

C-1. Existing Conditions Supporting Information

C-1.1 Geology

The ALCOSAN Service Area falls within the Appalachian Plateau Physiographic Province, in the Pittsburgh Low Plateau and Waynesburg Hills Sections. The geology formations underlying the Service Area are the Casselman Formation (Pcc), Monongahela Group (Pm), Waynesburg Formation (PPw), Allegheny Formation (Pa), Glenshaw Formation (Pcg), and the Washington Formation (Pw).²

- **The Casselman Formation** is characterized by a few locally persistent red beds, calcareous claystones, freshwater limestones, thin sandstones, shales, siltstones, and generally thin, economically insignificant coal beds.
- **The Monongahela Group** consists of cyclic sequences of limestone, shale, sandstone, and coal in the Uniontown and Pittsburgh Formations.
- **The Waynesburg Formation** is divided into upper, middle and lower members, and its rocks occur in cyclic sequences with sandstone overlying Waynesburg coal.
- **The Allegheny Formation** is composed primarily of cyclic sequences of clay shale, claystone, siltstone, sandstone, limestone, and coal. Freshwater limestone beds (commonly less than five feet thick) or calcareous claystone with limestone nodules commonly underlie the coal beds in the upper third of the formation.
- **The Glenshaw Formation** consists of repeated sequences of sandstone, siltstone, shale, claystone (including red beds), limestone, and coal.
- **The Washington Formation** conformably overlies the Waynesburg Formation. It is divided into an upper limestone member, middle member, and lower limestone member, all of which have cyclic rock sequences. The Washington coal is at the base of the Washington Formation.

Near the top of the Glenshaw Formation are the Pittsburgh Red Beds, which are a primary source in southwest Pennsylvania for landslides. The Pittsburgh Red Beds are a 40 to 60-foot series of mostly reddish, greenish, and grayish claystone and shale, with minor amounts of sandstone and siltstone that tend to weather deeply on hillsides throughout southwestern Pennsylvania. Claystone is a low permeability, low strength rock with weakly connected pore space. Repeated weathering cycles and excessive pore pressure tend to reduce the internal shear strength of this particular rock, which can lead to failure.

Additionally, large swaths of Allegheny County have been mined for coal, mainly bituminous coal. The Pennsylvania Department of Environmental Protection (DEP) has created a Mine Subsidence Insurance map that details where historic underground mines are located. Most of the mines are located underneath the southern and eastern parts of Allegheny County, although there are several areas in the City of Pittsburgh that are marked as underground mining areas. Abandoned mine areas are considered a constraint for GSI and have been classified as such in the GSI constraints analysis.

² Source: <http://www.gis.dcnr.state.pa.us/geology/index.html>

Source: https://c.ymcdn.com/sites/aegweb.site-ym.com/resource/collection/715B28EC-6D1B-4D3F-93B9-EBC2933C98E4/Geology_of_Pittsburgh.pdf

C-1.2 Soils

Allegheny County is dominated by ten major soil types and those ten types are divided into two groups: 1) areas dominantly unaltered by urban development and strip mines and 2) areas dominantly altered by urban development and strip mines.³ Many of these soils have characteristics that are subject to factors that can affect earth-moving activities, such as erosion, seasonal high-water table, hydric soils, landslide, and slow percolation.

The following soil associations are areas considered to be dominantly unaltered by urban development and strip mines in Allegheny County.

- **Gilpin-Upshur-Atkins soils** are mainly located along the floodplains of the three main rivers. This association is characterized by moderately deep and deep, well drained soils underlain by red and gray shale on uplands and deep, poorly drained soils on flood plains.
- **Gilpin-Weikert-Atkins soils** are located in the northern section of Allegheny County along tributaries to the Allegheny River. This association is shallow and moderately deep, well drained soils underlain by gray shale on uplands and deep, poorly drained soils on flood plains.
- **Culleoka-Weikert-Newark soils** are located in the southern section of Allegheny County along the floodplains of tributaries to the Ohio and Monongahela Rivers. This association is shallow and moderately deep, well drained soils underlain by gray shale and limestone on uplands and deep, somewhat poorly drained and poorly drained soils on flood plains.
- **Gilpin-Wharton-Upshur soils** are the most dominant soil type located in the northern section of Allegheny County filling the areas left by the other soil types. This association is moderately deep and deep, well drained and moderately well drained soils underlain by red and gray shale on uplands.
- **Dormont-Guernsey-Culleoka soils** are one of the dominant soil types located in the eastern and southern sections of Allegheny County generally in upland areas. This association is moderately deep and deep, well drained and moderately well drained soils underlain by shale and limestone on uplands.

The following soil associations are areas dominantly altered by urban development and strip mines in Allegheny County.

- **Urban land-Philo-Rainsboro soils** are primarily located along the banks of the three main rivers and the banks of the tributaries to the Ohio and Monongahela Rivers. This association is deep, moderately well drained soils and Urban land on flood plains and terraces.
- **Urban land-Rainsboro-Allegheny soils** are located sporadically throughout the eastern portion of Allegheny County. This association is deep, well drained and moderately well drained soils and Urban land on terraces.
- **Urban land-Wharton-Gilpin soils** are located primarily in the City of Pittsburgh within Allegheny County. This association is moderately deep and deep, well drained and moderately well drained soils and Urban land underlain by gray shale on uplands.
- **Urban land-Dormont-Culleoka soils** are located east of the City of Pittsburgh and south of the City of Pittsburgh in between the Monongahela and a tributary to the Ohio River. This association is

³ Soil Survey of Allegheny County and the Pennsylvania Department of Environmental Protection Erosion and Sediment Pollution Control Program Manual

moderately deep and deep, well drained and moderately well drained soils and Urban land underlain by shale and limestone on Uplands.

- **Strip mines-Guernsey-Dormont soils** are located in the southern section of Allegheny County primarily in low lying areas or floodplains. This association is deep, moderately well drained soils and Strip mines underlain by shale and limestone on uplands.

A small portion of the ALCOSAN Service Area is also located in Westmoreland County. This section of Westmoreland County is underlain by the Casselman Formation and the Monongahela Group. The section of Westmoreland County that is in the ALCOSAN Service Area is dominated by the following three major soil types:

- **Westmoreland-Guernsey-Clarksburg soils** are deep and moderately deep, well-drained to somewhat drained soils over acid, gray shale and siltstone.
- **Philo-Monongahela-Atkins soils** are deep, moderately well-drained to poorly drained soils on terrace and flood plains.
- **Upshur-Gilpin-Clarksburg soils** are deep and moderately deep, well-drained and moderately well-drained soils over red and brown clay shale, siltstone, and sandstone.