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2.0 Description of Study Area

2.1 Location and Physical Setting

The study area is located in the southwestern portion of the Commonwealth of Pennsylvania, wholly within Washington County. The county encompasses approximately 857 square miles, or 548,643 acres. Major highways in the vicinity of the study area include Interstate-79 and Interstate-70, both modern four-lane thruways. Other important roadways extending through the county include State Routes 40, 22, and 19.

Washington County is bordered on the north by Allegheny and Beaver counties, on the east by Westmoreland and Fayette counties, on the south by Greene County, and on the west by the State of West Virginia. Furthermore, the study area is located within West Finley Township, the southwestern-most township within the county. West Finley Township is bordered on the north by Donegal Township, on the east by East Finley Township, on the south by Greene County and on the west by West Virginia. This part of the state drains into the Ohio river system.

2.2 Population

The largest cities within the county include: Washington, Donora, Canonsburg, Monongahela, and Charleroi. Population for the county according to the 2000 U.S. Census Bureau was 202,897, representing a 0.8 decrease from 1990. Within the study area, census data indicates a population density of between 0.1 to 6,485 people per square mile. This range is the next to lowest density used by the U.S. Census Bureau.

2.3 Land Use – Washington County

According to the Agricultural Census for Washington County (compiled in 1997), land usage within the county consists of the following:

- *Total Cropland:* 115,325 acres (includes harvested land and pasture/grazing land)
- *Total "Other" Cropland:* 10,307 acres (includes cover crops, summer fallow, failed crops, and idle farmlands)
- *Total Woodland:* 34,945 acres
- *Pastureland and Rangeland:* 25,102 acres (other than cropland)
- *House lots, ponds, roads, wasteland:* 10,818 acres

- *Pastureland:* 70,522 acres
- *Conservation or Wetland Reserve:* 2,187

Total farm acreage within the county declined from 218,906 acres in 1987 to 186,190 acres in 1997. Likewise, the number of farms operations declined from 1,594 to 1,307 within the same time period. In 1997, farmland use accounted for 33 percent of the total acreage in Washington County.

2.4 Position of Study Area in Relation to Factors Affecting Stream, Wetland, and Riparian Area Quality

Land use within the Robinson Fork watershed was delineated for the area that is relevant to this study. Specifically, the area encompasses the headwater region of Robinson Fork through the southern end of the mined study segment along with all intervening first and second order tributaries. The applicable portion of the Robinson Fork watershed, approximately 14.4 square miles, and associated land use is depicted in Sheet 2. As this sheet indicates, land within the Robinson Fork watershed is primarily forested and, secondly, is associated with cropland and pasture. The town of Good Intent represents the most densely populated area within the delineated watershed and is situated approximately 0.3 linear mile south (downstream) of the unmined study segment and approximately two linear miles north-northeast (upstream) from the mined segment. Longwall deep mining operations have been conducted beneath a large portion of the subject watershed and extend northward to approximately 0.5 mile south of the town of Good Intent. Also, several paved and unpaved secondary roads are present within the Robinson Fork watershed. Within the overall Robinson Fork watershed, the stream and tributary network has probably been impacted by increased erosion and/or runoff from adjacent crop and pastureland, mowed areas, roads, and domestic activities. These impacting factors were either of a lower magnitude, or similar, in comparison to those observed for the other candidate streams.

In general, croplands in proximity to bodies of surface water can be a source of various herbicides, pesticides, phosphates, nitrates, and sediment resulting from plowing activities, crop protection, and fertilization. Pasturelands are often associated with elevated levels of fecal coliform and sediment in surface water derived from livestock feces and defoliation caused by grazing livestock. Populated areas, including a very small town such as Good Intent, can cause adverse impacts to surface water by introducing sewage, sediment due to construction and other types of earth disturbance, and various chemical compounds through improper disposal practices. Affects from longwall mining techniques are often manifested at the surface through subsidence-related features such as depressions or fractures. Roadways adjacent to bodies of surface water can result in elevated levels of chlorides that are leached

from deicing materials and from hydrocarbon compounds from motor vehicles. The following sections specifically describe land use within the Robinson Fork watershed in relation to the mined and unmined study segments.

2.4.1 Croplands and Pasturelands

Upstream of the unmined study segment, Robinson Fork flows primarily through agricultural areas that are active along the valley floor, and to a lesser extent, along the valley slopes (Sheet 2). Based on field observations, these areas are mainly comprised of croplands with secondary pasturelands (idle fields and livestock grazing). As previously discussed, agricultural activities can introduce pest and weed control substances, nutrient compounds derived from fertilizers, and sediment into nearby surface water. Within the unmined study segment, the Robinson Fork stream valley is largely forested with minor cropland and maintained (mowed) areas. Aside from one maintained area within the mined study segment, the stream flows through an area of forest and unforested floodplain. To assist with segregating potentially adverse impacts to Robinson Fork resulting from local agriculture, the laboratory and field analytical program was augmented with specific nutrients, fecal coliform, and turbidity.

2.4.2 Populated Areas Including Construction

No construction activities were observed within or near the town of Good Intent (including the study segments and upstream of these segments). Also, no other types of earth disturbance, aside from small "backyard" type gardens, were identified within the town of Good Intent. Earth disturbances due to relatively large-scale agriculture upstream of the study areas were formerly discussed in Section 2.4.1. Methods of sewage disposal within and in the vicinity of Good Intent have not been determined. Potentially discharged sewage, however, could result in elevated concentrations of nutrients and fecal coliform within the stream. As previously indicated, these constituents have been included in the surface water analytical program. Adverse effects to Robinson Fork resulting from improper waste disposal practices are expected to be negligible because of the sparse population, and because the stream channel and banks were devoid of refuse and staining.

2.4.3 Longwall Mining Operations

Consol's Enlow Fork Mine extends beneath a substantial portion of the Robinson Fork watershed (Sheets 3 and 4). The relationship between longwall mining and the post-mining characteristics of Robinson Fork forms the essence of this document and is described in detail in proceeding chapters.

2.4.4 Adjacent Roadways

A paved secondary Road (State Route 3037) is located approximately 310 to 390 feet west of Robinson Fork along the southern portion of the mined study segment. The remainder of the segment is paralleled by an unpaved secondary road (Township Road 360) located approximately 120 to 390 feet west of the stream. A paved secondary road (State Route 3025) is located approximately 50 to 340 feet west of the unmined study segment. Because these roads are not heavily traveled and are separated from the channel by up to 390 feet, it is not expected that the stream would be adversely impacted by hydrocarbon compounds. Also, it is not likely that these rural paved and unpaved roads receive significant amounts of deicing materials during the winter season.