Day Two
Saturday, May 20, 1995

ENGINEERING AND ENVIRONMENTAL GEOLOGY

Trip Leaders:
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Welcome to the second day of the Pittsburgh Geological Society's 50th Anniversary Field Trip. Today's field trip will focus on aspects of the environmental and engineering geology of the rocks of the Pennsylvanian System of western Pennsylvania. As an introduction, the cut at the south end of the IKEA building is a large gunite face covering a Pittsburgh coal exposure. The Pittsburgh coal is located to the right of the grout and a down-to-the-right listric fault is exposed at this location. Whether this fault is the result of mining, earthwork or Mother Nature is not clear. To the left of the gunite, weathered coal is exposed. Note how erosion is occurring along the edges of the grout curtain. This area is the location of the McCurdy extension of the McDonald oil pool, first drilled in 1890.

Meeting Point: IKEA parking lot, Robinson Towne Centre.
Meeting Time: 8:00 AM to 8:30 AM. **DISEMBARK at 8:30 AM PROMPTLY.**

Mileage Interval	Mileage Cumulative	Field Trip Itinerary
0.0	0.0	At the south end of IKEA parking lot, Robinson Towne Centre (Figure 2-1).
0.2	0.2	Exit from IKEA, turn left.
0.2	0.4	Intersection from the left with the ramp off PA 60 north. Bear right.
0.6	1.0	Traffic light at intersection with Cliff Mine (and Beaver Grade) Road on Montour Run. Here we are in the upper Glenshaw Formation. The Ames Limestone Member at the top of the Glenshaw Formation of the Conemaugh Group crops out in the cuts on the entry road directly ahead. The sandstone at road level may be the Saltsburg sandstone. Turn left on to Cliff Mine Road.
0.9	1.9	Bear right on to PA 60 north.

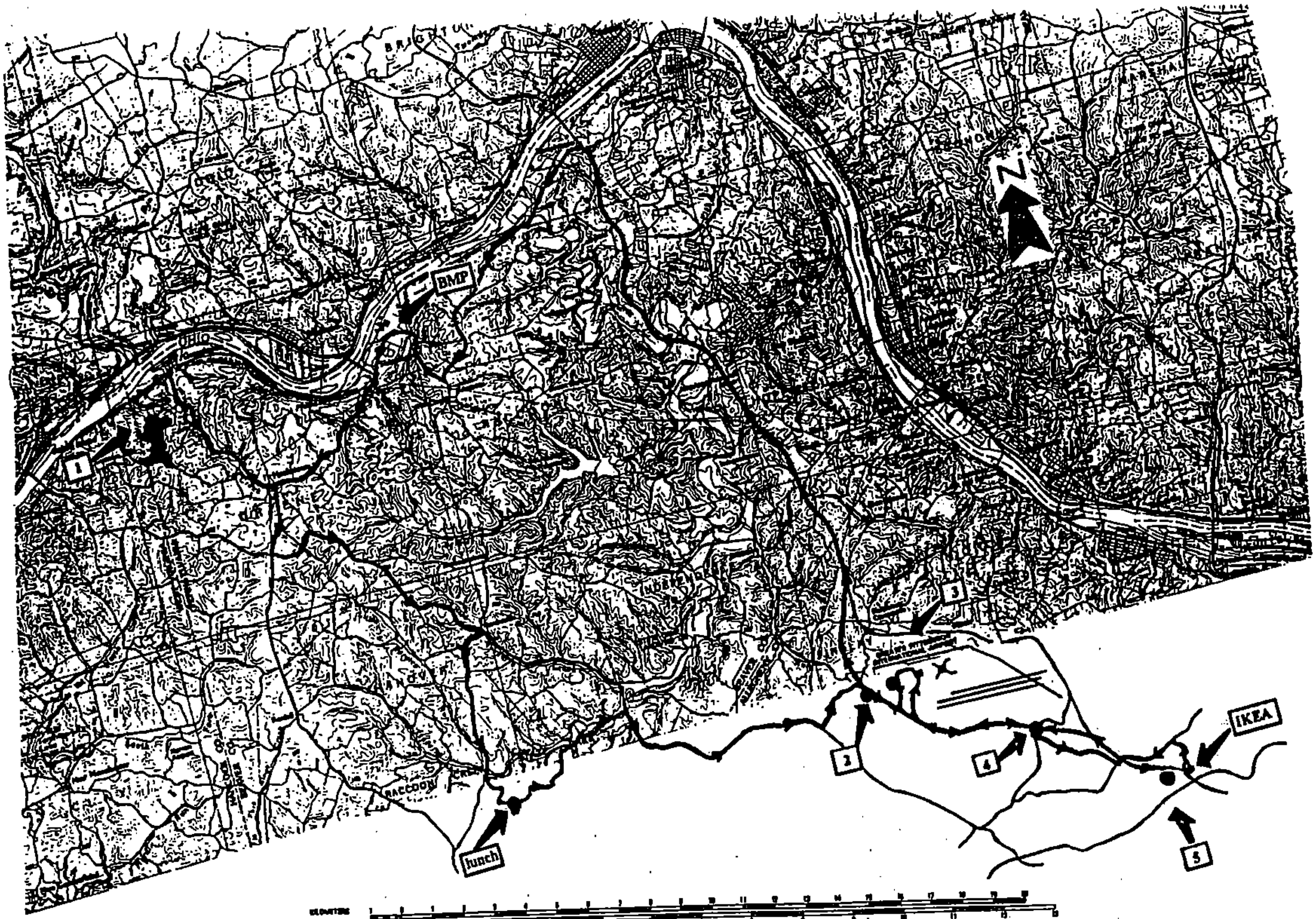
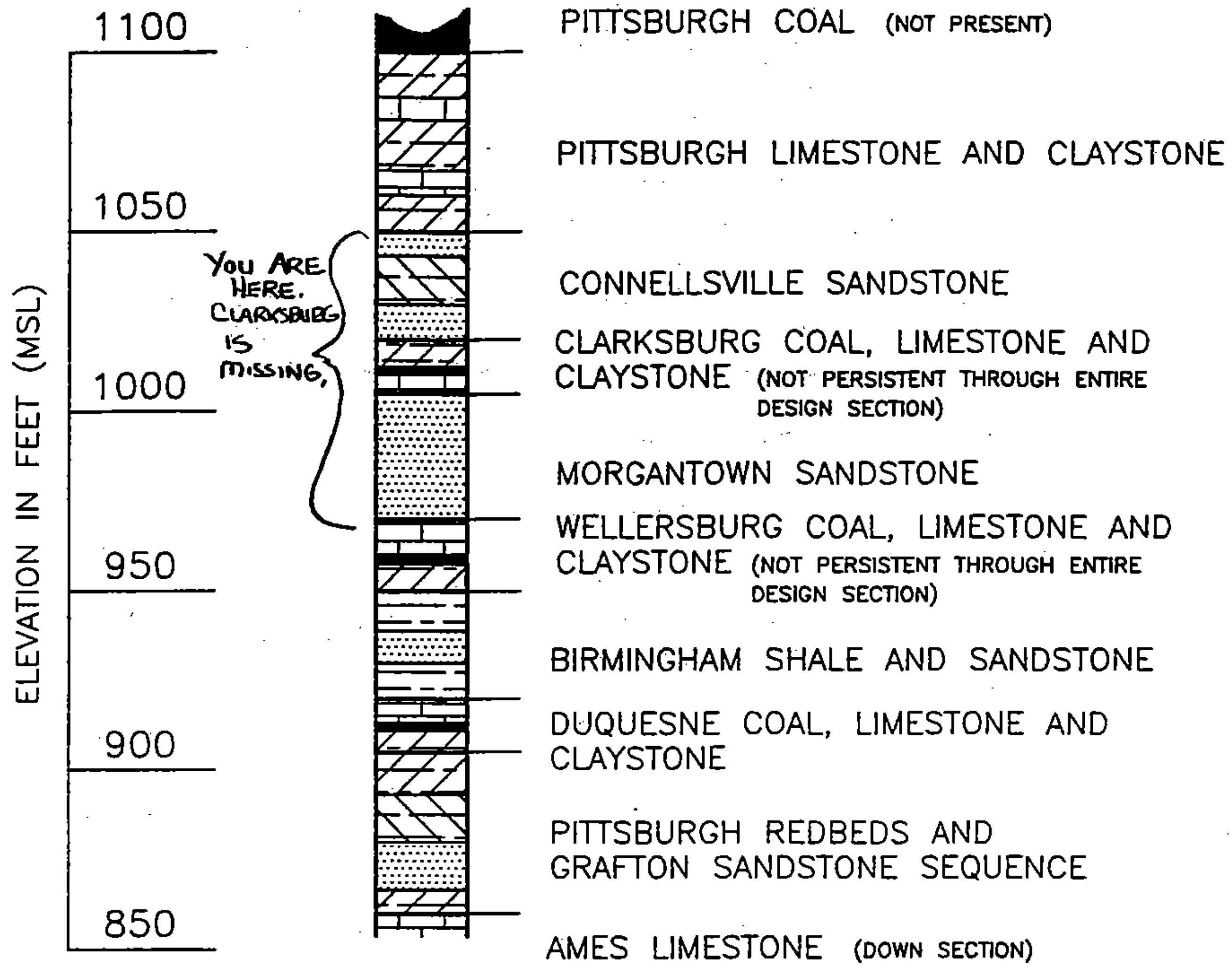


Figure 2-1 -- Map showing the route of Field Trip #2. Black dots are locations of field trip stops. Numbered squares and arrows show stop numbers. BMP - Bruce Mansfield power plant. IKEA - start and end of field trip log. Large arrow points north. Scale as shown.

0.5	2.4	Continue straight on PA 60.
0.7	3.1	Cuts on left expose the Morgantown sandstone in the Casselman Formation, Conemaugh Group. The Clarksburg claystone is missing at this locality (Figure 2-2). Basal conglomerate is present for first 50 feet at south end of cut at ramp grade. Highly fractured Morgantown sandstone is present at the south end of cut likely due to stress relief adjacent to small valley (notice benching added during construction to remediate this area).
1.5	4.6	Bench in the road cut on the right is the level of the Pittsburgh coal bed. Approximately 1.5 mile to the north is a mine fire in a isolated knoll of the Pittsburgh coal bed.
1.8	6.4	Landfill on the right.
0.6	7.0	Airport entrance. Continue straight on PA 60.
1.1	8.1	Mine seal in the Pittsburgh coal on the left. This is the drainage divide between the Raccoon Creek watershed and the Montour Run watershed.
1.4	9.5	Hookstown Grade Road overpass. Cut is in Pittsburgh limestone/claystone sequence through Clarksburg claystone(Figure 2-3). Note Clarksburg claystone is unusually thick in this area (up to 75 feet). This may be more of a depositional anomaly rather that structural.
0.6	10.1	Junction with business PA 60. Continue north on PA 60.
1.1	11.2	Beaver County line.
1.5	12.7	Crossing the north end of the Shannopin oil pool.
2.6	15.3	Saltsburg sandstone in the Glenshaw. Ames Limestone not far above.
0.6	15.9	Bridge over Raccoon Creek. USAir 427 crashed a mile west of here in September 1994 killing 132 people.
2.8	18.7	Center Township exit.



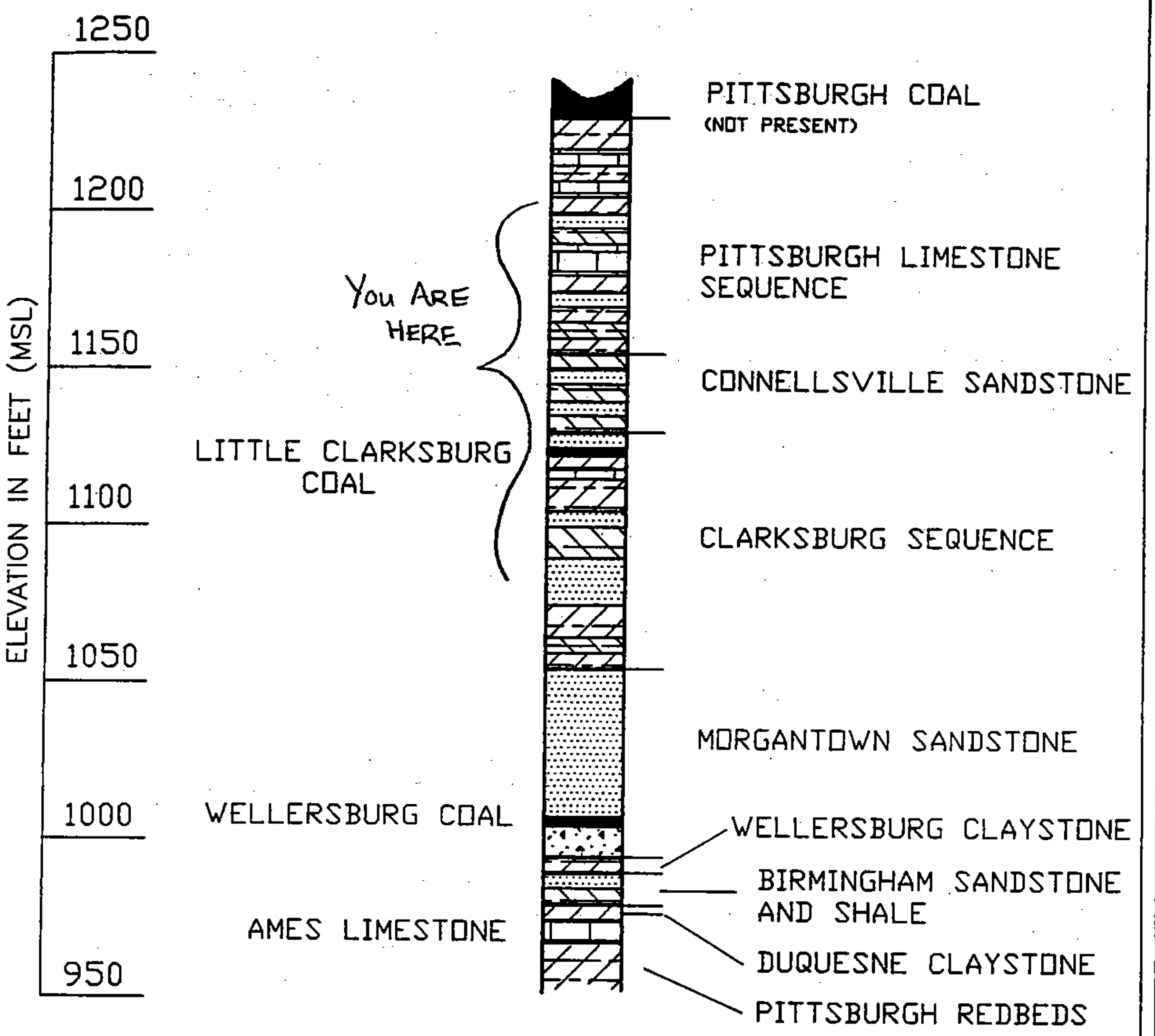
LOCAL STRATIGRAPHY

S.R. 60

SCALE: AS SHOWN S.O. No. 16539-ARA

DATE: DEC., 1989 FILE: CAR

Figure 2-2



LOCAL STRATIGRAPHY

S.R. 60

SCALE: AS SHOWN S.O. No. 16539-ARA
DATE: DEC., 1989 FILE: CAR

Figure 2-3

2.0	20.7	Bear off right on exit 12, Monaca/Shippingport. Bear left at end of ramp to stop sign.
0.3	21.0	At stop sign turn left on PA 18 South toward Shippingport. Note the stressed vegetation due to fumes from old mills.
0.7	21.7	On the right, Zinc Corp. of America on the flood plain of the Ohio River.
1.2	22.9	Raccoon Creek just upstream from its confluence with the Ohio River.
0.3	23.2	Road to the right leads to the corps of Engineers Montgomery Lock & Dam on the Ohio. Continue straight.
0.3	23.5	Now you can see the Ohio River.
3.6	27.1	Kennedy's Corners, turn right toward Shippingport. The upland surface in this area is relatively flat with a general elevation of 1,100 to 1,160 feet. It is interpreted as an ancient cut terrace of the Ohio River.
0.6	27.7	The 950-foot stack of the Bruce Mansfield Power Plant is visible straight ahead.
1.1	28.8	Turn right into entrance to the Bruce Mansfield Plant of Penn Power. After stop sign go right then left and follow signs to Main Entrance.
0.2	29.0	Plant visitors center. The Bruce Mansfield Plant is a coal-burning power plant with a demonstrated capacity of 2,360,000 kw. It receives an average of about 5,500,000 tons of coal per year by rail, river, and truck. It is mislabeled "Nuclear Power Plant" on topographic maps. After some months of tests and trials, the plant was opened officially on June 1, 1976, producing electricity to the power grid. It is expected to generate power through the year 2040. Flue gases from combustion of coal pass through scrubbers that remove sulfur oxides and particulates from the exiting boiler gases. The scrubbing process converts slaked lime to a sludge chiefly composed of gypsum, $CaSO_4 \cdot 2H_20$. The sludge is pumped to an impoundment which will be this field trip's Stop 1. The scrubbers consume as much as 425,000 tons of

		lime each year. The limestone converted to lime comes from a huge underground mine in the Cabin Creek area near Maysville, Kentucky and is delivered to the plant by barges on the Ohio River. It is produced from a 50-foot section in the 300-to-350-foot-thick Middle Ordovician Camp Nelson Formation. The Camp Nelson is correlated approximately with the Bellefonte Formation in Pennsylvania. Return to highway.
0.2	29.2	Stop sign at highway. Turn right.
0.9	30.1	Intersection with PA 168 from the north. Continue straight on 168 South. On the right hand side just after the intersection is the Beaver Valley Nuclear Power Plant of Duquesne Light, with a demonstrated capacity of 1,643,000 kw.
1.6	31.7	Gabion wall stream stabilization for support of PA 168.
0.1	31.8	In the valley to the right was the former Peggs Run underground mine in the Upper Freeport bituminous coal bed, here about 42 inches thick. The Upper Freeport is the uppermost unit of the Freeport Formation of the Allegheny Group. Ahead on the left the coal bed has been strip mined.
1.6	33.4	Stop sign in Hookstown. Continue straight on Georgetown Road.
0.5	34.9	Sandstone in the Kittanning Formation of the Allegheny Group exposed in the Mill Creek valley.
1.8	36.7	Turn left, with caution, onto a gravel road where the paved road curves to the right. Go about 50 yards to a T-intersection and turn left on an abandoned right of way of the former Penn Central Rail Road. On the right are extensive inactive sand and gravel pits in the Ohio River flood plain and on the left, the lower Mill Creek Valley.
0.3	37.0	Gate to the Penn Power gypsum impoundment reservation.
0.5	37.5	On the right, intersection with a gravel road heading uphill. Continue straight across former railroad embankment crossing Little Blue Run. Below us on the right is the intersection of Mill Creek and Little Blue Run, and beyond is the Ohio River. At the end of the embankment turn left.

0.5	38.0	Base of Little Blue Run dam, STOP 1.

STOP 1A
Little Blue Run Dam

The Little Blue Run Dam was constructed to contain the scrubber sludge from the Bruce Mansfield power station on the Ohio River at Shippingport, PA. The Bruce Mansfield power plant clean air disposal system includes four positive displacement pumps each with a capacity to pump 1,200 gpm of waste slurry from the mixing tank through four 7-mile-long pipelines into Little Blue Run Dam.

The Little Blue Run Dam was constructed between July 1, 1974 to July 1, 1977 (Figures 2-4 and 2-5). The dam is 420 feet high, 1,700 feet thick at the base and 2,200 feet along its crest. It contains 9,000,000 cubic yards of earth and rock and is reputed to be the largest earth and rock fill dam in the East. All materials used in dam construction were mined locally in the Little Blue Run drainage area (Appendix A).

The dam and its reservoir cover ground on the west edge of the Hookstown oil pool. Oil and gas wells in the area were plugged. Sixteen monitoring wells surround the site. The dam is designed to contain the heaviest 24-hour rainstorm expectable in a 100-year period. Note targets painted on some of the riprap boulders. Presumably these are used for periodic monitoring of possible movement in the face of the dam. On the east side of the face of the dam is a weir for measuring flow of seepage. The gypsum sludge has a high pH, and if the pH exceeds a certain limit, acid is added to the runoff in the small impoundment below.

Road Log Continues from Stop 1A

0.5	38.5	Turn right uphill, climbing the east side of the valley of Little Blue Run.
0.8	39.3	Blue Run Dam pump and maintenance station near the east abutment of the dam, STOP 1B.

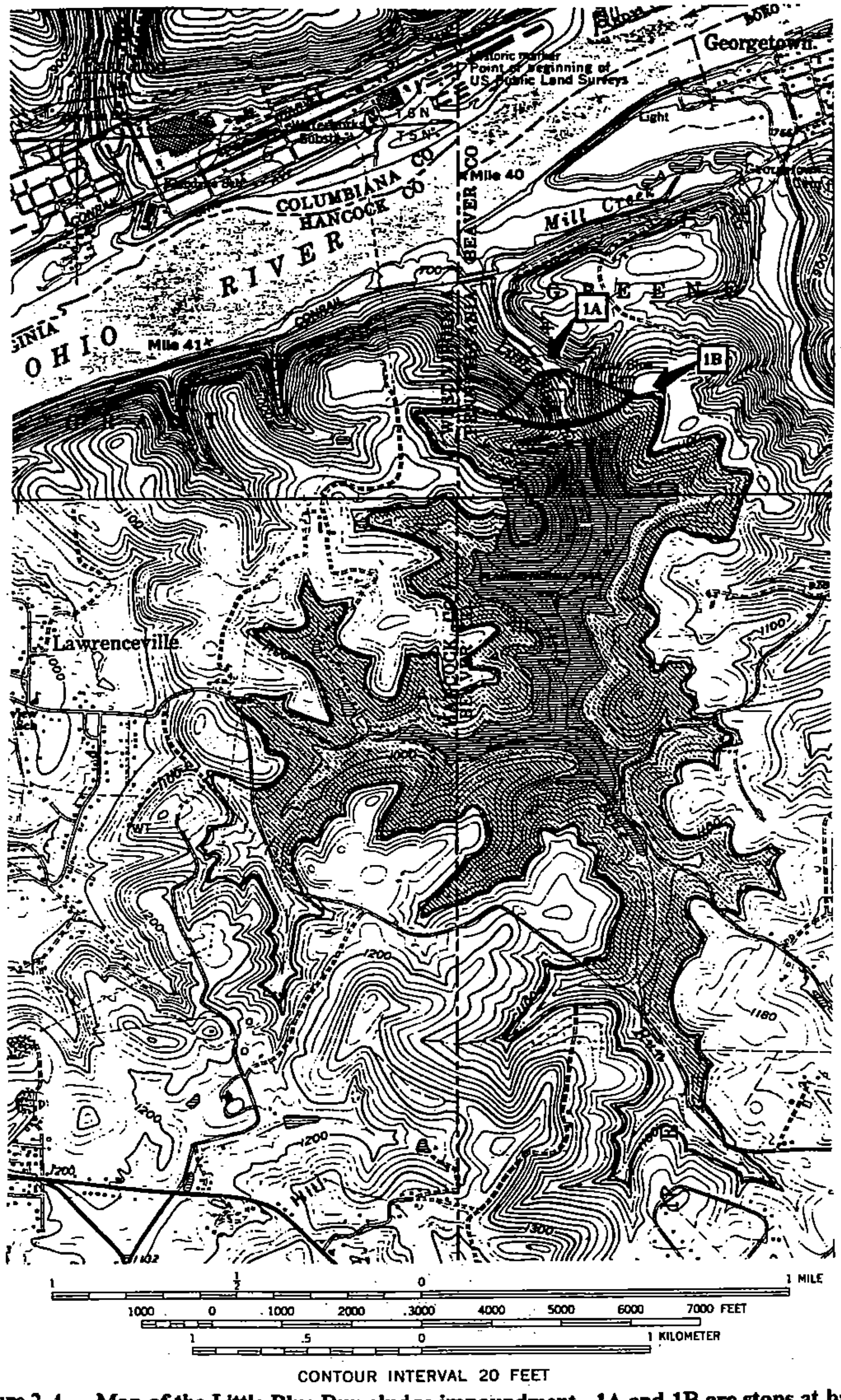


Figure 2-4 – Map of the Little Blue Run sludge impoundment. 1A and 1B are stops at base and top of dam. Top is north. Scale as shown. Base from East Liverpool North and East Liverpool South 7.5-minute quadrangles.

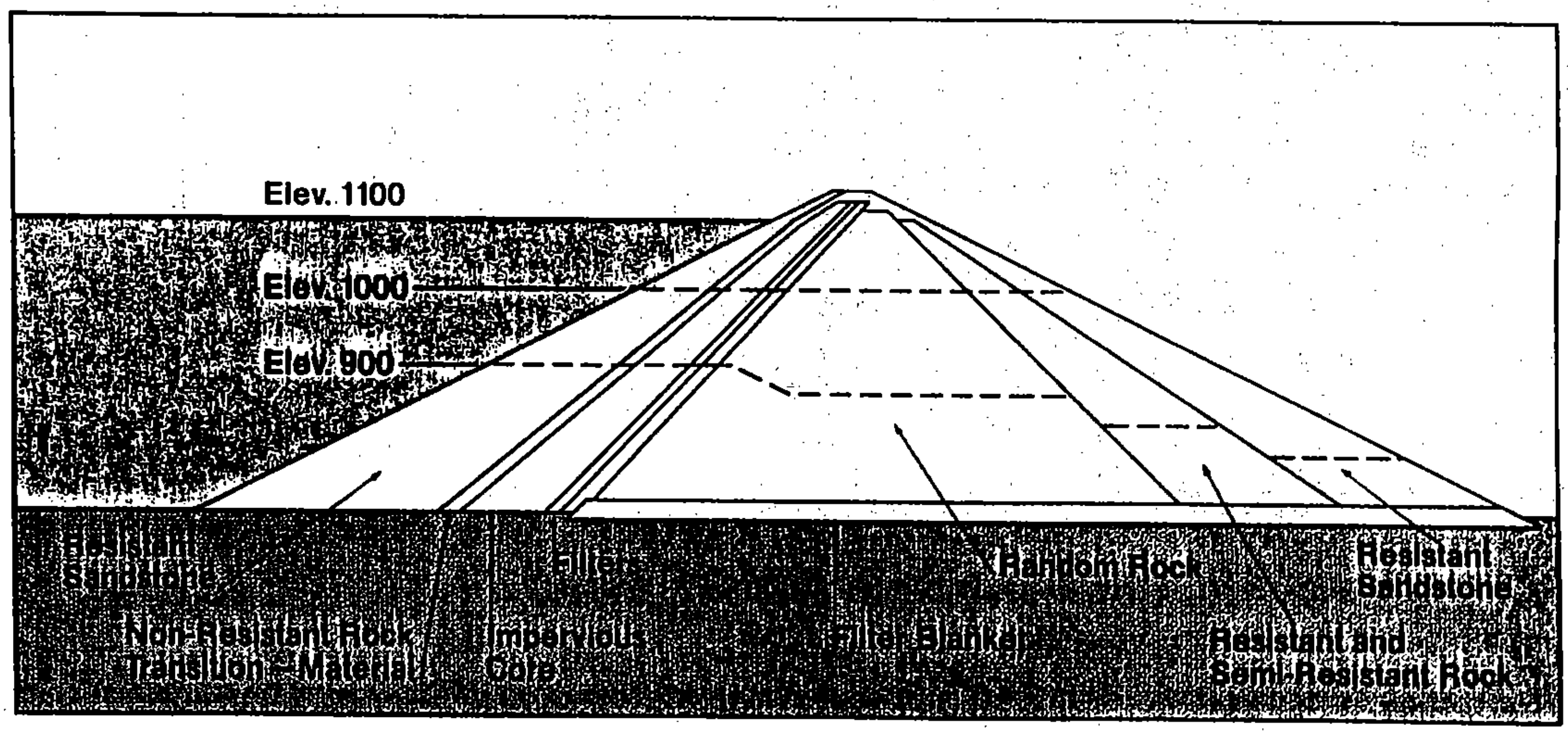


Figure 2-5 -- Sketch from south (left) to north (right) through the Little Blue Run dam.

STOP 1B
Blue Run Dam Pump and Maintenance Station

Park here and walk a short distance to the north then turn left and walk 100 yards out onto the crest of the dam (Figure 2-4). The total site includes 1,300 acres, just over two square miles, and eventually the 860-acre lake will cover 92,000,000 cubic yards of scrubber waste. When the power plant is in full operation, the impoundment receives about 3,000,000 gallons of sludge per day. The first sludge was pumped to the impoundment on December 5, 1975, during the power plant run-up trials and before the dam had been topped off. The floats you see carry the sludge piping out into the lake. The pipes can be moved to allow even deposition of the sludge. Particularly when viewed from the air, the impoundment has a striking blue color, much like the blue seen over sandbars and near beaches in tropical seas.

Depending on operational variables, the sludge capacity of the impoundment will be reached between the years 2007 and 2015. To handle sludge once the impoundment is full, Penn Power is considering conversion to a dry system, with the sludge still piped to here, where it will be dewatered with the water returned to the power plant. The damp sludge will be stacked on the full impoundment, below the level of the rim of the drainage basin. Tests have shown that the sludge can be compacted to a bearing capacity of 4½ tons per square foot.

The crest of the dam is at the approximate elevation 1,100 feet. Here the Upper Freeport coal bed horizon is at approximately 940 feet elevation, so the base of the dam rests on Allegheny Group strata while the crest is at a level about half way up in the Glenshaw Formation. Below us the normal pool elevation of the Ohio River is 665 feet, so the crest of the dam is about 435 feet above the river. Return to the paved road along Mill Creek.

Road Log Continues from Stop 1B

1.6	40.9	Intersection of gravel road with Georgetown (Mill Creek) Road. Turn right.
3.4	44.3	Stop sign at intersection with PA 168 in Hookstown. Turn right, south, on PA 168.
1.5	45.8	Intersection of PA 168 and US-30. Turn left onto US-30.
5.3	51.1	Intersection of US-30 and PA 18. Turn right, south, on PA 18. A short distance up the hill we pass the horizon of the Ames Limestone.

ALTERNATE ROUTE

If running early, instead of turning right onto PA 18 at mile 51.1, continue straight on US-30 to cumulative mile 51.9, to a yellow brick house on the right. This house was built on fill over the very marshy ground along Little Traverse Creek. The front yard of the house has collapsed into the creek, and stress cracks can be seen in the brick of the front wall of the house. Continue on east along US-30, noting on the right near cumulative mile 52.8 very wet ground and dams built by those superlative engineers, the beaver, who lent their name to the county. Continue east on US-30 to Raccoon Park entrance at cumulative mile 54.6. Turn right into the park and take the reverse route to the lunch stops given below.

Road Log Continues

2.8	53.9	Recurring embankment failure on the west side of the road, perhaps associated with the unstable Clarksburg red beds in the Casselman Formation.
0.4	54.3	Cross Traverse Creek to intersection on left of PA 18 and the main road through Raccoon Creek State Park (which actually is on Traverse Creek). If you were to continue 0.4 miles farther on PA 18, on your right you will find the trail to Frankfort Springs, a spa famous during the 19th century and early 20th century. Turn left into the Raccoon Park Road.
1.1	55.4	LUNCH STOP -- Picnic area with rest facilities. Lunch today is sponsored and provided by Michael Baker Jr., Inc.
0.6	56.0	ALTERNATIVE LUNCH STOP.
1.3	57.3	Main park picnic area on the left.
2.2	59.5	Intersection of Raccoon Park Road and US-30. Turn right on US-30.
0.8	60.3	Crossing Raccoon Creek.
4.1	64.4	Intersection of US-30 with Moon Clinton Road in Clinton. Turn left on Moon Clinton Road.
0.8	65.2	The water tank on the knob on the right side of the road is 100 feet above mined-out Pittsburgh coal bed. Reportedly, this

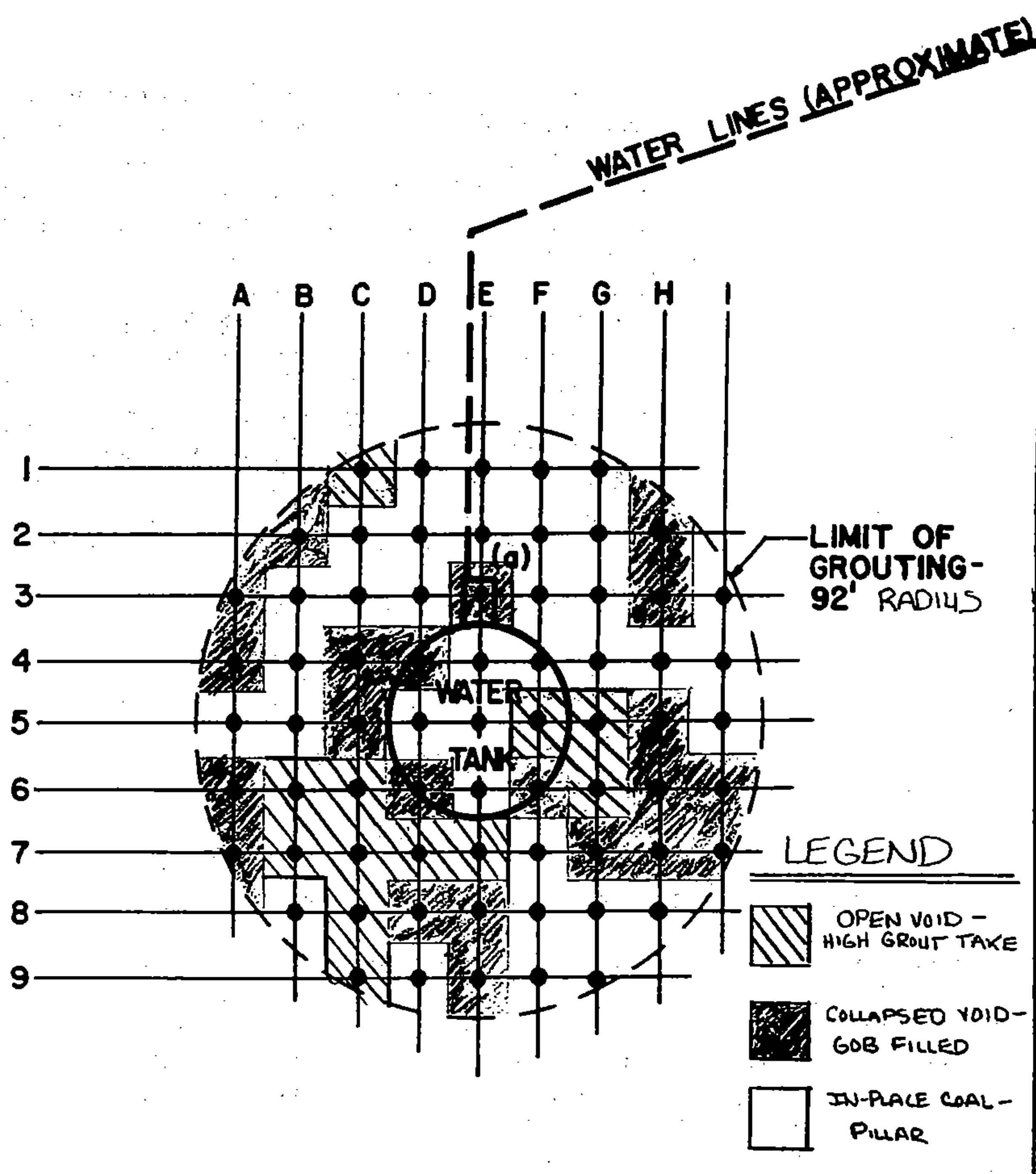
water tank is the highest point in Allegheny County. During the construction of new S.R. 60, Moon Clinton Road was relocated and lowered. Due to the close proximity of the mined Pittsburgh coal under old Moon Clinton Road, the coal was undercut, removed and backfilled with replacement embankment to eliminate any chance of future subsidence under Moon Clinton Road. Because of this under cut and the adjacent cut on mainline, a grout program occurred to back fill the mine and stabilize the area under the water tank prior to excavation. Approximately 80 100-foot grout holes were drilled to inject the grout. Approximately 2,000 cubic yards of grout were needed to accomplish this program (Figure 2-6). Figure 2-6 depicts the findings of this program which determined areas of in-place coal (remaining pillars), gob filled areas and zones of open voids which experienced high grout takes.

0.1	65.3	Turn right onto ramp to PA 60 south.
0.3	65.6	Proceed to Stop 2. Landslide on the right at the end of the ramp poses a threat to a pipeline parallel to the highway.

STOP 3
Stabilized Landslide

A geotechnical investigation was conducted for a landslide within Detention Basin No. 5 located along the Southern Expressway, S.R. 6060, between the Moon Clinton Road and Midfield Terminal interchanges, during the Summer of 1994. The landslide is located approximately 150 feet to 200 feet right of the southbound lane on the southwest side of Detention Basin No. 5. The most significant concern of the landslide was its impact on a 24" natural gas pipeline located approximately 35 feet upslope of the main scarp of the landslide. Additionally, the landslide resulted in a partial blockage of the riser outlet pipe for the detention basin and decreased the capacity of the reservoir.

To monitor movement of the slide, standard inclinometer casings were installed in Borings D1 and D2 during the subsurface investigation of the landslide in August, 1994. The inclinometer casing was installed to an approximate depth of 32 feet in Boring D1, located upslope of the Columbia Gas transmission line, and to a depth of 36 feet in Boring D2, downslope of the gas pipeline. Upon completion of the inclinometer installation on August 23, 1994, baseline readings were obtained for both inclinometer on August 30, 1994. The inclinometer readings were obtained using Slope Indicator Company equipment that includes the Digitilt Inclinometer Probe and the Digitilt Datamate data capture device. After the baseline readings were obtained, readings were taken approximately every two weeks.



(a) LOCATION OF VALVE CHAMBER.

● - LOCATION OF GROUT HOLE AT MINE LEVEL 20' C-C SPACING.

ATTACHMENT TO FOUNDATION GROUTING SPECIAL PROVISION

WATER TANK GROUTING PLAN

SCALE 1" = 50' S.O. No 16539-ARA
DATE 6-1-90 FILE ______

Figure 2-6

A total of 6 rounds of readings were obtained for Inclinometer D1, and 7 rounds of readings for Inclinometer D2, from September 20 to November 30, 1994.

The results of the monitoring indicate Inclinometer D1 has experienced virtually no movement and an extremely small amount of cumulative movement of approximately 0.10 of an inch or less was detected in Inclinometer D2. Figure 2-7 illustrates inclinometer output from a different project where significant movement was detected over a period of time. This figure is included to demonstrate the value of this type of instrumentation in monitoring of slope movements. Notice, in the first of the two graphs, a sharp change in the graph has occurred at approximately 32 feet in depth. This indicates significant movement was occurring at that depth along a failure plane. The second graph illustrates the rate of movement or amount of movement that has occurred over time. Both graphs provide important data on slight or significant subsurface movements in failing soils.

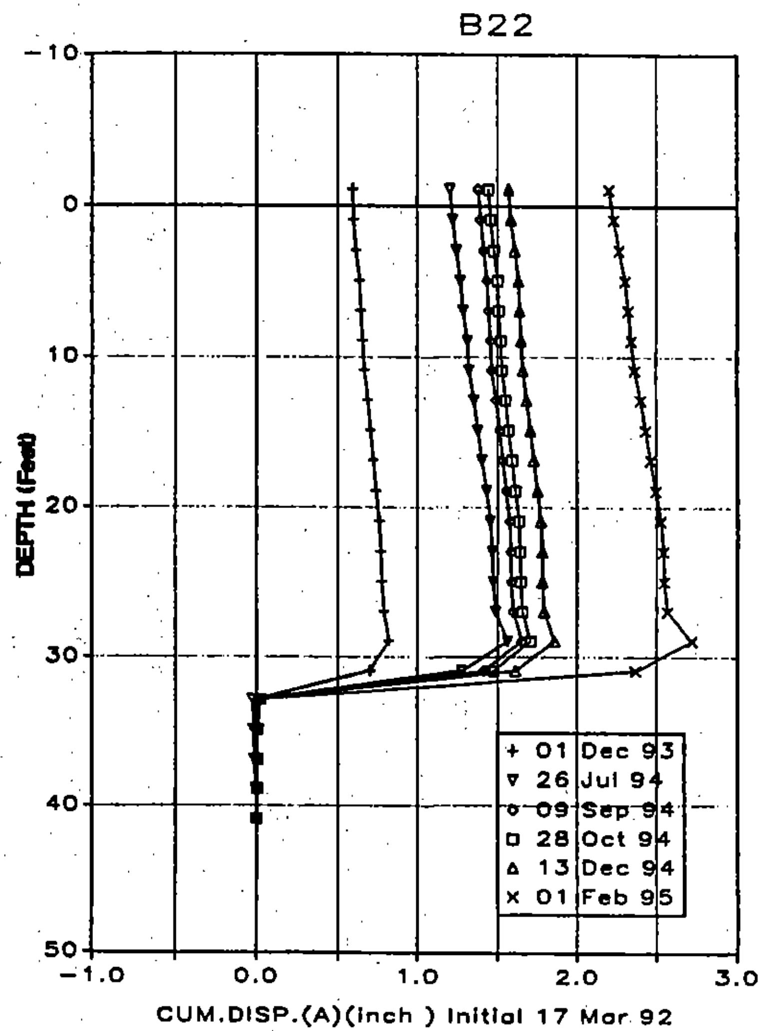
Road Log Continues from Stop 3.

9.5	66.1	Bear off right onto ramp to airport.
1.3	67.4	Passing departure gates at the landside terminal.
0.7	68.1	The "Governor's Overlook" overview of construction of the New Midfield Terminals, Optional Stop 3.

OPTIONAL STOP
Governor's Overlook

The "Governor's Overlook" provides an excellent overview of construction of the New Midfield Terminals. Figure 2-8 presents an overview of the Midfield Terminal Site Complex. The scope and magnitude of this project made it a geotechnical engineer's dream. Picture now typical airline passengers parking their car in the long-term parking lot and walking through the terminal of the future to their planes; they get a chance to pass over several different types of foundations, each working together to provide a firmly supported complex (Figure 2-9).

As patrons leave their cars, the passengers stand on areas that are either in a rock cut, that is up to 75 feet deep, or on top of a 65-foot high embankment section depending on which area of the parking lot they are located. Passengers enter the enclosed walkway supported on spread footings in either soil or rock. The walkway continues onto a bridge structure supported by caissons and then crosses over the Parking Garage supported by caissons. They then cross into the Landside Building that is supported on three types of foundations due mainly to its large size: the northern end of the building is supported on


B22
DEPTH (Feet)
CUM.DISP.(A)(inch) Initial 17 Mar 92
+ 01 Dec 93
▽ 26 Jul 94
◇ 09 Sep 94
□ 28 Oct 94
△ 13 Dec 94
× 01 Feb 95
-10
0
10
20
30
40
50
-1.0
0.0
1.0
2.0
3.0

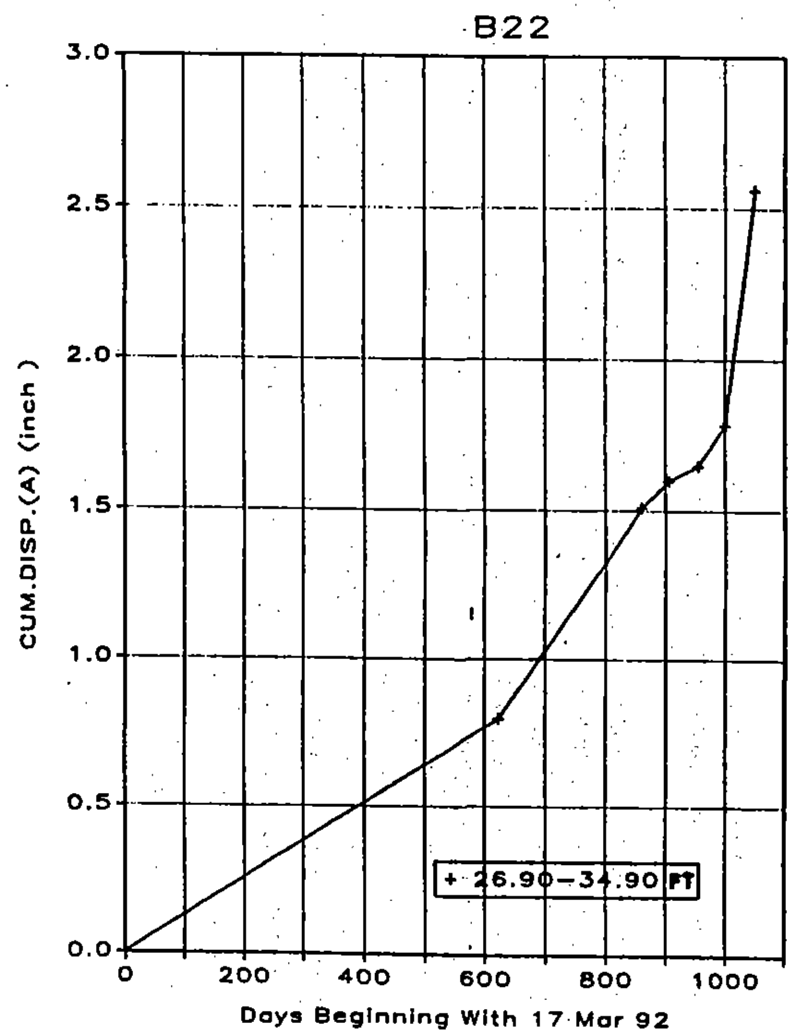

B22
CUM.DISP.(A) (inch)
Days Beginning With 17 Mar 92
+ 26.90-34.90 FT
0.0
0.5
1.0
1.5
2.0
2.5
3.0
0
200
400
600
800
1000

Figure 2-7

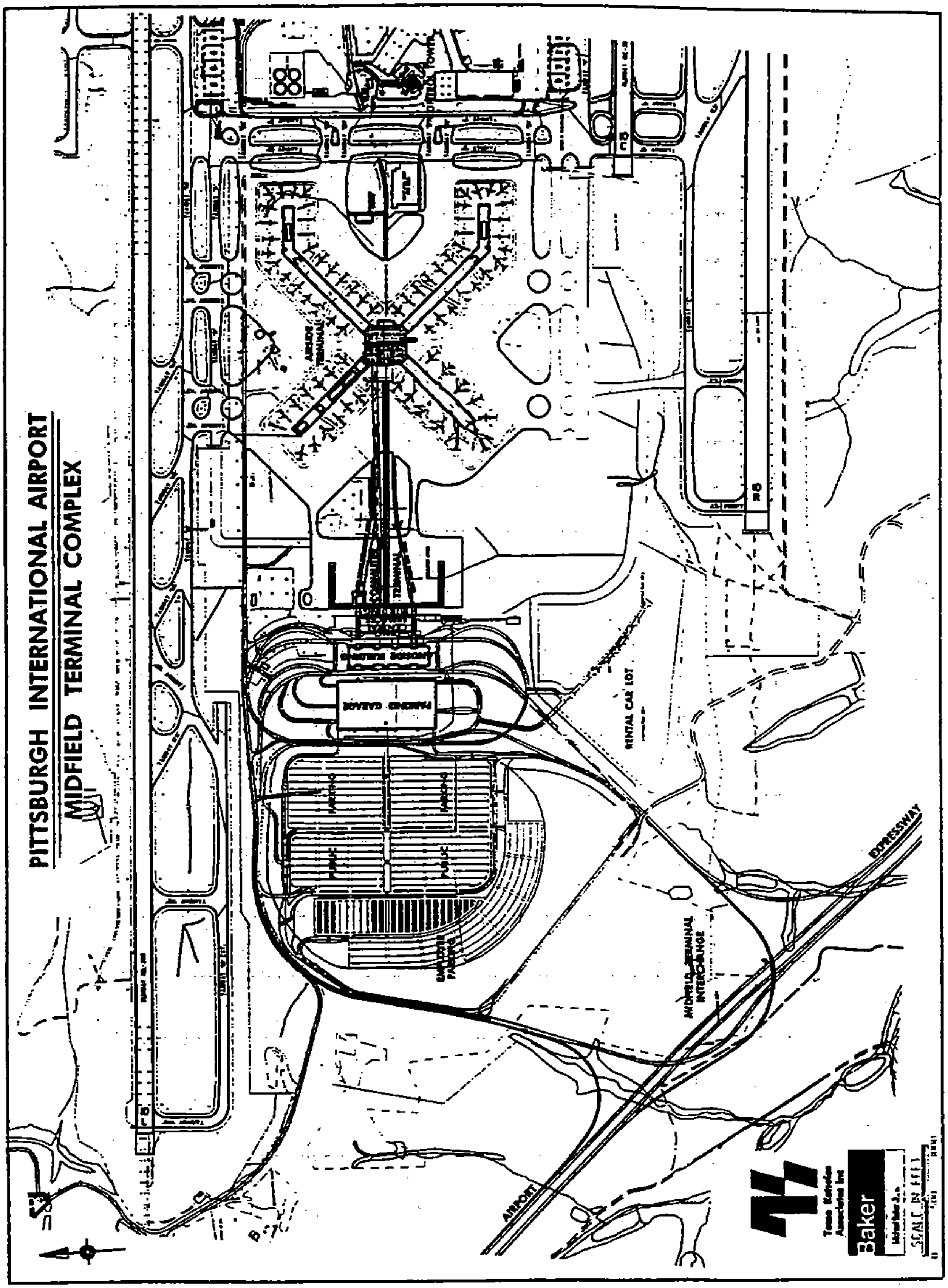


Figure 2-8 Pittsburgh International Airport Midfield Terminal Complex.

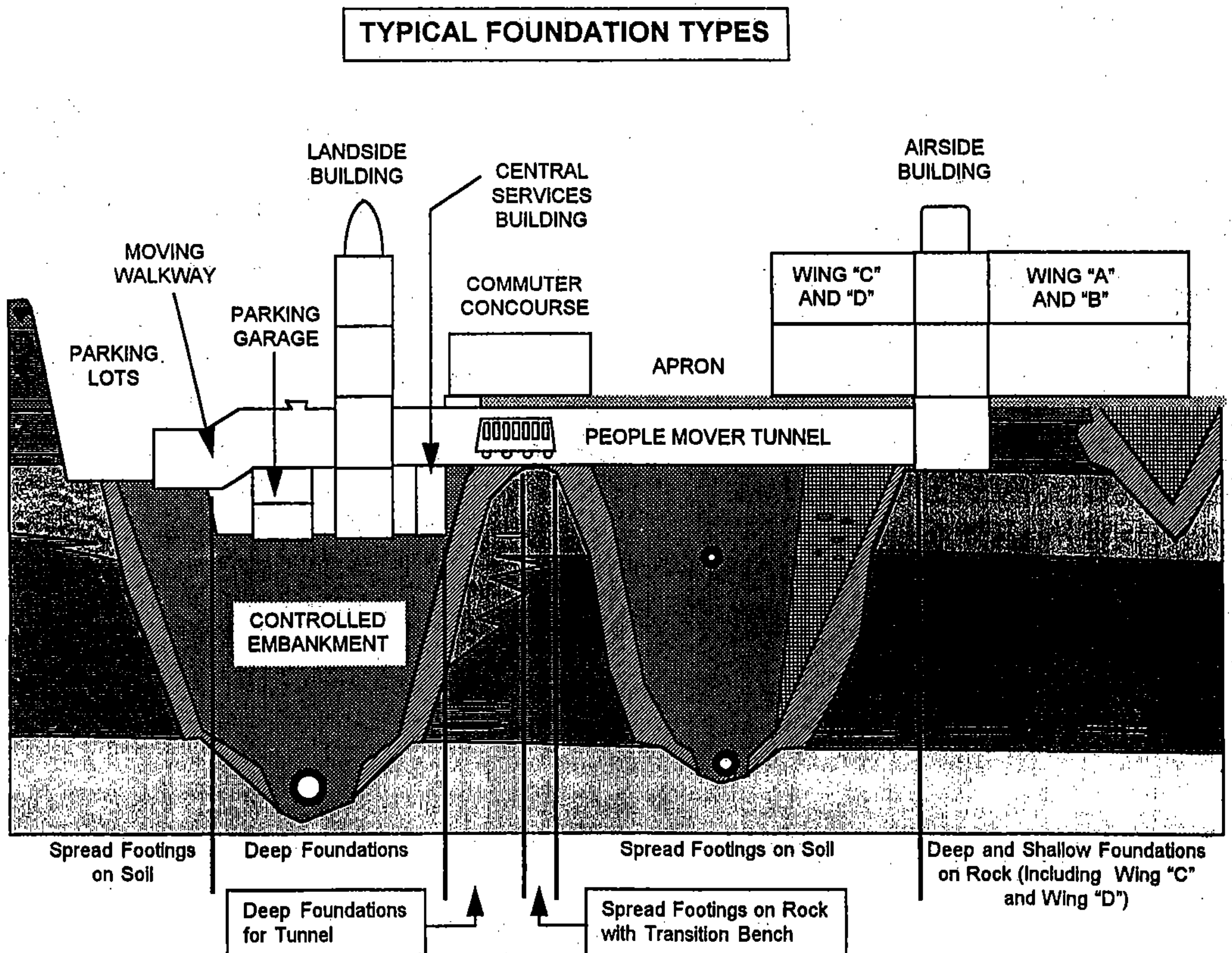


Figure 2-9 Typical foundations at the Pittsburgh International Airport Midfield Terminal Complex.

spread footings on rock and the southern portion of the building is supported on pedestals on rock, then on auger cast piles.

The passengers proceed to the people mover system. At the western end, this system passes over a bridge supported by auger cut piles and through a tunnel supported by auger cast piles. Still moving forward in the tunnel, it passes over spread footings on rock, followed by spread footings on soil as it crosses an embankment area that was preloaded with a 17-foot high surcharge embankment to reduce long-term settlement.

At the eastern end of the people mover system passengers enter the lower floor of an Airside Building that is supported on four different types of foundations, depending on the location within the building Spread footings on rock are used where rock is at footing elevation, while in transition areas pedestals are used. Auger cast piles were used in areas where the depth to rock exceeded 50 feet. When the depth to adequate bearing exceeded 50 feet, steel H-pile section were used. A small area of the Airside Building core also is supported on short steel H-piles that were installed to maintain the construction schedule prior to approval of the auger cast pile alternative. Finally, as our passengers cross from the Airside Building to their airplanes they pass through an enplaning bridge (jetway) supported on a concrete caisson.

Table 2-1 provides a breakdown of the pile and caisson quantities installed on this project.

Structure	Steel H-Pile (lineal foot)	Auger Cast Pile (lineal foot)	Caissons (lineal foot)
Landside*	—	170,384	—
Airside	29,507	172,182	3,225
Tunnels	7,070	51,568	161**
Parking Garage	—	—	19,610
Bridges	22,642	***	****
Totals	59,219	394,134	22,996

* Landside Building includes Central Services Building

** Installed for Baggage Building

*** Length of auger cast pile used to support bridge structures adjacent to Landside Building is included with Landside Building.

**** Moving sidewalk bridge quantities included with Parking Garage.

A total of 476,349 lineal feet or about 90 miles of deep foundation systems, not including pedestals, were installed for this massive project. To put this in perspective, this is as far as from here to Erie or a greater length than we will travel today on this trip. (For those who may wonder, the total volume of soil and rock removed from the deep foundation holes was about 23,750 cubic yards). An additional 17,416 lineal-feet (three miles) of pile pre-drilling holes were drilled and abandoned due to construction errors, hole cave-in, or re-design that occurred after initial piles had been installed. Based upon project performance to date, these various foundation systems are performing as expected.

Road Log Continues from Optional Stop

0.5	68.6	Ramp to PA 60 south.
0.6	69.2	Rejoin PA 60 south.
0.8	71.0	In the distance on the forward left is a landslide adjacent to the same gas line as at Stop 2.
0.6	71.6	Bear right on off ramp to McClaren Road.
0.4	72.0	Upper and lower Pittsburgh limestone, in the Casselman Formation below the Pittsburgh coal bed, is exposed in the cut on the right.
0.2	72.2	End of ramp. Turn left onto McClaren Road.
0.1	72.3	Bridge over PA 60.
0.7	73.0	Downhill past Pennsylvania Air National Guard entrance. The Morgantown sandstone is well exposed on left and right.
0.2	73.2	Old road blocked on the right. Use this to turn around and head back.
0.5	73.7	New Pennsylvania Air National Guard entrance on the right. Amusing problem with gates.
0.4	74.1	Pull off to side of road, Stop 4.

STOP 4
Pittsburgh Coal Mine Seals

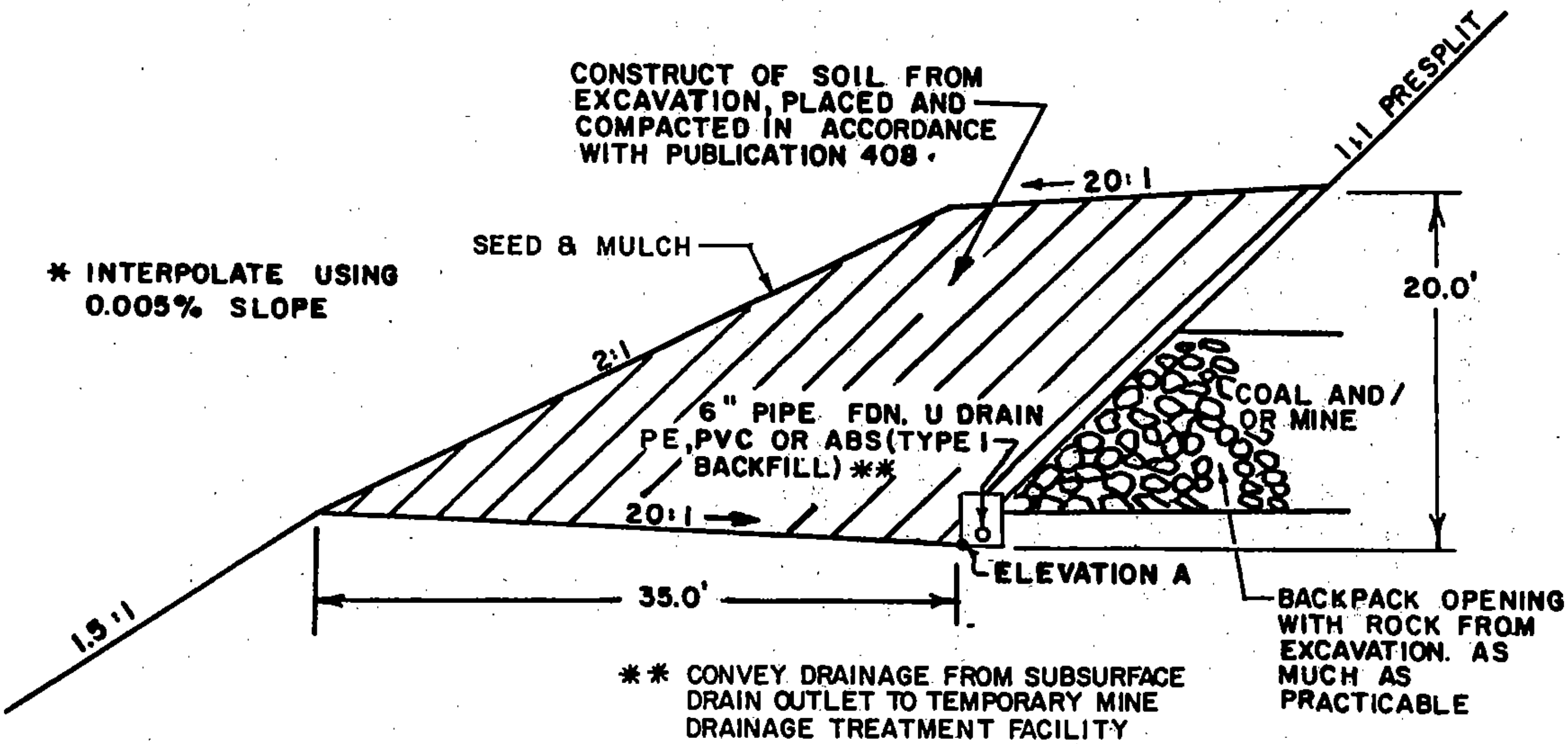
Leave bus and walk uphill about 50 yards to view a number of coal-mine seals in the Pittsburgh coal bed. This interchange is constructed in the lower Monongahela and upper Conemaugh Groups, specifically the Pittsburgh and Casselman Formations. The Pittsburgh coal is present approximately 50 feet above S.R. 60 grade elevation. The coal was deep mined by room-and-pillar mining methods in the early 1900's and subsequently surface-mined along the crop line. The coal has a localized synclinal structure within the interchange with the low area located in the northwest corner of the interchange (off to your right looking towards the Airport). The coal was as low as elevation 1,132 feet amsl in this area and as high as elevation 1,144 feet amsl in the southwestern corner of this same interchange (looking towards the town of Imperial). Because of this localized fold, the old Pittsburgh coal mine was subsequently flooded.

Since this entire interchange is below the elevation of the coal (therefore in cut), the mine had to first be dewatered prior to any excavation into or below the mine. A 12-inch diameter boring was drilled into the low portion of the mine (approximate elevation 1,132 amsl), to establish a pumping location to dewater the mine. Water pumped from the mine was piped to a temporary mine drainage treatment facility located in the valley to the northwest. Here, mine drainage was treated with either soda ash or potassium permanganate briquettes to bring the water to regulatory standards for pH, iron, manganese, alkalinity, acidity and suspended solids. Monitoring wells were measured to record the mine pool drawn down to establish when the mine was actually dewatered and when excavation could actually commence. Millions of gallons of water were pumped and treated from this mine prior to development of the cuts. The coal face was ultimately covered with an embankment seal and underdrain (Figure 2-10). From this location, six coal or mine seals can be observed.

Another issue related to stratigraphy playing a major role in the construction sequencing was the availability of quality durable rock. Typically, bases of embankments, old stream valleys and undercut areas are filled with rock prior to construction of the soil embankments. This particular project attempted to tighten the specification of this rock to ensure that on-site, durable, competent rock be placed in these areas. This rock was available on site from the Pittsburgh limestones and the Connellsville sandstone (in areas) but it required very careful sequencing of the construction work to best utilize the available natural materials.

Road Log Continues from Stop 4.

0.2	74.3	Turn left onto Aten Road.



TYPICAL SECTION
MINE SEAL

Figure 2-10

0.6	74.9	Stop sign at Old Ridge Road. Continue straight.
0.2	75.1	Stop sign at Cranbrooke Road. Continue straight.
1.1	76.2	Traffic light at T intersection with Cliff Mine Road. Turn left.
0.2	76.4	Follow Cliff Mine Road under PA 60 overpass.
2.1	78.5	Traffic light at entrance to Robinson Towne Center. Turn right uphill.
0.6	79.1	Pull off to view North Fayette Township Interchange, Stop 5.

STOP 5
North Fayette Township Interchange

This stop is an overview of the construction of the future North Fayette Township Interchange from old Steubenville Pike (Figure 2-11). This project is a Public-Private Partnership between the Federal Highway Administration, the Pennsylvania Department of Transportation, the Township of North Fayette and Metro Property Developers. The prime contractor performing the work is Atlas Services. Observations at this site will be dependent on the contractor's work operations around the time of our field trip. Possible activities or operations to review include toe bench and undercut development, cut excavation, high embankment culvert installation, induced trench development, rock embankment placement (408, 408 modified and 510 modified) and culvert relining under the existing Parkway.

Road Log Continues from Stop 5

79.3 Entrance to IKEA.

79.5 South end of IKEA parking lot.

END OF Road Log, Day 2.

Stop 5

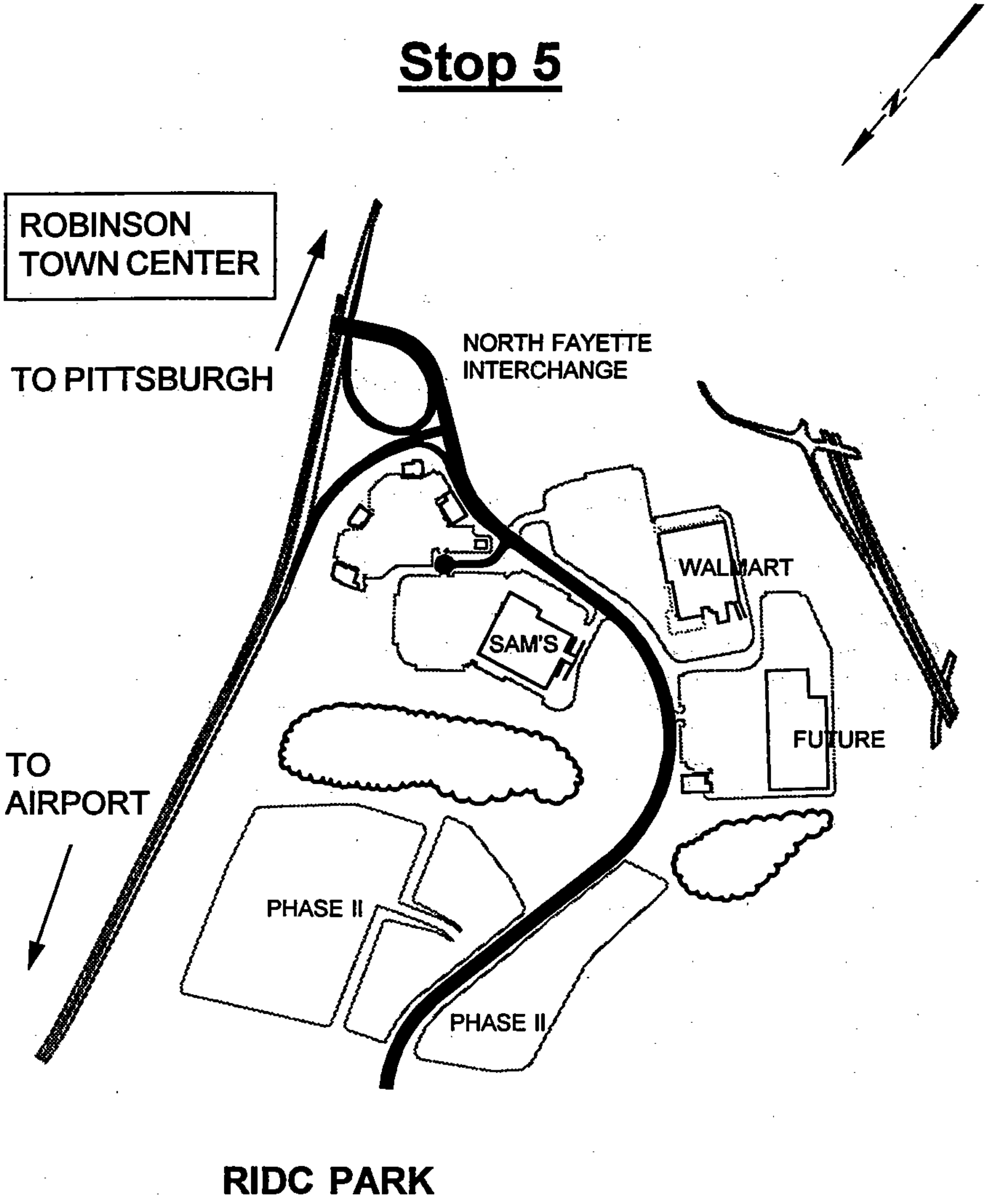


Figure 2-11