ICICLE CREEK ENGINEERS

Critical Area Report
Geotechnical Engineering Services
Preliminary Coal Mine Hazard Assessment
King County Parcel No. 302107-9080 (Lot Q)
Sections 19 and 30, Township 21 North, Range 7 East
Black Diamond Area, King County, Washington

October 18, 2021
ICE File No. 0102-016

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Prepared For:
Palmer Coking Coal Company, LLP

Prepared By:
Icicle Creek Engineers, Inc.

ICICLECREEK ENGINEERS

October 18, 2021

William Kombol, Manager
Palmer Coking Coal Company, LLP
P.O. Box 10
Black Diamond, Washington 98010

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1.0 INTRODUCTION

This Critical Area Report presents the results of Icicle Creek Engineers' (ICE's) preliminary coal mine hazard assessment within King County Parcel No. 302107-9080 (referred to as "Lot Q") that is owned and managed by Palmer Coking Coal Company, LLP (PCCC). Lot Q, which was created by a Boundary Line Adjustment (BLA) through King County, occupies about 240 acres in portions of Sections 19 and 30, Township 21 North, Range 7 East, Willamette Meridian, near Black Diamond in King County, Washington. The location of Lot Q relative to regional physical features is shown on the Vicinity Map, Figure 1. Lot Q is also shown relative to nearby physical features on the Site Plan, Figure 2.

ICE's services were completed in general accordance with our Confirming Agreement dated September 21, 2021 and were authorized in writing by William Kombol, Manager with PCCC, on September 21, 2021.

2.0 BACKGROUND INFORMATION

Mr. Kombol provided ICE with the following documents related to this project:

- Bennett Consulting, PLLC, January 11, 2017, Results of Gravel Exploration Drilling, Franklin Ridge-Fish Lake Parcels, King County, WA, prepared for PCCC, 24 pages.
- Bennett Consulting, PLLC, January 25, 2008, Report on the Coal Mine Subsidence Hazards and Surface and Ground Water Conditions, Franklin Ridge Mineral Rezone and Expansion Project, King County, Washington, prepared for PCCC, 11 pages.
- David Evans & Associates, March 9, 2020, 30-21-7 Rezone Site Plan for Palmer Coking Coal Company, LLP, prepared for PCCC, sheets 1 and 2.
- ESM Consulting Engineers LLC (ESM), July 19, 2021, Palmer Coking Coal, Hyde Mine, prepared for PCCC, sheets C-1 to C-7, C-11, C-12, C-22, C-23 and C-24.
- King County Department of Development and Environmental Services (DDES), July 30, 2006, Coal Mine Hazard on PCCC Enumclaw-Franklin Road Properties, Inquiry Number L06SA435, 28 pages.

ICE has previously completed preliminary coal mine hazard and hydrogeological assessments in the general area and including Lot Q. These reports are referenced as follows:

- ICE, May 2, 2006, Report, Geological Engineering Services, Preliminary Assessment of Coal Mine Hazards and Landslide/Steep Slope Hazards and Landslide Hazard Drainage areas, PCCC Enumclaw-Franklin Road Properties, Section 19-T21N-R7E and Section 30-21N-R7E, Black Diamond (King County), Washington, prepared for PCCC, 20 pages.
- ICE, November 4, 2016, Report of Geological Engineering Services, Hydrogeologic Assessment, Cannon Mine Abandoned Coal Mine Shaft, Gem Source – Alternative Water Source Evaluation, Section 10, Township 21 North, Range 7 East, King County, Washington, prepared for the City of Black Diamond, 29 pages.

3.0 PROJECT DESCRIPTION

We understand that PCCC is planning to submit a Rezone Application to King County related to sand and gravel resources within Lot Q. For this purpose, a Critical Area Report specific to Coal Mine Hazard Areas, which are regulated by King County, was requested by PCCC. Based on our review of the project plans (ESM, July 19, 2021), the plan is to mine sand and gravel resources across Lot Q down to about Elevation 720 feet (up to 80 feet below existing grade).

As previously described, ICE completed a preliminary coal mine hazard assessment and hydrogeologic assessment that included much of the Lot Q area in the previously referenced reports by ICE (May 2, 2006 and November 4, 2016). Because up to 80 feet will be mined within Lot Q, Mr. Kombol requested that ICE complete an update to the May 2, 2006 ICE report, regarding coal mine hazards, that will consider the surface elevation changes as result of this mining which may change the classification of the mine hazards within Lot Q.

4.0 SCOPE OF SERVICES

The purpose of our services was to complete a Preliminary Coal Mine Hazard Assessment for Lot Q generally consistent with the methods described in King County Zoning Code Title 21A.24.205/210. Specifically, ICE's services included the following:

- Review available coal mine hazard and gravel resource reports previously completed within and around Lot Q.
- Review available historic coal mine records from the Washington State Department of Natural Resources (DNR) and our in-house technical library to evaluate the location of the mined-out areas, together with the depth of mining, thickness of zone mined and mining methods.
- Complete mine mapping by superimposing the identified mines onto a property base map. We used a parcel base map from ESM for Elevation control and proposed mining areas. This map was used to provide a plan showing existing and post-mining depth to the abandoned underground coal mines.
- Classify the mine hazards as either: 1) Severe Coal Mine Hazard Areas, 2) Moderate Coal Mine Hazard Areas, or 3) Declassified Coal Mine Areas.

5.0 KING COUNTY COAL MINE HAZARD AREAS

The principal physical hazards associated with abandoned coal mines include 1) sinkholes (Severe Coal Mine Hazard Areas), 2) regional ground subsidence (Moderate Coal Mine Hazard Areas and Declassified Coal Mine Areas), and 3) mine rock fill (King County DDES, March 1999). Sinkholes form shallow depressions in the ground surface, or in extreme cases, a vertically-sided pit caused by collapse of poorly-backfilled mine openings or progressive failure of the mine roof. Regional ground subsidence occurs as

regional plastic deformation of the ground surface as the mine collapses. Mine rock fill includes stockpiles of mining by-products consisting of broken rock and coal.

King County DDES 2005 Zoning Code Chapter 21A.24.205 (updated September 20, 2021), defines "Coal Mine Hazard Areas" as follows:

A. Declassified coal mine areas are those areas where the risk of catastrophic collapse is not significant and that the hazard assessment report has determined do not require special engineering or architectural recommendations to prevent significant risks of property damage. Declassified coal mine areas typically include, but are not limited to, areas underlain or directly affected by coal mines at depths of more than three hundred feet as measured from the surface;

B. Moderate coal mine hazard areas are those areas that pose significant risks of property damage that can be mitigated by implementing special engineering or architectural recommendations. Moderate coal mine hazard areas typically include, but are not limited to, areas underlain or directly affected by abandoned coal mine workings from a depth of zero, which is the surface of the land, to three hundred feet or with overburden-cover-to-seam thickness ratios of less than ten to one depending on the inclination of the seam; and

C. Severe coal mine hazard areas are those areas that pose a significant risk of catastrophic ground surface collapse. Severe coal mine hazard areas typically include, but are not limited to, areas characterized by unmitigated openings such as entries, portals, adits, mine shafts, air shafts, timber shafts, sinkholes, improperly filled sinkholes and other areas of past or significant probability for catastrophic ground surface collapse; or areas characterized by overland surfaces underlain or directly affected by abandoned coal mine workings from a depth of zero, which is the surface of the land, to one hundred fifty feet. (Ord. 15051 § 158, 2004).

6.0 GEOLOGIC AND HYDROGEOLOGIC CONDITIONS

Regional mapping by the US Geological Survey (USGS - Geologic Map of the Cumberland, Hobart and Maple Valley Quadrangles, King County, Washington, 1969) indicates that the Lot Q area is mantled with Quaternary age glacial deposits (referred to as "Glacial Drift") that consist of silt, sand, gravel, cobbles and boulders. The Glacial Drift varies from a few feet to several tens of feet in thickness.

Bedrock referred to as "Puget Group" underlies the Glacial Drift and is present at the surface in the walls of the Green River gorge located west of Lot Q and adjacent to the northeast corner of Lot Q. Puget Group bedrock consists of interbedded sandstone, siltstone, shale, claystone, carbonaceous shale and coal beds (sedimentary rock). Structurally, the bedrock has been uplifted, folded and faulted over time. This structural deformation of the bedrock in this area has caused the sedimentary layering of the bedrock to dip from 20 to 70 degrees down to the west.

Based on our review of the gravel resource report (Bennett Consulting, January 11, 2017), five drill holes (FR-1 through FR-5) as shown on Figure 2 were completed to evaluate the mineral resource. Drill holes FR-1, FR-2 and FR-3 were completed within the King County regionally-mapped Coal Mine Hazard Area as shown on Figure 2.

Drill Hole FR-1 – Drill hole FR-1 encountered Recessional Outwash consisting of medium dense gravel with sand and occasional cobbles and boulders to a depth of about 78 feet. Underlying the Recessional Outwash, Drill hole FR-1 encounter Glacial Till (dense silty sand with gravel) and Advance Outwash (dense sandy gravel with variable amounts of cobbles and boulders to the completion depth at about 141 feet.

Drill Hole FR-2 – Drill hole FR-2 encountered Recessional Outwash to a depth of about 68 feet underlain by Glacial Till and Advance Outwash to the completion depth at about 146 feet.

Drill Hole FR-3 – Drill hole FR-3 encountered Recessional Outwash to a depth of about 108 feet underlain by Glacial Till to the completion depth at about 146 feet.

Drill Holes FR-4 and FR-5 encountered about 55 to 60 feet of Recessional Outwash underlain directly by sandstone and siltstone (bedrock) to the completion depths of 72 and 61 feet, respectively.

Collectively, the Recessional Outwash, Glacial Till and Advance Outwash are commonly referred to as Glacial Drift.

Groundwater was encountered at a depth of about 136 feet in Drill hole FR-1, 133 feet in Drill hole FR-2, 99 feet in Drill hole FR-3 and 42 feet in Drill hole FR-4. No groundwater was observed in Drill hole FR-5 (completion in bedrock at a depth of about 61 feet.

7.0 DESCRIPTION OF HISTORICAL UNDERGROUND COAL MINING

The north part of Lot Q is underlain by the Cannon Mine (McKay Coal Seam) and a portion of the Hyde Mine Drainage Tunnel. Other abandoned underground mines in the area of Lot Q include the Cannon Mine (Gem Coal Seam) and the Hyde Mine as shown on the Regional Abandoned Underground Coal Mine Map, Figure 3. Collectively, this group of mines, and others north of the Green River, are referred to as the "Franklin Mines." Also underlying a portion of Lot Q in Section 19 in the north part of Lot Q is a rock tunnel (referred to as the "Hyde Mine Drainage Tunnel") that is connected to the Hyde Mine. The Hyde Mine is located east of Lot Q, as shown on Figure 3, in Sections 20 and 29. Individually, the mines were operated on the McKay, Gem, No. 10 and No. 12 Coal Seams; only the Cannon Mine, McKay Coal Seam underlies Lot Q.

The mines, including the Cannon Mine – McKay Coal Seam, that underlie or are around Lot Q were all accessed from near the level of the Green River (called a "portal") by an access tunnel (haulageway) driven along the coal seam. The haulageway was inclined slightly upward (typically about 1 foot vertically over 100 feet) to facilitate drainage of groundwater seeping into the mined-out areas. The Cannon Mine – Gem Seam (west of Lot Q) and the Hyde Mine (east of Lot Q) were further developed by driving a "slope" down the dip (inclination) of the coal seam with subsequent deeper haulageways (referred to as "levels") which required mechanical pumping to keep the mines dry. Usually the main haulageways or slopes were shored with timber posts/beams or reinforced concrete to prevent collapse. Further development of the coal seams used "room-and-pillar" (also referred to as "chute-and-pillar") mining methods.

At specified intervals along the main haulageway, "chutes" were driven up the coal seam to a "chain-pillar." The chain pillar is coal left in place to protect the ground surface or upper level from caving into the next level below. The mines were typically developed from the top down, so the shallow levels were typically mined first. "Cross-cuts" were then driven between the chutes. The chutes and cross-cuts were then widened until the coal left in place (pillars) and rooms comprised about a 1 to 1 ratio.

Most or all of the pillars were removed before abandonment of a level. This mining method is referred to as "full pillar extraction." Full pillar extraction is a normal underground mining process designed to maximize coal extraction and to promote short term collapse of the mined-out areas. As designed, the

removal of the pillars causes the mined-out area to collapse within a few hours to days following retreat since backfilling was not intended.

Rock tunnels (underground tunneling across the bedrock layers) was a common practice in this area for connecting mines together or to access other coal seams while using a single access haulageway or slope. A rock tunnel (referred to above as the Hyde Mine Drainage Tunnel) was driven in 1915 a distance of about 4,300 feet to facilitate drainage of the nearby Hyde Mine in Section 29. As previously described, the Hyde Mine Drainage Tunnel crosses under Section 19 as shown on Figure 3.

Based on engineering studies conducted at the time of mining, caving of the mined-out areas (rooms) was required upon retreat of production areas. Room caving was **required** to allow the overburden pressures in the mines to adjust to equilibrium. If mined-out rooms remained open, then "bumps" became a major concern. Bumps occur when a large room remains open for a long period of time followed by a catastrophic collapse sending an air blast through the mine that could injure the miners.

The Franklin Mines were intermittently active from about 1889 to 1971 when the No. 10 Mine closed. Most of the active mining was in the early 1900s. Presently, there are no active coal mining operations within or adjacent to Lot Q.

Based on our review of current topographic mapping and the historic mine maps that include underground elevations, **the post-gravel mining depth to the abandoned Cannon Mine, McKay Seam varies from about 158 feet to 798 feet below the ground surface within Lot Q** as shown on the Abandoned Underground Coal Mine Depth Map, Figure 4. A cross-section showing the Cannon Mine – McKay Coal Seam relatively to the existing and proposed ground surface is shown on Geologic Cross-Section A-A', Figure 5. No surface openings (mine entries or shafts) are shown on the historic underground mine maps, likely because of the relatively thick overburden (Glacial Drift). The Cannon Mine – McKay Coal Seam was access by an entry tunnel located near the level of the Green River northwest of Lot Q.

8.0 SURFACE CONDITIONS

8.1 GENERAL

The surface conditions within and around Lot Q are based on detailed surface reconnaissance completed on March 9 and 23, 2006 by Brian Beaman of ICE, along with review of recent aerial photographs from Google Earth (August 14, 2020) and King County iMap (2007, 2009, 2012, 2013, 2015, 2017 and 2019).

8.2 LOT Q

Lot Q occupies about 240 acres located about 2.8 miles southeast of the City of Black Diamond. The Enumclaw-Franklin Road SE borders the northwest part of Lot Q. Lot Q is accessed by two gated, single-lane, gravel-surfaced roads. An electric transmission line and related easement crosses the south part of Lot Q in a diagonal as shown on Figure 2.

Lot Q is characterized by nearly level to gently undulating topography from about Elevation 720 feet 790 feet. A localized lower area occurs in a deep depression (referred to as a "Kettle") at about Elevation 680 feet in the north part of Lot Q as shown on Figures 3 and 4. A Kettle is a closed depression that is created by a remnant of glacial ice that is lodged in the Recessional Outwash that subsequently melts leaving the closed depression landform. Other Kettles occur within the mid-part of Lot Q that are dry (no water).

Based on the mapping by ESM (July 19, 2021), four wetlands (A, B, C and D) occur adjacent to Lot Q. We understand that the identified wetlands are excluded from the gravel mining plan.

"Franklin Ridge," a sand and gravel surface mine owned by Green Section 30 LLC, is located west of the central part of Lot Q.

Based on our review of historical aerial photographs, Lot Q was sequentially logged as even-age (clear-cut) harvest from about 2012 to 2017. Mature trees remain in the triangular-shaped area south of the electric transmission line easement in the south part of Lot Q.

8.3 LOT Q COAL MINE-RELATED SURFACE FEATURES

No mining-related surface features such as sinkholes, mine openings, undocumented coal mine workings or surface prospects were shown on the historic mine maps, observed during our surface reconnaissance, review of historical aerial photographs from Google Earth and King County iMap and our review of LiDAR-based Digital Terrain Model (DTM) information, also from King County iMap within Lot Q. No mine rock fill (waste by-product of coal mines consisting of coal fines and broken rock) was observed during our surface reconnaissance.

9.0 ANALYSIS OF COAL MINE HAZARDS

9.1 SEVERE COAL MINE HAZARD AREAS

The Severe Coal Mine Hazard areas are underlain by abandoned underground coal mines at a depth of less than 150 feet. Based on our evaluation of mine depth as shown on Figure 4, no abandoned underground mine workings occur within Lot Q at a depth of less than 150 feet; no Severe Coal Mine Hazard Areas occur within Lot Q.

9.2 MODERATE COAL MINE HAZARD AREAS

Moderate Coal Mine Hazard Areas may occur where the abandoned underground coal mines occur within 300 feet of the ground surface. Based on the estimated mine depths shown on Figure 4, abandoned underground mine workings occur locally in the north part of Lot Q. Based on our analysis, total potential regional ground subsidence is estimated to range from about 1 to 1.4 inches uniformly across this area. No differential subsidence (tilt) that could cause property damage is expected (tilt is estimated to be less than 1V:350H – vertical to horizontal). No excessive ground strain that could cause property damage is expected (ground strain is estimated to be less than 0.0003 inches per inch).

Based on our analysis, no Moderate Coal Mine Hazards occur within Lot Q.

9.3 DECLASSIFIED COAL MINE AREAS

Based on our evaluation Lot Q should be classified as Declassified Coal Mine Area as shown on the Coal Mine Hazards Map, Figure 6. This evaluation is based on the post-mining surface of Elevation 720 feet as shown on the mining plan (ESM, July 19, 2021).

10.0 CONCLUSIONS AND RECOMMENDATIONS

Based on our review of available information and analysis of coal mine hazards at the Lot Q property, we have developed the following conclusions for this Critical Area Report:

- The Lot Q area is underlain by portions of six abandoned underground coal mines and the Hyde Mine Drainage Tunnel as shown on Figure 3.

- The depth to the mine workings that underlie Lot Q vary from 158 to 798 feet below the ground surface (post-mining to Elevation 720 feet). For this reason, no Severe Coal Mine Hazard Areas occur within Lot Q.
- The analysis of Moderate Coal Mine Hazards (regional ground subsidence) including ground strain and ground tilt indicates that the estimated values are less than the threshold values for damage to structures. For this reason, no Moderate Coal Mine Hazard Areas occur within Lot Q.
- We recommend that the entirely of Lot Q be considered a Declassified Coal Mine Area as shown on Figure 6.
- We recommend that ICE be contacted immediately to provide an evaluation if evidence of undocumented coal mine workings or prospects are encountered during future grading at Lot Q.

11.0 USE OF THIS REPORT

We have prepared this report for use by Palmer Coking Coal Company; this report is not applicable to other locations or for other purposes. Our report, conclusions and interpretations should not be construed as a warranty of the subsurface conditions.

The property subject to this report is located in an area of extensive historical mining. It is possible that undocumented mining (usually a "prospector's tunnel"), an abandoned dry well, septic tank or dug water well, and/or mine rock fill, may be encountered. We recommend that ICE be contacted immediately if a shallow void or evidence of mine rock fill is encountered.

Within the limitations of scope, schedule and budget, our services have been executed in accordance with generally accepted practices in this area at the time this report was prepared. No warranty, express or implied, should be understood.

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We appreciate the opportunity to be of service on this project. If there are any questions concerning this report or if we can provide additional services, please call.

Yours very truly,
Icicle Creek Engineers, Inc.

Kathy S. Killman, LEG
Principal Engineering Geologist

Brian R. Beaman, PE, LEG, LHG
Principal Engineer/Geologist/Hydrogeologist

Document ID: 0102016.Rep

Attachments:
Vicinity Map – Figure 1
Site Plan – Figure 2
Regional Abandoned Underground Coal Mine Map – Figure 3
Abandoned Underground Coal Mine Depth Map – Figure 4
Geologic Cross-Section A-A' – Figure 5
Coal Mine Hazards Map – Figure 6

Submitted via email and surface mail (one original copy)

FIGURES

Base map obtained from Environmental Research Research Institute (Esri) World Imagery dated July 19, 2020

0 ½ 1
Approximate Scale in Miles

VICINITY MAP

PRELIMINARY COAL MINE HAZARD ASSESSMENT, PALMER COKING COAL COMPANY - LOT Q
BLACK DIAMOND AREA, KING COUNTY, WASHINGTON

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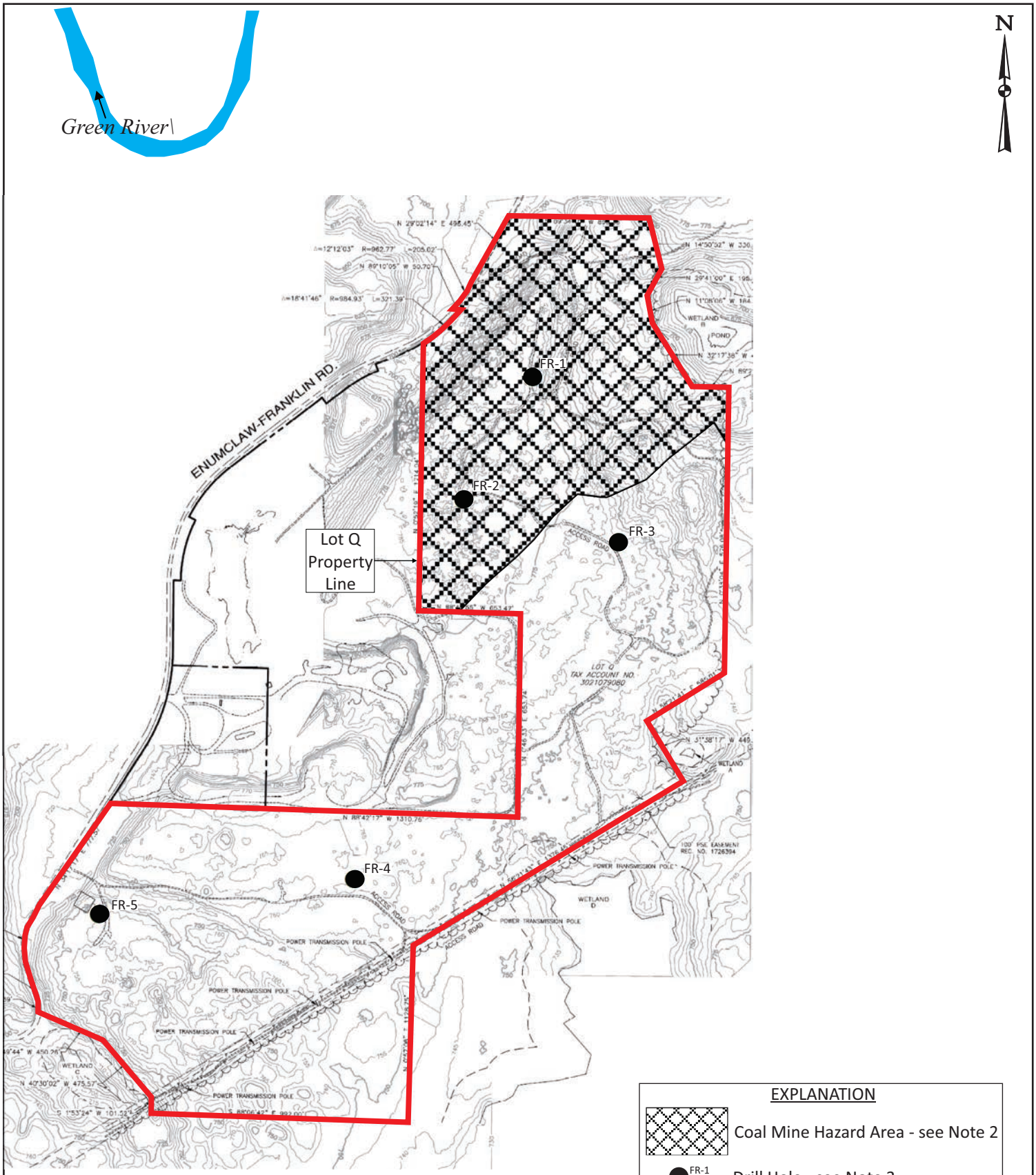

Notes: Base map obtained from ESM Consulting Engineers, July 19, 2021, Palmer Coking Coal, Hyde Mine, 25 sheets.
2) Regional Coal Mine Hazard mapping from King County iMap (https://gismaps.kingcounty.gov/iMap/), Environmentally Sensitive Areas, Coal Mine Hazards (1990 Sensitive Areas Ordinance)
3) Drill holes from Bennett Consulting, PLLC, Results of Gravel Exploration Drilling, Franklin Ridge-Fish Lake Parcels, King County, WA, 24 pages.

SITE PLAN

PRELIMINARY COAL MINE HAZARD ASSESSMENT, PALMER COKING COAL COMPANY - LOT Q
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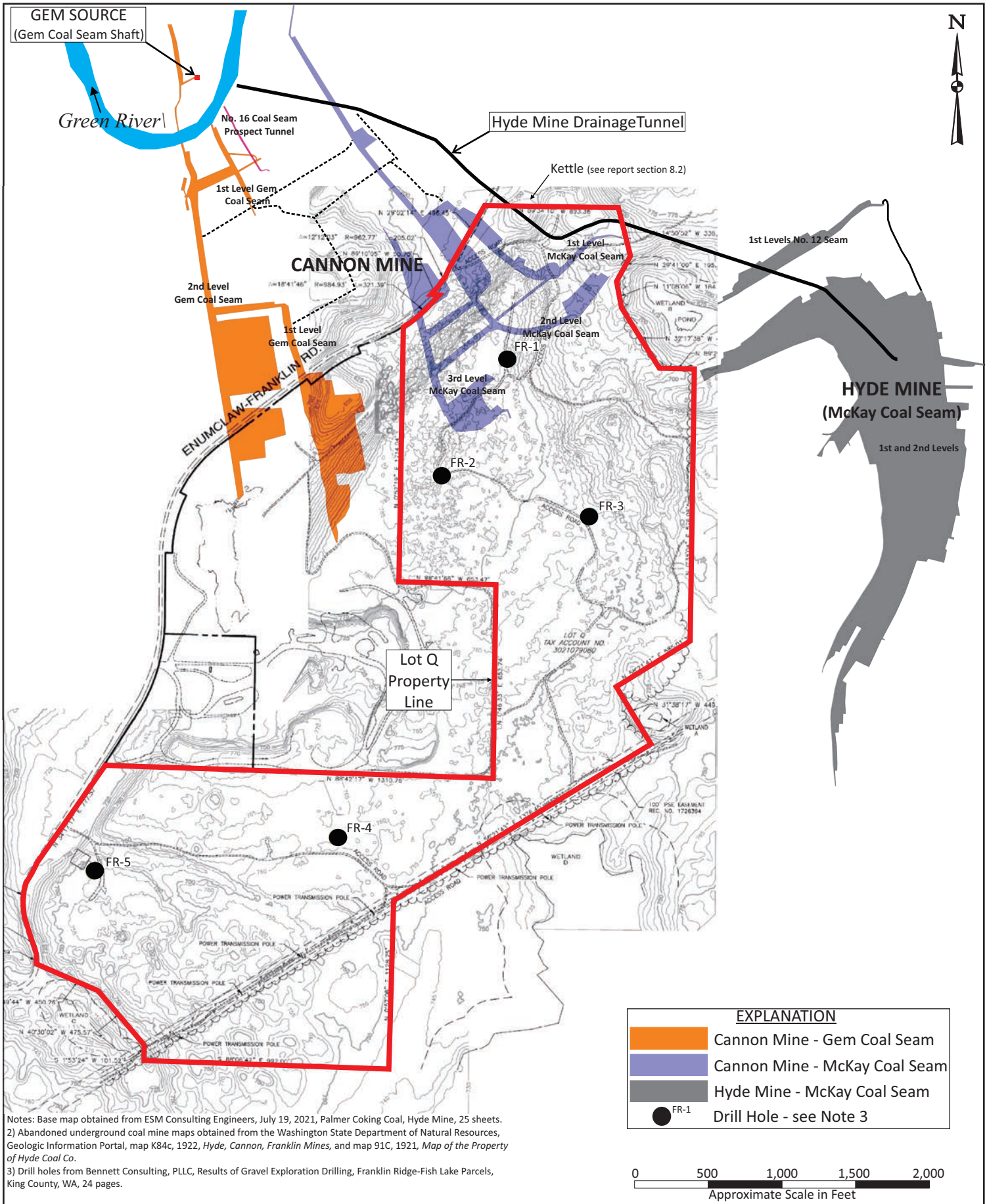

Notes: Base map obtained from ESM Consulting Engineers, July 19, 2021, Palmer Coking Coal, Hyde Mine, 25 sheets.
2) Abandoned underground coal mine maps obtained from the Washington State Department of Natural Resources, Geologic Information Portal, map K84c, 1922, *Hyde, Cannon, Franklin Mines,* and map 91C, 1921, *Map of the Property of Hyde Coal Co*.
3) Drill holes from Bennett Consulting, PLLC, Results of Gravel Exploration Drilling, Franklin Ridge-Fish Lake Parcels, King County, WA, 24 pages.

REGIONAL ABANDONED UNDERGROUND COAL MINE MAP

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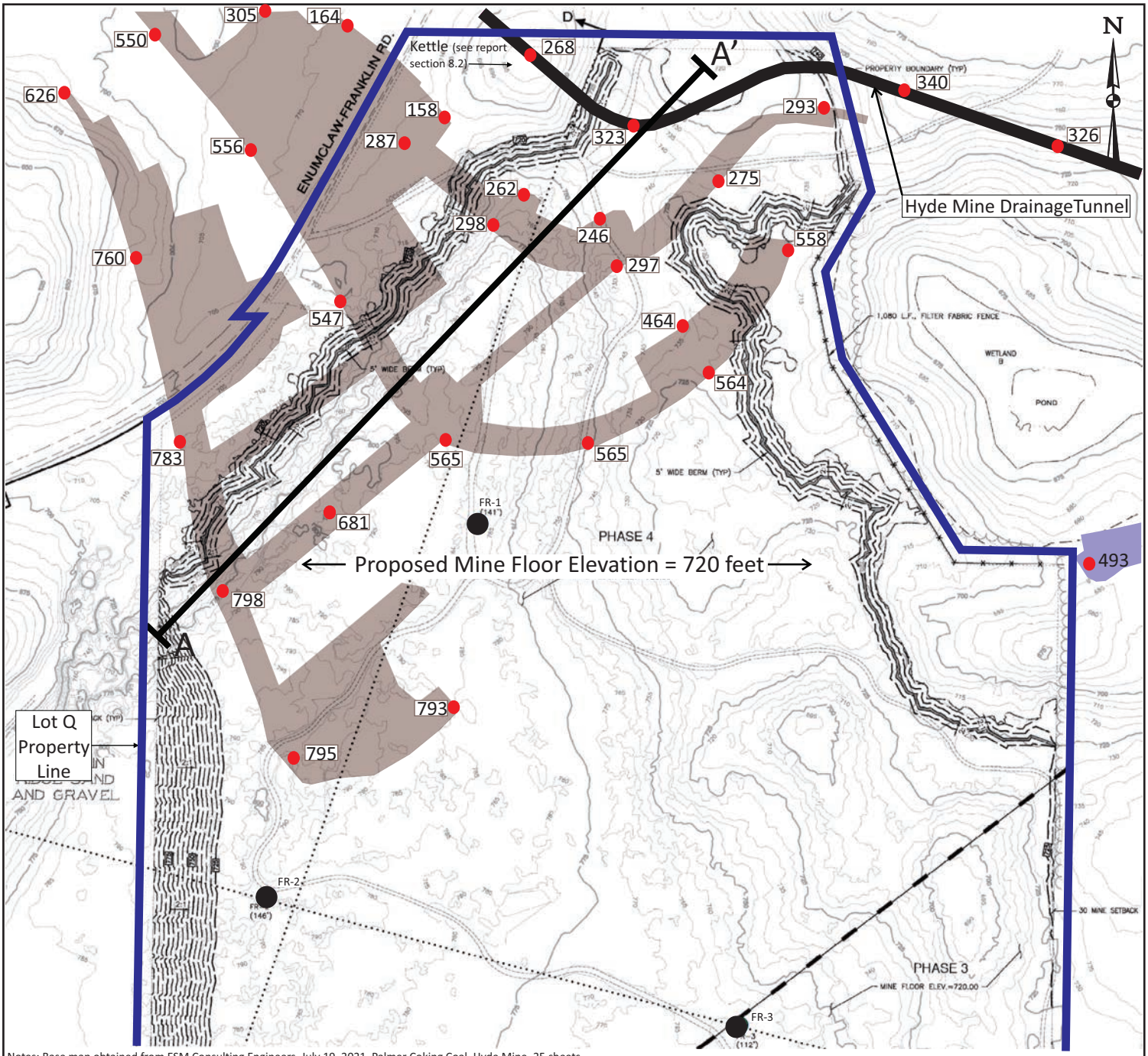

Notes: Base map obtained from ESM Consulting Engineers, July 19, 2021, Palmer Coking Coal, Hyde Mine, 25 sheets.
2) Abandoned underground coal mine maps obtained from the Washington State Department of Natural Resources, Geologic Information Portal, map K84c, 1922, *Hyde, Cannon, Franklin Mines,* and map 91C, 1921, *Map of the Property of Hyde Coal Co.*
3) Drill holes from Bennett Consulting, PLLC, Results of Gravel Exploration Drilling, Franklin Ridge-Fish Lake Parcels, King County, WA, 24 pages.

EXPLANATION

- Cannon Mine - McKay Coal Seam
- Hyde Mine - McKay Coal Seam
- Hyde Mine Drainage Tunnel
- 558 — Estimate Depth (in feet) to Mine Workings (based on proposed mine floor at Elevation 720 feet)
- NONE - within the mapped area
- FR-1 — Drill Hole - see Note 3

0 250 500
Approximate Scale in Feet

ABANDONED UNDERGROUND COAL MINE DEPTH MAP

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BLACK DIAMOND AREA, KING COUNTY, WASHINGTON

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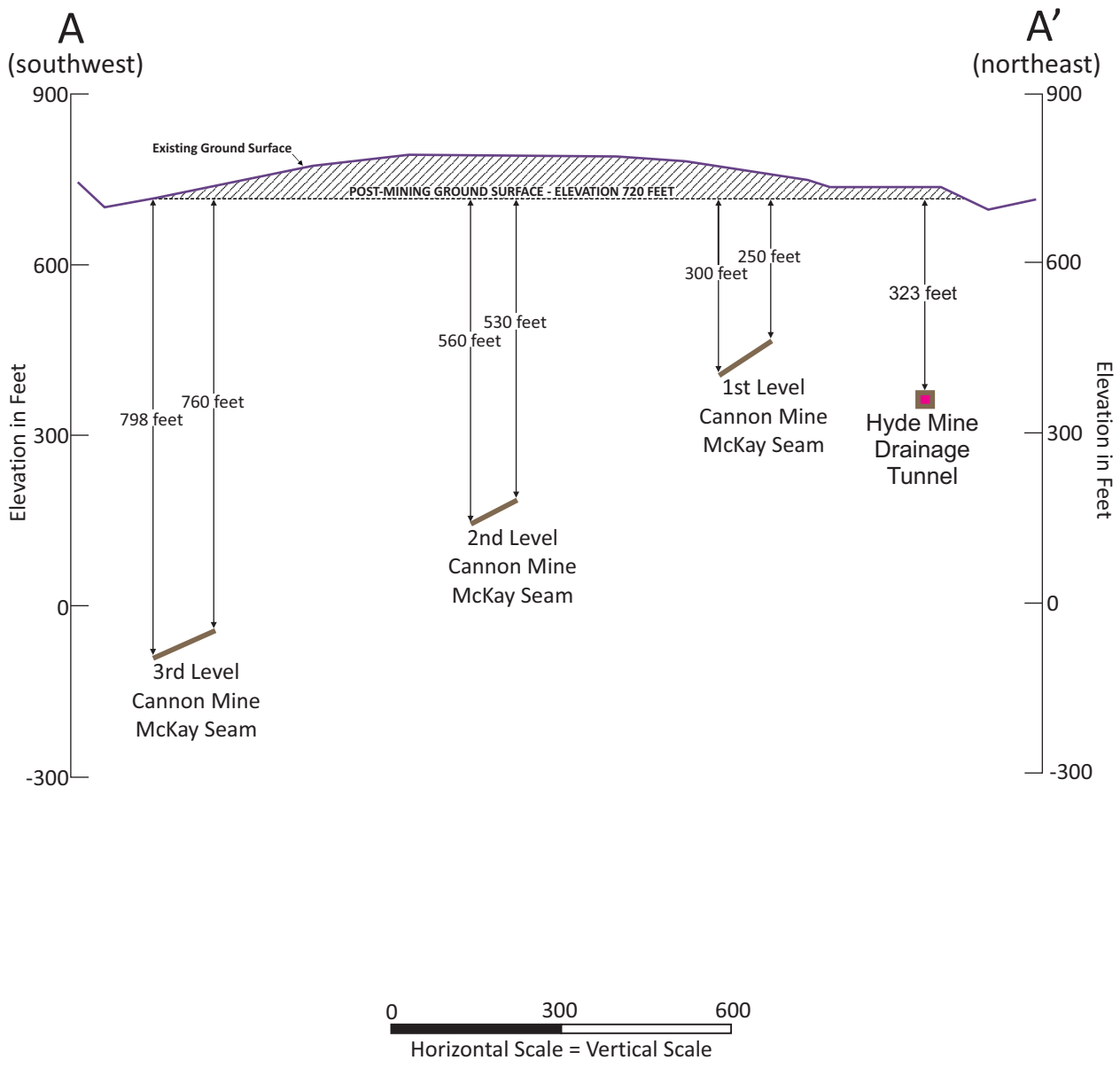

Notes: 1) See Figure 4 for the location of the Geologic Cross-Section A-A'.
2) Subsurface soil and bedrock/mine conditions shown on the cross-section are based on interpretation of historic coal mine maps (Washington State Department of Natural Resources Abandoned Coal Mine Map Collection, map K84c, 1922, *Hyde, Cannon, Franklin Mines,* and map 91C, 1921*, Map of the Property of Hyde Coal Co*.
3) Actual subsurface conditions may vary from that shown.

GEOLOGIC CROSS-SECTION A-A'

PRELIMINARY COAL MINE HAZARD ASSESSMENT, PALMER COKING COAL COMPANY - LOT Q
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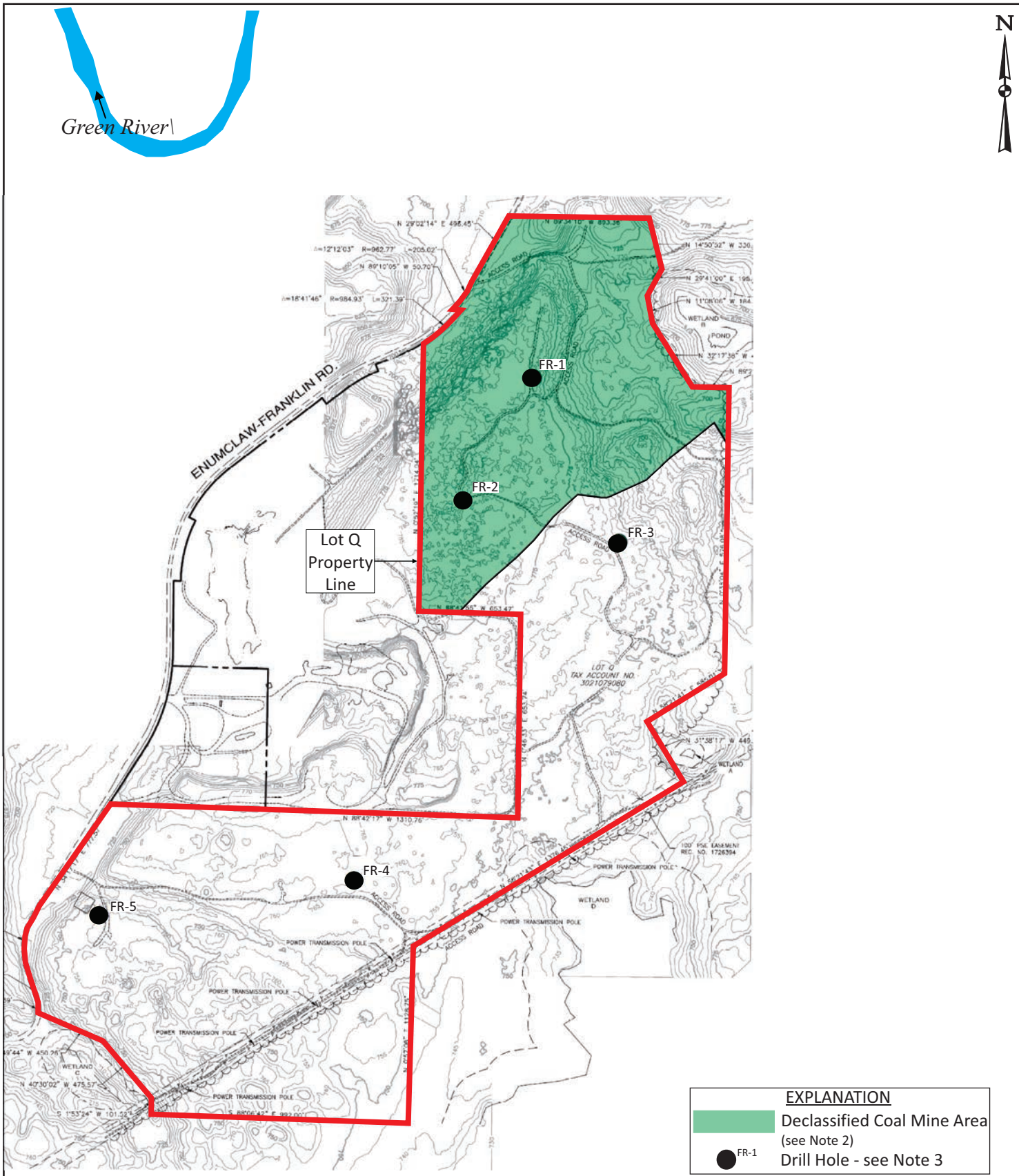

Notes: Base map obtained from ESM Consulting Engineers, July 19, 2021, Palmer Coking Coal, Hyde Mine, 25 sheets.
2) Coal mine hazards classified in accordance with King County Zoning Code 21A.24.205.
3) Drill holes from Bennett Consulting, PLLC, Results of Gravel Exploration Drilling, Franklin Ridge-Fish Lake Parcels, King County, WA, 24 pages.

COAL MINE HAZARDS MAP

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