hellbender	*Cryptobranchus alleganiensis*	PS[4]	E	S3	Yes	No
Birds						
Bachman's sparrow	*Aimophila aestivalis*	-	E	S1B	Yes	No
Bald eagle	*Haliaeetus leucocephalus*	DL	D	S3	No	No
Cerulean warbler	*Setophaga cerulea*	-	D	S3B	Yes	No
Sharp-shinned hawk	*Accipiter striatus*	PS[4]	-	S3B,S4N	Yes	Yes
Swainson's warbler	*Limnothlypis swainsonii*	-	D	S3	Yes	No
Whooping crane	*Grus americana*	EXPN	-	SX	No	No
Mammals						
Gray bat	*Myotis griscesens*	E	E	S2	No	No
Northern long-eared bat	*Myotis septentrionalis*	E	E	S1S2	No	No
Indiana bat	*Myotis sodalis*	E	E	S1	No	No
Little brown bat	*Myotis lucifugus*	-	T	S3	No	No
Meadow jumping mouse	*Zapus hudsonius*	PS[4]	-	S4	Yes	No
Southeastern shrew	*Sorex longirostris*	-	-	S4	Yes	No
Tricolored bat	*Perimyotis subflavus*	PE	T	S2S3	No	No
Insects						
Monarch	*Danaus plexippus*	C	-	S4	Yes	No

2. Excavation-related activities

TVA currently plans to excavate for the CRN-1 RB to a depth of 115 feet deep. The anticipated diameter of the excavation is 132 feet. TVA plans to remove overburden soils using standard excavation methods and using drilling and blasting to remove competent rock. Spoils would be removed from the excavation using standard front-end loaders and rock buckets via crane. TVA is currently planning to excavate competent rock in lifts. TVA anticipates blasts to occur weekly, during daytime hours.

a. Excavation-related work schedule

TVA has developed a preliminary schedule assuming a January 2025 start date. The following table provides a preliminary milestone schedule.

Preliminary Unit 1 Reactor Building Shaft Excavation Milestone Schedule		
Activity	**Start**	**Complete**
Mobilization	1/25	3/25
Stage 1 Excavation (Overburden)	3/25	4/25
Lift 1 Excavation (Weathered Rock)	4/25	5/25
Lift 2 Excavation (Competent Rock)	5/25	6/26
Lift 3 Excavation (Competent Rock)	6/25	7/25
Lift 4 Excavation (Competent Rock)	7/25	8/25
Lift 5 Excavation (Competent Rock)	8/25	9/25
Lift 6 Excavation (Competent Rock)	9/25	10/25
Lift 7 Excavation (Competent Rock)	10/25	11/25
Lift 8 Excavation (Competent Rock)	11/25	12/25
Lift 9 Excavation (Competent Rock)	1/26	2/26
Lift 10 Excavation (Competent Rock)	2/26	2/26
Lift 11 Excavation (Competent Rock)	2/26	3/36
Lift 12 Excavation (Competent Rock)	3/26	4/26
Lift 13 Excavation (Competent Rock)	4/26	5/26

Typical work activities in Lifts 1-13 include:

- Drilling and Blasting
- Excavating Spoils
- Rock Cleaning (competent rock)
- Rock Inspections (competent rock)
- Rock bolting (competent rock - if required)
- Shotcrete application (competent rock)
- Removing equipment in shaft in preparation for next layer of blasting
- Water infiltrating the excavation will be pumped to the settlement basin (if required) at each successive lift

b. Estimated volume of spoils

The CRN-1 RB excavation will take place starting at the existing plant grade of 800 feet. TVA initially estimates that approximately 14 feet of overburden soil, 6 feet of weather rock and 95 feet of competent rock will be removed. Volumes for each of these are below.

TVA has developed a preliminary estimate of the volume of materials to be removed:

- Overburden: 7,095 cubic yards
- Weathered Rock: 3,041 cubic yards
- Competent Rock: 48,151 cubic yards

c. Workforce size and shift schedules

The current workforce size is estimated to be 25 to 30 personnel per shift, with 2 shifts on a 5-day, 10-hour work schedule.

d. Duration and peak time of excavation-related work

The current duration of excavation is estimated to be 16-18 months. Peak time of excavation related work will occur during the excavation of the competent rock, Lifts 2-13 (see schedule above).

e. Horizontal gravity drains/weep holes

The recommended method for removing groundwater infiltration into the RB excavation is through low point sumps and standard construction pumping equipment. TVA is planning to develop a detention area. TVA anticipates utilizing shotcrete on exposed walls to minimize groundwater intrusion and it is anticipated that gravity drains will be used to manage the flow to sump areas. If seams of groundwater inflow are found during the excavation of the competent rock, gravity drains will be installed to minimize the impact on the shotcrete surface.

f. Dewatering rate, duration, disposal, monitoring

The rate at which groundwater will enter the excavation has not yet been determined. TVA has reviewed site data and information from the CRBRP that indicates that minimal groundwater infiltration is expected because groundwater occurs primarily in the upper, weathered zones. TVA will address storm water management as part of the excavation project. As the excavation proceeds through each lift, low point sump collection features will be installed to remove groundwater from the excavation. Current geotechnical data indicates the majority of groundwater flow is expected to be through the weathered rock layer. TVA is exploring methods to hold back the soil overburden and significantly reduce any groundwater inflow through the weathered rock. Groundwater, or any other water that enters the excavation, will be removed by pumping it to a settlement basin.

g. Water treatment or storage

TVA will develop a project-specific water treatment plan to accommodate discharge of stormwater and non-stormwater sources resulting from required activities for CRN-1 RB

excavation. The provided treatment shall also address anticipated flow rates and volumes and allow for adequate retention and water storage prior to discharge. The project-specific water treatment and retention plan will be used to obtain all required water permitting for authorized discharge of stormwater and allowable non-stormwater sources during excavation activities. Permit compliance will ensure effluents meet water quality criteria in the receiving water body.

h. Site preparation (e.g., grubbing or ground disturbance)

Ground disturbance activities are expected to take place within the immediate area of the CRN-1 RB excavation. The footprint of the proposed CRN-1 RB is fully within the Power Block Area depicted in TVA's Clinch River ESPA ER (Refer to ER Figure 2.1-3, CRN Site Layout) and the NRC FEIS (Refer to FEIS Figure 2-2, Clinch River Nuclear Site Utilization Plan) supporting issuance of ESP-006.

Maps showing the location of the CRN-1 RB excavation are provided in the Figures section of this document. Figures 1 and 2 provide an overlay of the location of the CRN-1 RB excavation with the disturbed area evaluated in the ESPA ER and the NRC ESP FEIS.

TVA is evaluating the need to improve existing roads. However, these improvements would primarily support overall site preparation and other pre-construction activities, rather than the CRN-1 RB excavation. The portion of the existing access road on the west side of the CRN-1 RB excavation within the anticipated extent of disturbance associated with the CRN-1 RB excavation will be relocated and remain within the disturbance area depicted on Figures 1 and 2.

i. Activities in barge and traffic area

There are no activities planned in the barge and traffic area to support CRN-1 RB excavation or the installation of the initial ground support system.

j. Access road widening

TVA does not anticipate any road widening to support CRN-1 RB excavation and installation of the initial ground support system.

k. Types of equipment

Anticipated equipment that will be needed to support the excavation are:

- Crane(s)
- Front End Loader(s)
- Rock Bucket(s) for spoil removal
- Rock crusher (crush spoils)
- Compressors (for air changeouts in the excavation)
- Drilling rigs (for blasting and rock bolts)
- Power washers
- Shotcrete equipment
- Non-potable water trucks
- Lighting detection equipment

- Explosive trucks (during installation of explosive charges only)
- Fuel trucks (fueling equipment)
- Pumps (sump and mud)

The number of pieces, size, and height of equipment necessary to perform the activities associated with the exemption request are bounded by the equipment described in the ESPA ER and the NRC ESP FEIS.

l. Potable and sanitary water use source and amount

TVA will provide bottled (i.e., potable) water to the site during CRN-1 RB excavation and installation of the initial ground support system. Sanitary waste will be managed using temporary portable sanitary facilities, minimizing requirements for sanitary water. A licensed contractor would be used to service the portable toilets, thereby precluding adverse impacts to the quality of nearby water bodies.

m. Estimated sanitary waste, solid waste, and gaseous effluents

During the excavation activities, sanitary waste will be managed using temporary portable sanitary facilities. Solid wastes generated by the excavation activities could include typical industrial wastes such as metal, wood, and paper, as well as process wastes including potentially hazardous and universal wastes. Sanitary and solid waste management practices and procedures would comply with applicable federal, state, and local requirements and standards for handling, transporting, and disposal of solid waste, as well as multiple internal TVA practices and procedures. Estimated quantities of sanitary and solid wastes are not available at this time. Sanitary and solid wastes will be handled by contracted licensed vendors.

The equipment required to support excavation activities would include gasoline and diesel-powered engines and emit the air pollutants normally associated with mobile fossil-fuel powered equipment. All diesel equipment would use low sulfur fuel and are expected to be equipped with all required pollution controls. The increase in emissions from the equipment would be similar to that of a small to moderate sized industrial site.

3. Permits needed (local, State, Federal, and Tribal as applicable)

TVA anticipates the following permits will be obtained to support CRN-1 RB excavation and installation of the initial ground support system:

a. Tennessee Construction General Permit (CGP) (a stormwater pollution prevention plan (SWPPP) is required to be prepared and submitted to the Tennessee Department of Environment and Conservation (TDEC) to obtain coverage under the CGP),

b. Tennessee Aquatics Resource Alteration Permit (ARAP) (Section 401 certification), and

c. U.S. Army Corps of Engineers (USACE) Section 404 permit.

TVA sent a letter to the USACE Nashville District on May 23, 2023, requesting an Approved Jurisdictional Determination (AJD) for those aquatic features with questionable

jurisdictional status located within the potential project boundary. The letter also included a request for a Preliminary Jurisdictional Determination for all other aquatic features on site. On October 17 and 24, 2023, USACE visited the CRN Site to assess the federal jurisdictional status of wetlands and streams and drainage features on site. Visual observation of stream and drainage features and wetland delineations were made during these site visits in response to the May 2023 submittal. Updates to the request were made based on the field review and these updates were submitted to the USACE on December 15, 2023. Updated shapefiles, reflective of the observations documented during the USACE's site visits, were provided to the USACE on March 14, 2024.

TVA will pursue any necessary USACE/404 permit coordination to support the CRN-1 RB excavation upon completion of 60% engineering design drawings. If 60% design indicates impacts to potentially federally regulated aquatic features, but the AJD has not yet been issued, TVA would submit for 404 permit coverage stating the AJD is pending. TVA's application to USACE would include documentation of TVA's NRHP Section 106 and Endangered Species Act Section 7 consultation for the entirety of the CRN Site. If the CRN-1 RB excavation is not anticipated to impact federally regulated features, TVA will request a letter of "No Permit Required" from the USACE, including and referencing site-wide NRHP Section 106 and ESA Section 7 consultation. The USACE would not issue this letter until the AJD is completed, because the justification for the letter would be the AJD. Impacts to Tennessee "waters of the State" are anticipated to result from proposed activities (regardless of their federal jurisdictional status), and TVA will apply for the required state water permitting (Aquatic Resource Alteration Permit [ARAP]) to support the CRN-1 RB excavation.

4. Programs and procedures

   a. Worker health safety

      Workplace health and safety regulations are designed to eliminate personal injuries and illnesses from occurring in the workplace. The Occupational Safety and Health Act (OSH) is the main statute protecting the health and safety of workers in the workplaces. TVA has a robust safety conscious culture that is focused on awareness and understanding of workplace hazards, prevention, intervention, and active integration of Best Management Practices (BMPs) to avoid and minimize hazards.

      Personnel at TVA are well trained regarding health and safety practices and are conscientious in following procedures for reducing or eliminating occupational hazards through implementation of safety practices, training, and control measures. All personnel (inclusive of TVA and its contractors) working on CRN-1 RB excavation activities would have all appropriate training and certifications prior to starting work on the project. Programs and processes for workplace safety that are communicated to work crews include the following:

      - *Pre-Job Brief* – allows the worker to think through a job and use that knowledge to make the job as safe as possible.

- *Two-Minute Rule* (situational awareness) – take time before starting a job to familiarize yourself with the work environment and to identify conditions that were not identified during the pre-job brief.
- *Stop When Unsure* – when confronted with a situation that creates a question and what to do is uncertain, stop and get help.
- *Self-Check* – use of "STAR" acronym to promote self-check awareness: **S**top and focus, **T**hink what would happen with right or wrong action, **A**ct correctly, **R**eview that the results are as expected.
- *Procedure Use and Adherence* – allows for proper application of procedures and work packages based on expected activities.
- *Flagging and Operational Barriers* – key to ensure control of the work zones and avoidance of exposure to work hazards by public.
- *Three-Way Communication* – essential for all job tasks to ensure they are completed safely and productively.

TVA's Safety Standard Programs and Processes would be strictly adhered to during the implementation of the proposed actions. The safety programs and processes are designed to identify actions required for the control of hazards in all activities, operations, and programs. It also establishes responsibilities for implementing the OSH Act and state requirements.

b. Spoils/stockpile management/disposal

Spoils management is described in section 3.9.2.1 of the ESPA ER. Consistent with what is described in the ESPA ER, temporary spoils areas would be established on the CRN Site to manage materials from clearing, grubbing, and excavation activities associated with CRN-1 RB excavation and installation of the initial ground support system.

In accordance with TVA's, "*A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Construction and Maintenance Activities"* (Revision 4 dated 2022) (2022 BMP Manual), any spoil accumulated from grading, trenching, foundation work, or line structures / poles would be spread back onsite and the area re-graveled/re-surfaced. Offsite spoil areas are subject to environmental review and compliance requirements. If any spoil is taken offsite, it would be tested, handled, and disposed of in accordance with TVA procedure TVA-SPP-05.053 (Soil Placement and Disposal), which provides guidance for onsite and offsite placement of spoils, as well as all state and federal regulations.

Drainage control measures for the spoil piles may include berms, riprap, sedimentation filters, and a settlement basin to control stormwater runoff before its release to the Clinch River arm of the Watts Bar Reservoir or surrounding property.

c. Stormwater pollution prevention/spill prevention
Stormwater discharges from construction sites in the State of Tennessee that involve clearing, grading, or excavation that result in an area of disturbance of one or more acres are regulated by the TDEC under the National Pollutant Discharge Elimination System General Permit for Discharges of Stormwater Associated with Construction Activities (previously defined as the CGP). A SWPPP with proposed BMPs (including measures to limit erosion and sedimentation) is required to be submitted to TDEC to obtain a CGP. No sensitive habitats or rare aquatic species are known to be present in the aquatic habitats potentially affected by building activities in the Reservoir adjacent to the CRN Site, or within the streams on or adjacent to the CRN Site. Compliance with the SWPPP and the lack of sensitive receptors would ensure potential effects on aquatic communities from CRN-1 RB excavation and installation of the initial ground support system would be minor, localized, and temporary.
The SWPPP will also address runoff from construction support areas, such as spoil or stockpile locations, equipment staging yards, and material storage areas, for authorization with the project's construction stormwater permit.

d. Employed best management practices
BMPs, mitigation measures, and commitments can avoid, minimize, or reduce adverse impacts to the environment. Impacts resulting from CRN-1 RB excavation and installation of the initial ground support system would be confined to a small portion of the CRN-1 site previously disturbed during the construction activities associated with the former CRBRP, and are fully within those disturbed areas previously evaluated in TVA's ESP ER (Refer to ER Figure 3.1-2, CRN Site Cleared Areas) and the NRC FEIS (Refer to FEIS Figure 2-2, Clinch River Nuclear Site Utilization Plan) supporting issuance of ESP-006.
Impacts resulting from CRN-1 RB excavation and installation of the initial ground support system would be minimized through the use of mitigative measures committed to by TVA through regulatory permitting processes and detailed excavation planning. Additional project-specific BMPs may be applied as appropriate on a site-specific or technology-specific basis to further reduce potential impacts on environmental resources.

- BMPs that would be implemented include those described in:
  - TVA's 2022 BMP Manual,
  - the Tennessee Erosion and Sediment Control Handbook, and
  - the project-specific stormwater pollution prevention plan (SWPPP).
- Water entering the CRN-1 RB excavation (including groundwater entry, surface water runoff, precipitation, and water to facilitate the excavation and rock face inspection processes) will be managed and controlled using BMPs that are instituted and maintained during the entire period that the excavation remains open in accordance with TDEC requirements.

- Stormwater detention would be incorporated into detailed excavation planning to ensure that runoff rates and discharge requirements are in compliance with all appropriate state and local requirements, including CGP limits.
- Accidental discharge of chemicals to surface water would be prevented by BPMs in accordance with CGP and federal and state requirements.
- Land clearing operations would be conducted in accordance with TVA BMPs described in the 2022 BMP Manual, and in a manner that would prevent any unnecessary damage to the remaining natural vegetation, would protect wetlands and streams to the extent practicable, and would prevent soil erosion.
- Nonhazardous and hazardous solid waste would be managed by TVA-approved solid waste disposal vendors and disposed of at state-approved, licensed facilities in accordance with TDEC solid waste regulations. The disposal vendor would be required to confirm that they would comply with all applicable federal, state, and local requirements and standards for handling, transporting, and disposing of nonhazardous or hazardous solid waste, as applicable.

e. Monitoring of water quality
Monitoring of water quality would be conducted in accordance with the CGP requirements. Additional treatment to ensure uncontaminated discharge to surface water would be included, and additional monitoring requirements for compliance purposes would be accommodated.

f. Avoidance and/or monitoring for known and identified eligible or potentially eligible historic properties
There are no NRHP-listed, eligible, or potentially eligible historic properties or archaeological sites that could potentially be affected by CRN-1 RB excavation and installation of the initial ground support system, and none of the activities associated with the exemption request would overlap, intersect, or otherwise impact historic and cultural resources (eligible or ineligible for listing in the NRHP).

g. Description of conversations, communications, or formal consultations with the Tennessee State Historic Preservation Offices, the Advisory Council on Historic Preservation, or Tribes
TVA consulted with the TNSHPO and federally recognized tribes in association with the ESPA ER. TVA, the TNSHPO, and United Keetoowah Band of Cherokee Indians in Oklahoma executed a Programmatic Agreement (PA) to address the management of cultural resources affected by the Clinch River SMR Project (*Programmatic Agreement between the Tennessee Valley Authority and the Tennessee State Historic Preservation Office regarding the management of historic properties affected by the Clinch River SMR Project*). The PA was initially signed in August 2015, was later revised, and signed again in 2016. No NRHP-eligible or listed sites are located within the proposed excavation area. TVA has conducted a Phase II testing investigation and consultation for the development of the CPA ER.

TVA has completed consultation on the CRN-1 project and, therefore, is not consulting separately on the early excavation effort.

h. Descriptions of any consultations and agreements with U.S. Fish and Wildlife Service

TVA anticipates initiating consultations with the U.S. Fish and Wildlife Service regarding all proposed construction-related activities associated with the CPA (not limited to the exemption request) in spring 2024. TVA will provide copies of the consultation correspondence to NRC as soon as it is available.

TVA is not consulting separately on the early excavation effort.

5. Potential impacts

a. Noise-related impacts to workforce and nearby residents

Activities associated with excavation of the CRN-1 RB and installation of the initial ground support system are consistent with similar activities considered in TVA's ESPA ER and the NRC ESP FEIS that included periodic blasting and other noise generating activities.

The NRC ESP FEIS did not identify any disproportionately high and adverse impacts from noise-related pathways, as noticeable construction noise impacts on the public would be limited to receptors in close proximity of the CRN Site. Furthermore, TVA would use standard noise control measures for construction equipment, limit the types of construction activities during nighttime and weekend hours, notify all potentially affected neighbors of planned activities, and establish a construction-noise monitoring program. Thus, offsite construction noise impacts are generally consistent with those described in the NRC ESP FEIS. However, the highest noise levels are short-term and temporary, and are minimized using the same measures described in the NRC ESP FEIS. Additionally, there are no identified minority or low-income communities in close proximity of the CRN Site.

To determine potential impacts to noise receptors, TVA assumed a conservative scenario in which the loudest piece of equipment (a rock pile driver) is operated at the boundary of the CRN Site closest to the receptor. Assuming straight-line noise attenuation, consistent with the analysis in the NRC ESP FEIS, maximum noise levels from the construction equipment attenuates to 77.5 dBA at the closest sensitive noise receptor. While this is greater than the noise level attenuation estimate from the NRC ESP FEIS (70.4 dBA) and the NRC's 65 dBA noise threshold for impacts, it represents a conservative scenario in which the loudest piece of equipment (a rock pile driver) is operated at the boundary of the CRN Site disturbance area closest to the receptor, as opposed to the equipment being in operation at the CRN-1 RB excavation. Sound levels from most standard construction equipment listed in the ESPA ER (e.g., backhoes, cranes, excavators, dozers, dump trucks) operate at less than 85 dBA at 50 feet from the source which attenuates to levels below the 65 dBA threshold at the nearest sensitive receptor.

In addition, impacts from blasting were assessed in the NRC ESP FEIS. As stated in the NRC ESP FEIS periodic blasting on the CRN Site would occur during construction

and preconstruction activities, which may produce noise levels that reach 126 dBA. Due to the isolated nature of the blasting events, the noise produced by the explosion and from the collapse of rock is not a continuous, background, or intermittent noise that would contribute to typical noise levels. An isolated explosive blast event may be equivalent to a thunderclap at the source but would be temporary and short-term.

b. Surface water resources impacts (e.g., changes in runoff patterns, pollutant discharges, dewatering discharge)

Details of the required stormwater management system would be developed during final excavation planning. BMPs will be deployed in accordance with the SWPPP and CGP to prevent impacts to surface water or other environmental resources. Stormwater, groundwater encountered in the excavation area, and water used for excavation activities would be treated (if necessary), collected in a settlement basin, and authorized for discharge to surface water in a controlled manner in accordance with the project specific SWPPP/CGP. The SWPPP would incorporate BMPs to minimize erosion and stabilize the land surface. BMPs would include methods described in the State of Tennessee Erosion and Sediment Control Handbook.

There are 5 wetlands identified for potential impacts (refer to 1(i)), of which W010 is connected to W014 by a wet weather conveyance (E009). TVA will obtain all necessary permits and perform mitigation activities, required, prior to impacting any surface water resource. Impacts from soil disturbing activities would be limited to the immediate area of the CRN-1 RB excavation. Implementation of erosion control procedures, compliance with the project CGP, and adherence to the site-specific SWPPP would ensure surface water impacts are limited.

Figures

(6 pages follow)

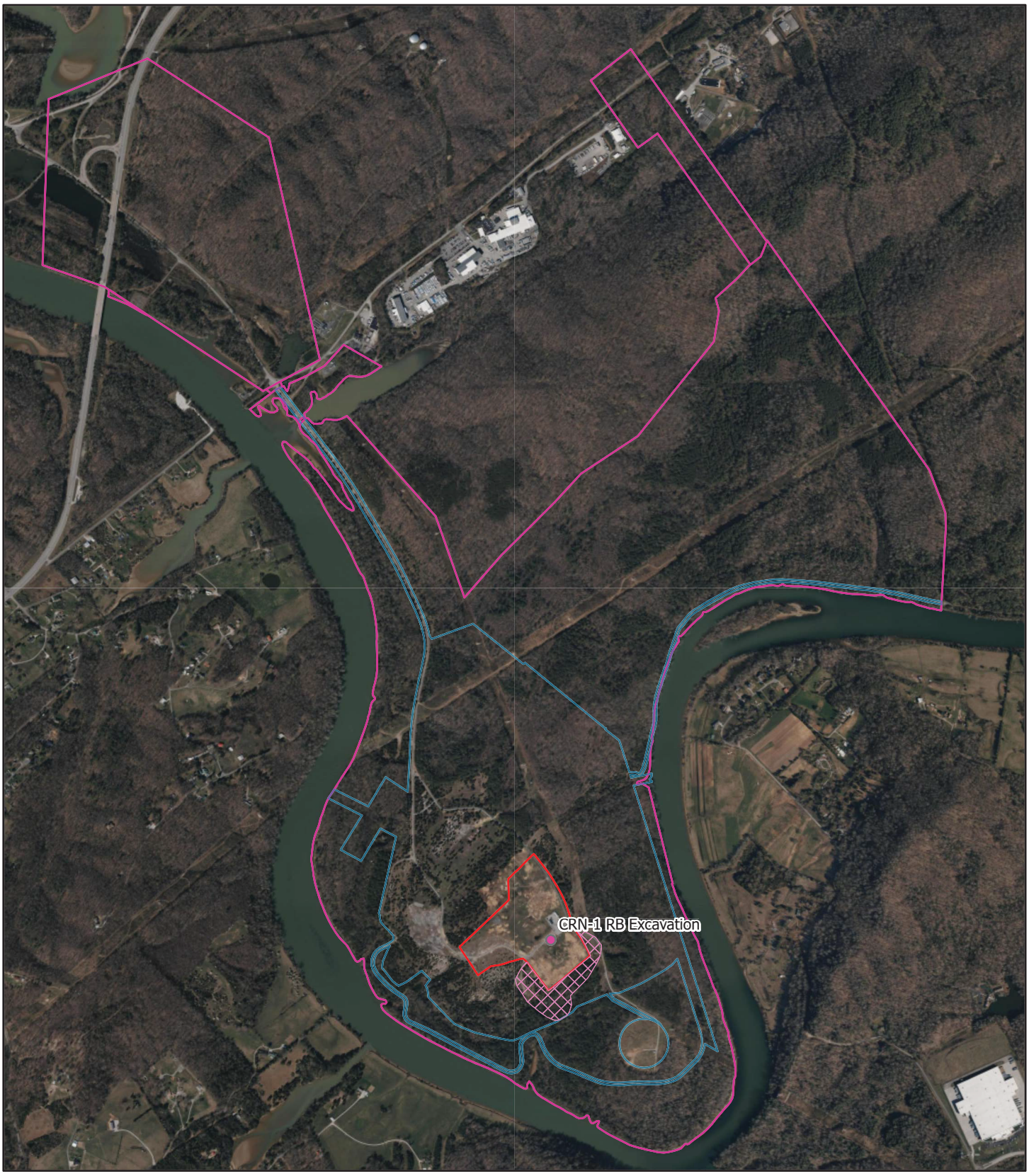
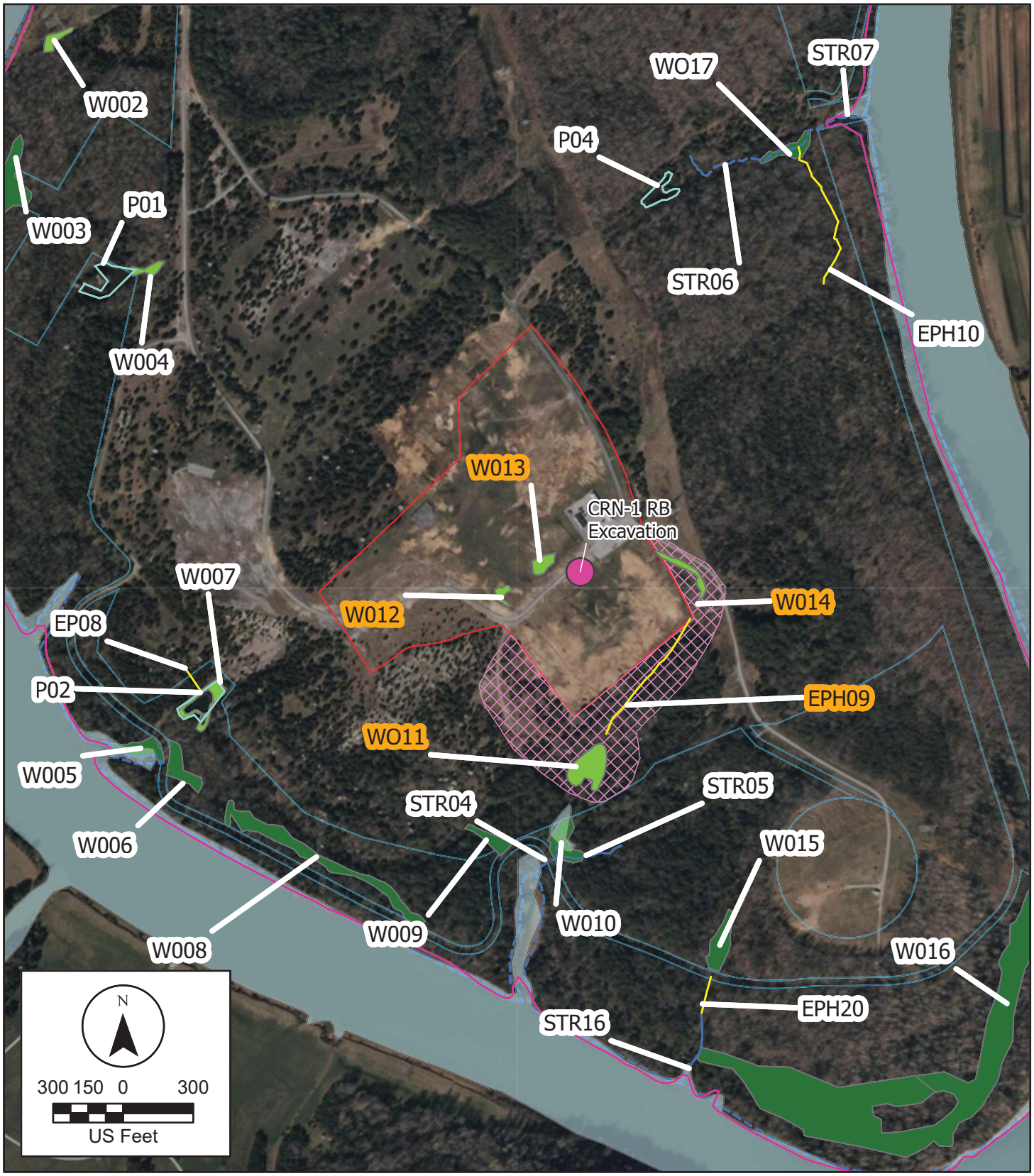

CRN-1 RB Excavation
Legend
CRN-1 RB Excavation
CRN Site Boundary
Permanent Disturbance Area Evaluated in the ESP
Estimated Primary Distrubance Area
Potential Settlement Basin Discharge Location
N
800400 0 800
US Feet

Figure 1



Legend

- CRN Site Boundary
- CRN-1 RB Excavation
- River or Lake
- Permanent Disturbance Area Evaluated in the ESP
- Potential Settlement Basin Discharge Location
- Estimated Primary Distrubance Area

Field Delineated Wetlands and Streams

Stream Type
- WWC/Ephemeral
- Perennial
- Intermittent
- Pond

Wetland Type
- Emergent
- Forested

Label Key

W = Wetland
P = Pond
STR = Intermittent or Perennial Stream
EPH = Wet Weather Conveyance/ Ephemeral Stream
WO14 = Potentially Disturbed Features

Figure 2

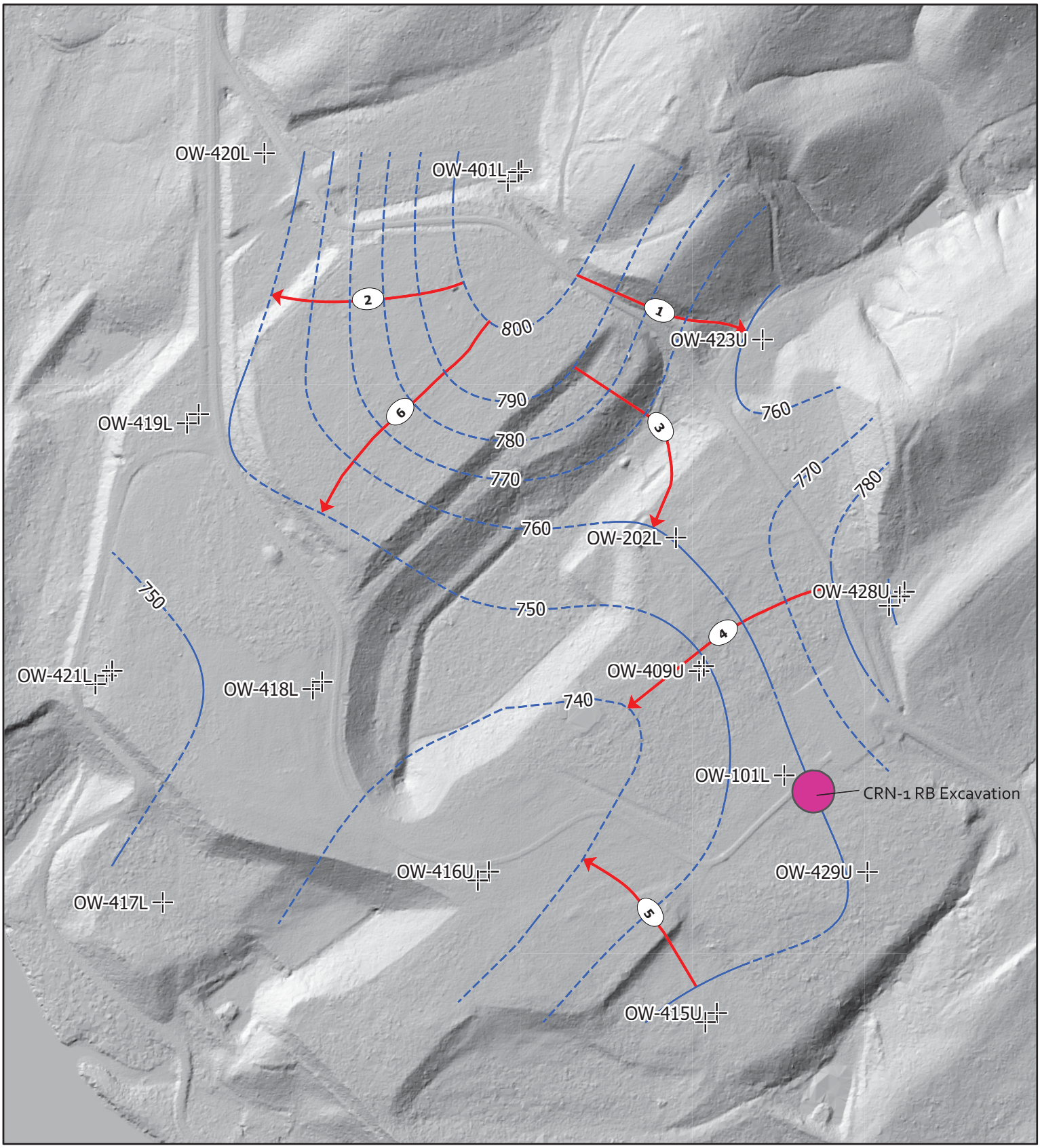
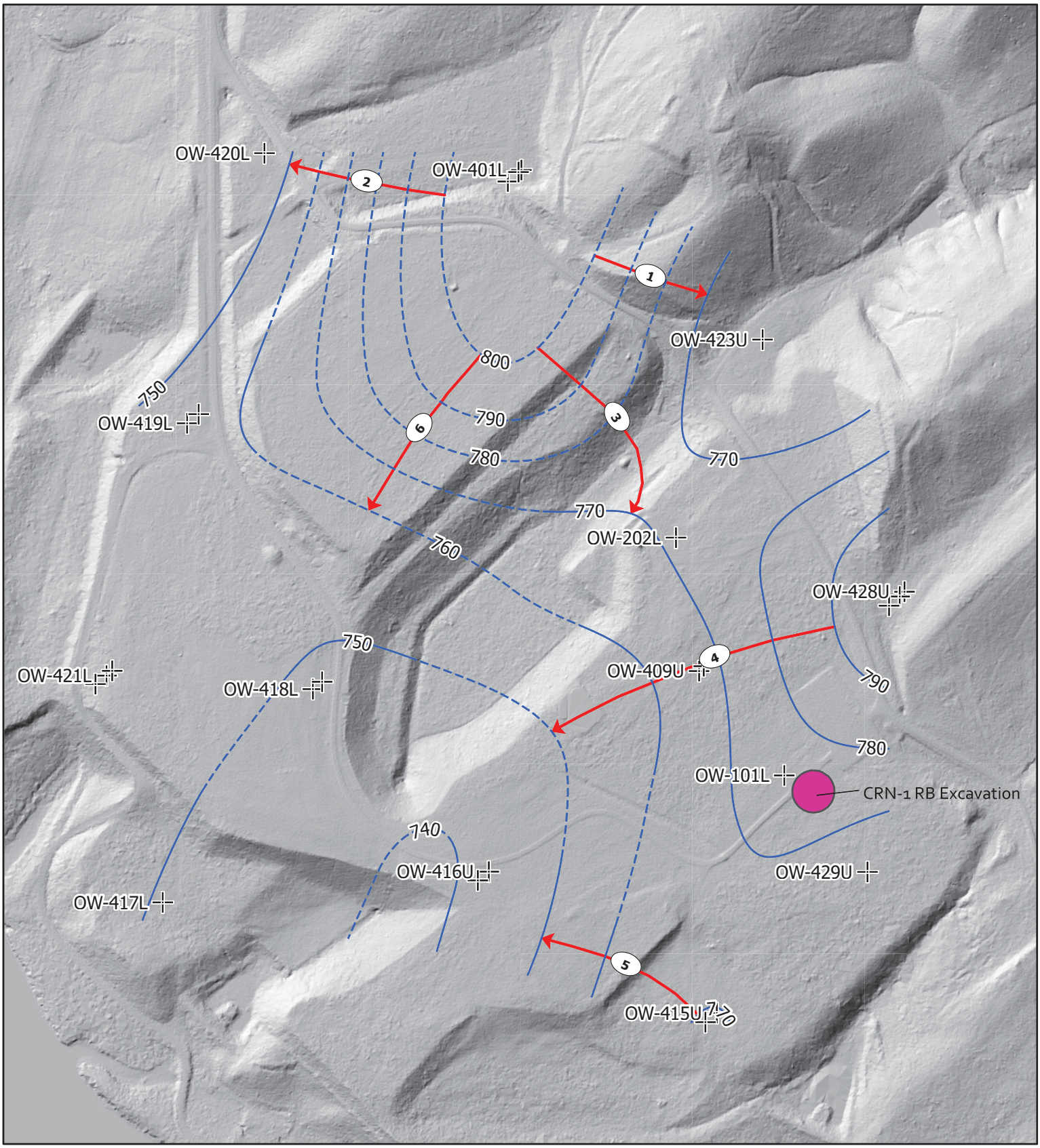

OW-420L
OW-401L
OW-423U
OW-419L
OW-202L
OW-428U
OW-409U
OW-421L
OW-418L
OW-101L
CRN-1 RB Excavation
OW-416U
OW-429U
OW-417L
OW-415U
800
790
780
770
760
750
740
1
2
3
4
5
6
Legend
Observation Well
Approximate Groundwater Flow Direction
Extrapolated Potentiometric Surface Contour
Potentiometric Surface Contour
CRN-1 RB Excavation
Date Collected: November 2022
N
200 100 0 200
US Feet

Figure 3



Legend

- Observation Well
- Extrapolated Potentiometric Surface Contour
- Potentiometric Surface Contour
- Approximate Groundwater Flow Direction
- CRN-1 RB Excavation

Date Collected: July 2023

N

200 100 0 200

US Feet

Figure 4

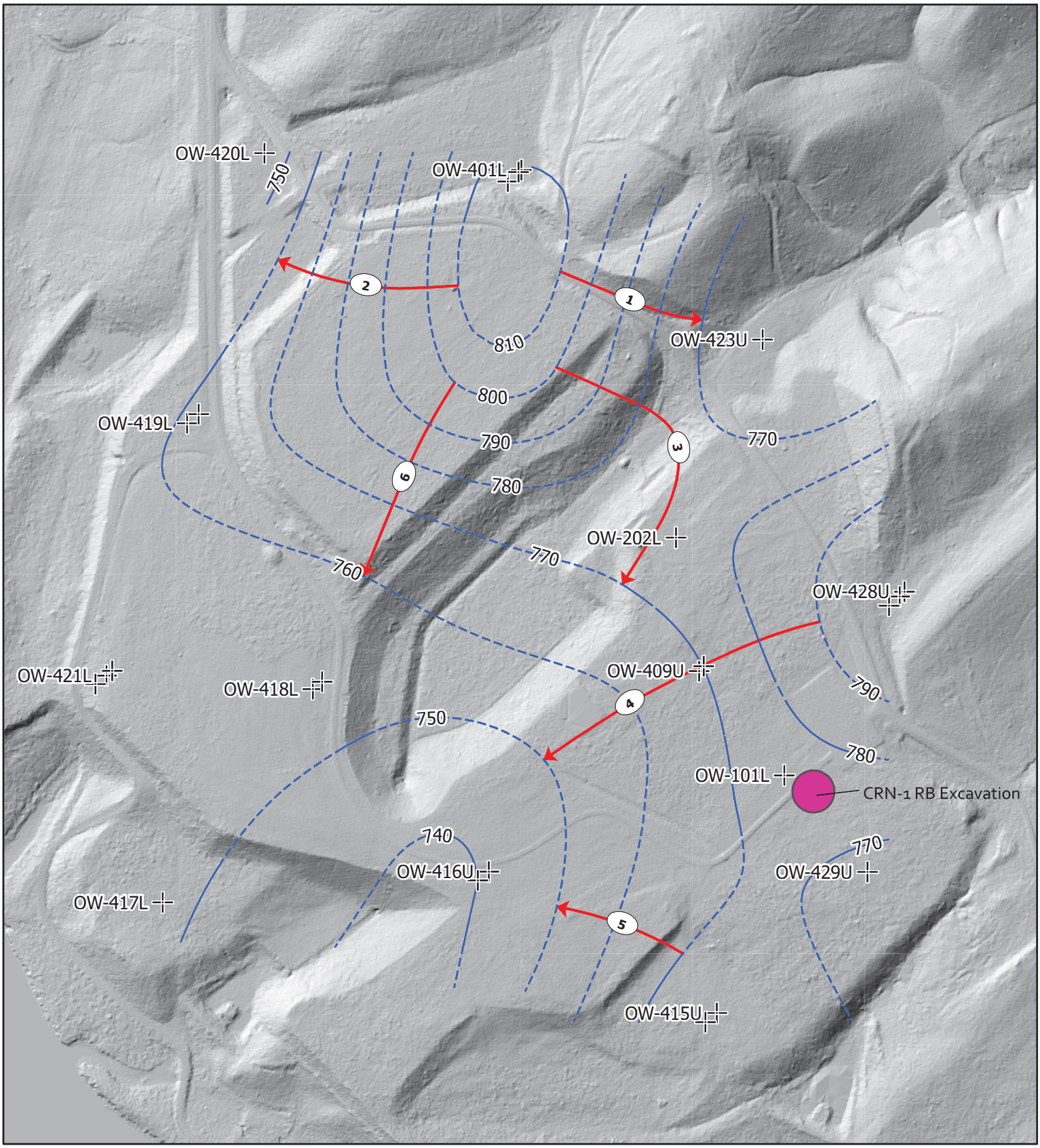
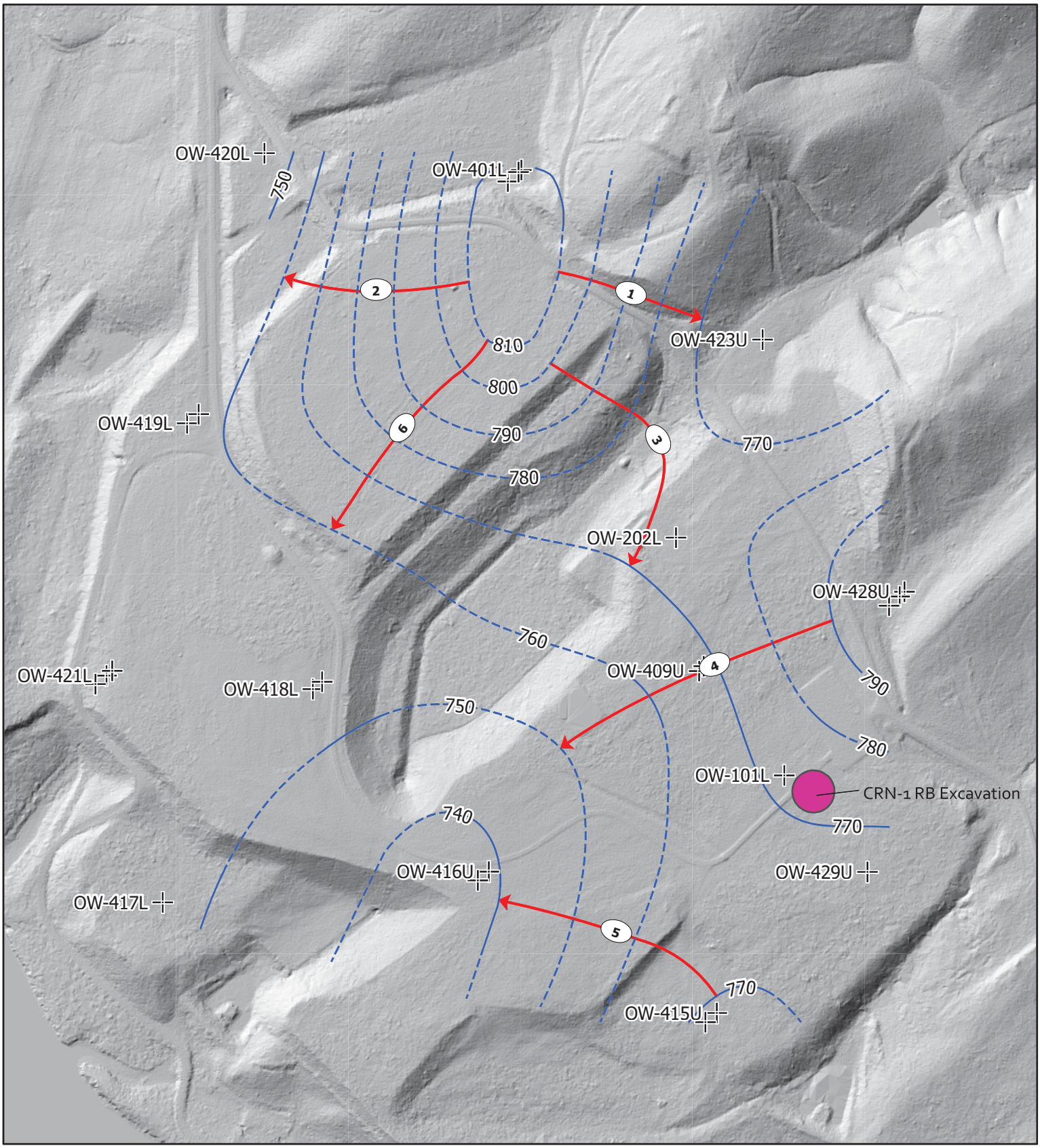

OW-420L
750
OW-401L
2
1
OW-423U
810
800
OW-419L
790
3
770
6
780
OW-202L
760
770
OW-428U
OW-421L
OW-418L
OW-409U
4
790
750
780
OW-101L
CRN-1 RB Excavation
740
OW-416U
770
OW-429U
OW-417L
5
OW-415U
Legend
Observation Well
Approximate Groundwater Flow Direction
Extrapolated Potentiometric Surface Contour
Potentiometric Surface Contour
CRN-1 RB Excavation
Date Collected: February 2023
N
200 100 0 200
US Feet

Figure 5



Legend

- Observation Well
- Approximate Groundwater Flow Direction
- Extrapolated Potentiometric Surface Contour
- Potentiometric Surface Contour
- CRN-1 RB Excavation

Date Collected: April 2023

N

200 100 0 200

US Feet

Figure 6