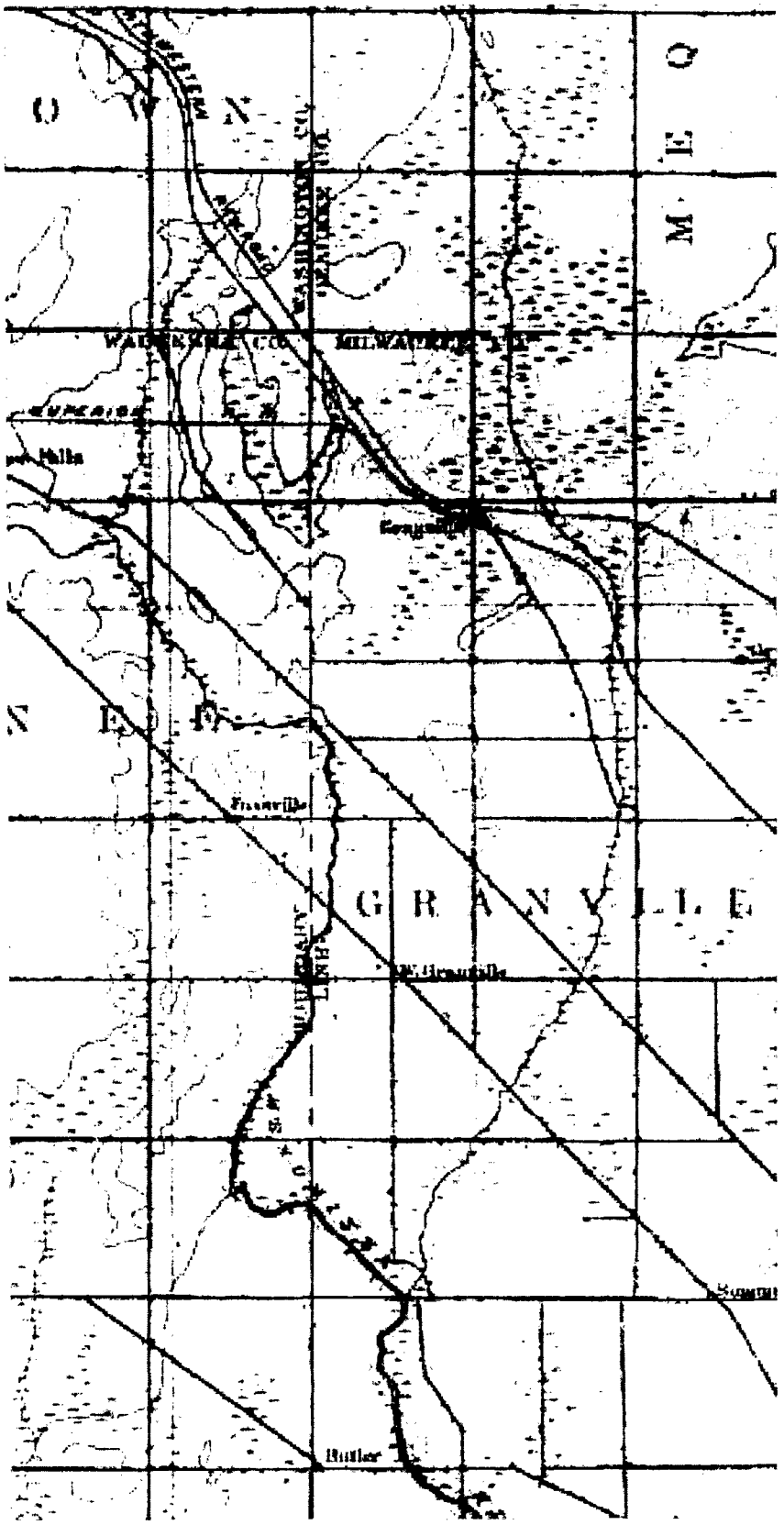


USGS 15-minute quadrangle, 1901

Extent of Contaminated Sediment at the Moss-American Superfund Site

Little Menomonee River

Milwaukee, Wisconsin

Wisconsin Department of Natural Resources

September, 1999

1. INTRODUCTION

This document summarizes the results of sediment probing and sampling work completed by the Wisconsin Department of Natural Resources (WDNR) between June and November, 1998. This work was completed in order to refine estimates of the vertical and horizontal extent of sediment contamination contained in the Little Memononee River between the Moss-American Superfund Site and its confluence with the Menomonee River. The Moss-American Site and the contaminated reaches of the Little Menomonee River are located primarily within the City of Milwaukee municipal boundaries, in the northwest corner of Milwaukee County. The primary chemicals of concern at the Moss-American Superfund Site include creosote and fuel oil mixtures associated with a former wood-treating operation.

The sections that follow document the methods used for probing, sampling, and data reduction, and present a summary of the results. In addition, a sediment volume estimate is presented that corresponds to the total volume of sediment (as defined by pushing a sounding rod to refusal) contained in the Little Menomonee River between the site and its confluence with the Menomonee River.

2. CONCLUSIONS

Based on the work presented in this document, we reach the following conclusions regarding the vertical and horizontal extent of contamination, and the associated contaminated sediment volume, of sediments in the Little Menomonee River between the site and the confluence with the Menomonee River:

- The vertical extent of contamination within Little Menomonee River sediments presented in the predesign technical memorandum prepared for Kerr-McGee (Weston, 1994) is underestimated when compared to the vertical extent of contamination as determined by this work. Generally, we found sediment thicknesses that were 0.5 feet to 3 feet greater than those reported by Weston (1994).

- The total contaminated sediment volume, as estimated by Weston (1994), is underestimated by up to a factor of four.

- Hydrocarbon odors were observed in core samples obtained from well below the mean sediment thicknesses reported by Weston (1994).

- Total PAH (TPAH) and Carcinogenic PAH (CPAH) concentrations were detected in core samples obtained from well below the mean sediment thicknesses reported by Weston (1994).

- Carcinogenic PAH (CPAH) concentrations exceed the river-wide sediment quality criteria of 15 mg/Kg throughout reaches 1 through 5, inclusive.

- CPAH concentrations in bank soils adjacent to the river channel exceed the river-wide sediment quality criteria of 15 mg/Kg CPAH. The horizontal extent of bank soils, as defined by the location of the observed bankfull extent, generally includes sediments, lateral bars, and bank soils 5-15 feet landward from the location of the land-water interface.

- The horizontal extent of the proposed sediment remediation area must include those sediments and soils that fall within the bankfull extent, and must extend from the site downstream to the confluence with the Menomonee River. This conclusion is reached assuming that the final remedy for the river sediments is changed from constructing a new channel to removing the contamination from the existing channel plus restoration of the existing channel after contaminant removal.

- The vertical extent of the proposed sediment remediation area must include all sediments within the envelope defined by the depth to refusal using a sediment sounding rod, provided that the final remedy for the river sediments is changed from constructing a new channel to removing the contamination from the existing channel plus restoration of the existing channel after contaminant removal..

- Based on the above considerations, we believe the sediment volume cited in the predesign report (Weston, 1994) of 16,000 yd^3 underestimates the volume that must be remediated in order to meet the river-wide sediment criteria of 15 mg/Kg CPAH. Our estimate of the volume of contaminated sediment between the site and the confluence with the Menomonee River is 64,000 yd^3. This conclusion is reached assuming that the final remedy for the river sediments is changed from constructing a new channel to removing the contamination from the existing channel plus restoration of the existing channel after contaminant removal.

3. INITIAL PROBING AND SAMPLING EFFORT

As was related in the Janisch June 25, 1998 memo, we visited the impacted river segments on June 23, 1998 along with Ken Stromberg of the U.S Fish and Wildlife Service. The intent of the site visit was to give Ken Stromberg an opportunity to observe the various habitats associated with the river. Another reason for the site visit was to view the high water marks and changes in sediment depositional patterns that may have been associated with flood events in the system that had occurred previously. In the course of looking at the sediment depositional areas and river bottom and bank characteristics in all of the river segments, we probed with a 6 ft. long, 3/8 in. metal rod and took samples for visual observation with a 4 in. diameter bucket auger.

The June 25, 1998 memo summarizes the findings of our June 23 probing and auguring. As noted in the memo, given the probing method we used, we found significant differences in what is being defined as "penetrable" soft sediments overlying the hardpan layer as defined by Weston in their November, 1994 Predesign Task 4 as well as the sediment depths reported in the RI produced by CH2M Hill.

Weston typically reported soft sediment depths that averaged 6 to 9 inches and had a maximum of 15 inches for all the river segments. As summarized in the Table in the June 25, 1998 memo, we were typically measuring sediment depths of 2 to 4 feet and up to 5 ft. with the metal probing rod. The rod was pushed in by hand to the point of refusal and a penetration depth reading taken.

Some essential observations during the probing in addition to the depth of penetrable sediments were:

1) The presence of creosote residuals at or near the bottom of the withdrawn rod which could mean the presence of creosote at depth;

2) The presence of creosote along the length of the rod withdrawn from probing made diagonally into the bank slope above the water line at some locations ; and

3) The presence of creosote on the rod that penetrated below overlying sand and gravel bars.

The bar areas are not penetrable by manual coring equipment. Instability of the bars in future high flow events could mean exposing of the creosote-contaminated sediments that lie below the bars.

On June 25,1998, we returned to one of the sites that showed creosote at depth based on its appearance on the probing rod both in the river bottom and a diagonal probe into the bank.

The site was approximately 300 ft. downstream from Good Hope Road, which would put it in the vicinity of Weston's Predesign Task 4 site SD03-0020.

A bucket auger was used to take samples at depth in the river bottom and bank for PAH analyses. In either case, the full depth of the creosote contamination was not sampled. The results of the analysis from the samples are shown in the following table.

River Bottom		Bank	
Sediment Depth (cm)	Total PAHs (mg/kg)	Bank Depth (cm)	Total PAHs (mg/kg)
0 – 20	191.1	0 - 15	2,075
20 – 40	121.8	15 - 30	7,240
40 – 60	233.8	30 - 42	2,622

For comparison, Weston reported a CPAH concentration of 28 mg/kg for the same general location and an average penetrable sediment depth of 15 cm. The average penetrable depth we found with the rod in a cross section at this location was 2.25 to 2.5 ft. (69 to 76 cm.) in the river bottom and 3.75 ft. (114 cm.) into the bank.

4. COMPREHENSIVE PROBING AND SAMPLING EFFORT

4.1. SEDIMENT SURVEY: JULY AND NOVEMBER, 1998

Based on the survey and probing work we did as discussed above and the resulting differences and discrepancies with existing report data, we decided to more fully probe the banks and river bottom of all the river segments using the metal probe rod and obtain samples using a sediment corer. The sediment corer was made up of 7.6 cm. diameter Lexan tubes that were mounted into a stainless steel core head and fastened with thumbscrews. The Lexan tubes used were 4 ft. in length. A rubber piston was placed in the core tube to help retain the sediment material in the tube when the tube was extracted from the river bottom. In addition, a weighted slide hammer was mounted on top of the core head to drive the sample tube into the bottom after the tube could no longer be manually pushed.

The probing was done at cross sections of the river at 300-ft. intervals, the same interval used by Weston during the Predesign Task 4 characterization activities. Weston had 103 transects across the river segments in their Task 4. We revisited all but three of the transects along river segments 1, 2, 4 and 5 to do cross-stream probing. In addition, the lower 12 transects along river segment 3 (SD03-0011 through SD03-0001) were not surveyed due to time constraints. Probing with the metal rod was done at 7 locations across each transect as follows:

1) At a 45^0 degree angle into the face of the bank slope above the water line on the west bank;

2) Vertically at the water line on the west bank;

3) Vertically 1/3 of the distance from the west bank;

4) Vertically at the mid-point of the river;

5) Vertically 1/3 of the distance from the east bank;

6) Vertically at the water line on the east bank; and

7) At a 45^0 degree angle into the face of the bank slope above the water line on the east bank.

The probing rod was pushed into the river bottom and bank manually to the point of refusal.

At the point of refusal, the types of material that the rod was encountering were estimated by feel or sound and recorded (e.g. rock or dense silt/clays). The water depth of each probing location was recorded.

A core sample was obtained at one location across each transect, usually at a probe location where the metal rod showed the greatest depth of penetration. The sediment core was extruded into a metal pan and the visual appearance of different strata in the core were described and recorded as to color, texture, odor, appearance of creosote/fuel oil residuals, and depths of strata below the sediment surface. The penetration depth that the core was driven into the bottom sediments was recorded as well as the length of the sediments in the retrieved core tube. Pictures were taken.

Based on visual appearances generally related to the presence of creosote, various core segments were selected for laboratory analysis. Twenty-eight (28) core segments were homogenized and placed in sample bottles from the SLOH for later analyses of PAHs.

Coring and subsequent core extrusion, homogenization, and sample packaging were completed by October 30, 1998. Samples were stored in a refrigerator until delivery to the State Lab of Hygiene in Madison, Wisconsin. Samples were delivered, on ice, to the State Laboratory of Hygiene on June 28, 1999.

4.2. LABORATORY METHODS

Eight months elapsed between sample collection and sample analysis. Sample holding times exceeded recommended holding times. However, contaminant loss through degradation, volatilization, or other processes would simply bias the results presented here toward the low end. In other words, although we don't believe that significant loss of contaminant occurred during the prolonged storage, any loss that did occur would bias our samples low, in which case, the results presented here may reported at lower levels than existed when the samples were first obtained.

State Lab of Hygiene (SLH) Method Number 1580 – "GC/MS – PAHs in Soil" was used to analyze the samples. All sample results referenced in this document were within State Lab of Hygiene QA/QC limits with respect to accuracy and reproducibility.

4.3. DATA REDUCTION AND PRESENTATION

Carcinogenic PAH (CPAH) concentrations were calculated in the same manner as the predesign document (Weston, 1994). Numeric values for the eight CPAHs were summed. The PAHs considered qualifying as "carcinogenic" are consistent with those used by Weston (1994), and include the following compounds:

1) Benzo(a)anthracene
2) Benzo(b)flouranthene
3) Benzo(k)flouranthene
4) Benzo(g,h,i)perylene
5) Benzo(a)pyrene
6) Chrysene
7) Dibenzo(a,h)anthracene
8) Indeno(1,2,3-cd)pyrene

Results reported as less than detect were included in the sum by adding a number equal to ½ the level of detection (LOD). Total PAH (TPAH) concentrations were estimated by summing all PAH results, and by including ½ of the detection limit in the case of non-detects.

Cross-section and sediment core detail pages were generated by writing a FORTRAN program to systematically plot the data obtained for all cross-sections and sediment cores. The side slope of bank soils was not measured in this study. For plotting and area calculation purposes, we estimated the horizontal extent of bank soils by extending a line at 2.5H:1V slope from the edge of the water surface, extending horizontally to the measured extent of the observed bankfull width. In reality, actual side slopes on the Little Menomonee River in the project area range from less than 1H:1V to more than 10H:1V.

Cross-sectional areas were calculated by using the "Area by Coordinates" method, used commonly by surveyors to find the surface area of irregularly shaped plots of land.

The sediment volume estimate presented in this report was generated by using the average-end area method:

$$SEDIMENT\ \ VOLUME = \frac{\left[AREA_{upstream} + AREA_{downstream}\right]}{2} \times \left[distance\ between\ cross\ sections\right]$$

All cross-sections between the former wood-treating site and the confluence with the Menomonee River were included in the sediment volume calculation. As such, this volume probably represents an "upper bound" or "worst-case" estimate of the total sediment volume at the site.

5. RESULTS AND DISCUSSION

5.1. PRESENTATION OF CROSS-SECTION AND CORE DETAIL PLOTS

DNR field staff obtained cross-section data and sediment cores at most of the sites previously sampled by Weston (1994). Appendix A contains 180 plots summarizing the results of this fieldwork. The plots are arranged so that the cross-section plot for a given station will appear first, followed by a core detail plot for the same station on the opposite page.

In most cases, the results of the DNR sediment probing revealed sediment thicknesses that greatly exceeded those reported in the predesign report (Weston , 1994). As can be seen in the core detail plots, described below, there were many occasions where field staff noted "oily lenses" and "creosote inclusions" clear to the bottom of the core.

A good example is the cross-section and core detail plot for station SD-01-0011, approximately 3300 feet downstream of the former wood-treating site. Weston (1994) reported an average sediment thickness of about 1-foot. Yet, as can be seen in these plots, field staff reported "free product" and a "very strong hydrocarbon odor" from a sediment core segment taken from the 0.9-2.0 foot interval. Sediment poling at this cross-section reveals unconsolidated deposits of nearly 5 feet in thickness. Because field staff could not recover a core sample deeper than the 2.0 foot mark, and given the presence of "free product" and CPAH concentrations of 281 mg/Kg in the bottom of this core sample, it is clear that the vertical extent of contamination at this cross-section extends below both the average thickness reported by Weston (1994), and below the deepest core sample obtained in this study.

CROSS-SECTION PLOTS

As we described earlier, we estimated the bank side slopes, because we did not obtain slope measurements while in the field. Side slopes were estimated to be 2.5H:1V.

The gray shaded area on the cross-section plots represents the horizontal and vertical extent of unconsolidated sediment, based on the fieldwork described in this document. The dark shaded area represents the horizontal and vertical extent of surface waters at a cross-section. Lastly, the dashed line outlines the extent of sediment based on the mean sediment depths reported by Weston (1994).

CORE DETAIL PLOTS

The core detail plots provide a visual representation of the notable physical characteristics of the sediment core obtained for a given cross-section. Dark (red) shading represents core segments for which samples were sent to the State Lab of Hygiene for PAH analysis. The description of each core segment is provided to the right of its associated core segment. Where core samples were analyzed for PAHs, those analytical results are displayed to the right of the corresponding sediment core segment.

5.2. MEASURES OF SEDIMENT THICKNESS

Figure 5-1 compares the average sediment thickness reported by Weston (1994) to the average sediment thickness measured as part of this work. Note that in this and the following figures (i.e. 5-1 through 5-4), the approximate locations of "Segments" are identified. These segment numbers correspond to the convention used in the predesign report (Weston, 1994), and are provided to assist in comparing the conclusions of this work to those in the predesign report.

The discrepancy between the Weston and DNR numbers ranges from about 3 feet near the former wood-treating site, to less than a foot halfway downstream to the confluence with the Menomonee River. For example, our average sediment thickness adjacent to the former wood-treating site is about 3.5 feet. At the same location, Weston reported a sediment thickness of between 0.5 and 0.75 feet.

One possible reason for the discrepancy between the mean sediment thickness reported by Weston (1991) and this study may be due to differences in equipment.

For this work, we used a 6 ft. long, 3/8 in. metal sediment-sounding probe to define sediment thicknesses. The rod was pushed, by hand, into the riverbed or bank material until it could be pushed no further (i.e. "refusal"). The length of metal rod present in the soil or sediment at the refusal depth was recorded.

The predesign report states that a 2-inch diameter Wildco "hand core sediment sampler" was used to obtain sediment cores (Weston, 1994). The cores were "examined in the field, and physical features, particle types, and sediment depth", along with other pertinent features, were noted in the field book.

Concluding that the maximum vertical extent of sediment contamination is accurately reflected by average sediment core penetration or recovery depths is erroneous. A sediment thickness estimate based on the amount of recovered core obtained by a Wildco Hand Corer is wrong, if only because the standard Wildco Hand Corer is only 20 inches long: this instrument is simply not capable of probing the depths at which we documented contamination in this study.

In addition to this, it is difficult to retain sample in this type of sampler given the type of sediment found at the Moss-American site. We have used the Wildco Hand Corer in the past, and have abandoned it because it is extremely difficult to retain all unconsolidated sediments in the sampler during retrieval.

In summary, the vertical extent of contaminated sediment reported by Weston (1994) is generally 0.5 to 3 feet less than those recorded by us at the same cross-sections. We believe that this discrepancy is likely due to the equipment and technique used in the Weston (1994) work, and that the true extent of unconsolidated sediment is more accurately reflected by the work described herein.

5.3. VERTICAL EXTENT OF CONTAMINATION

In addition to physically probing the sediments, sediment cores were obtained at most of the cross-sections. Although only a small subset were analyzed for PAHs, all sediment cores were extruded and examined, with notable features, such as presence and strength of hydrocarbon odor, recorded in the log book.

Figure 5-2 summarizes the average depth at which hydrocarbon odors were detected for each discrete core segment. For reference, this figure includes an overlay of the approximate average sediment thickness reported in the predesign document (Weston, 1994).

Although this information is somewhat subjective, it is clear that the relative magnitude and occurrence of hydrocarbon odors extend well below the average sediment thickness reported in the predesign document. The presence/absence of such odors was determined to be associated with CPAH concentrations greater than the river-wide CPAH sediment criteria of 15 mg/Kg.

Note that in Segment 1 and 2, the hydrocarbon odors are noted to a depth approximately 2 feet below the average sediment thickness reported by Weston (1994). In Reach 5, strong hydrocarbon odors were noted as much as 1.5 feet below the average sediment thickness reported in the predesign report.

5.4. HORIZONTAL EXTENT OF CONTAMINATION

BANK-BANK HORIZONTAL EXTENT

As may be seen in the cross-section plots in the appendix, the horizontal extent of unconsolidated materials generally extended many feet diagonally into the sediment bank. Field staff visually identified the indicators of bankfull width. In this context, bankfull width corresponds roughly to the width of the river cross-section during a flow event with a 1 in 1.5-year recurrence interval. Bankfull width corresponds to the bankfull discharge, which is defined in geomorphology as the

> "discharge at which channel maintenance is most effective, that is, the discharge at which moving sediment, forming or removing bars, forming or changing bends and meanders, and generally doing work that results in the average morphologic characteristics of channels (Rosgen, 1994)."

Although greater amounts of sediment are transported at higher discharges, the bankfull discharge is responsible for the average changes in channel geometry, and is, in our estimation, the appropriate measure of the horizontal extent of sediment contamination. The bankfull width is the appropriate measure of horizontal extent, in part, because we noted many instances where point bars had formed. Remediation of bank soils within ½ a foot of the edge of the water would leave most of these point bars in place. Because point bars are formed by transport and deposition of stream deposits, we would expect these point bars to be as contaminated as the sediments from which they came.

A limited number of bank samples indicate elevated CPAH and TPAH concentrations, the latter ranging from 19.4 mg/Kg to 7,240 mg/Kg.

In addition, it would be infeasible to increase the depth of proposed vertical sediment without simultaneously cutting back bank soils to a stable slope.

UPSTREAM-DOWNSTREAM HORIZONTAL EXTENT

Figure 5-3 summarizes the chemical analyses for PAHs performed as part of this work. Both Total PAHs (TPAH) and Carcinogenic PAH (CPAH) are depicted.

Note that CPAH concentrations in sediment exceed the river-wide sediment CPAH criteria clear to the end of segment 5.

Figure 5-4 compares CPAH concentrations determined as part of this work to CPAH concentrations reported in the predesign report (Weston, 1994). The CPAH trendline associated with the predesign report crosses the 15 mg/Kg river-wide sediment criteria line in the approximate location of the current proposed extent of sediment remediation (i.e. a little over 20,000 feet downstream from the former wood-treating site).

Using the trendline associated with the CPAH concentrations obtained through this work, an argument can be made for extending the extent of remediation all the way downstream to the confluence with the Menomonee River, since the trendline is at all locations above the 15 mg/Kg river-wide sediment criteria. An alternative approach may be to extend the downstream boundary of remediation to the point where the trendline becomes asymptotic to the 15 mg/Kg river-wide sediment criteria:

this would be about 26,500 feet downstream of the former wood-treating facility. Limited hot spot removal may suffice from there to the confluence.

5.5. SEDIMENT VOLUME

Our estimate for removal of all unconsolidated sediment, as defined by the methods described herein, is about 64,000 yd^3. This estimate is based on the following assumptions:

- Bankfull width is used as the bank-bank horizontal bound on contaminated sediment
- Depth to refusal, using a steel sediment sounding rod, is used as the vertical bound on contaminated sediment
- Project limits extend horizontally, bankfull to bankfull, from the former wood-treating site downstream to the confluence with the Menomonee River.

This estimate may be considered an upper bound, since if, as is suggested above, the downstream project extent were placed at 26,500 feet, the resultant sediment volume would be correspondingly less.

6. REFERENCES

Rosgen, Dave, 1996. Applied River Morphology. Wildland Hydrology. Pagosa Springs, Colorado.

Weston, 1994. Technical Memorandum: Predesign Tasks 2(b),3,4,5,6,7, and 19 (1994 Predesign Work), Moss-American Site, Milwaukee, Wisconsin.

7. APPENDIX A – CROSS-SECTION AND CORE DETAIL SUMMARIES – WISCONSIN DNR SEDIMENT SURVEY (1998)

Figure 5-1. Predesign vertical extent of sediment (Weston, 1994) vs. observed extent of sediment in this study

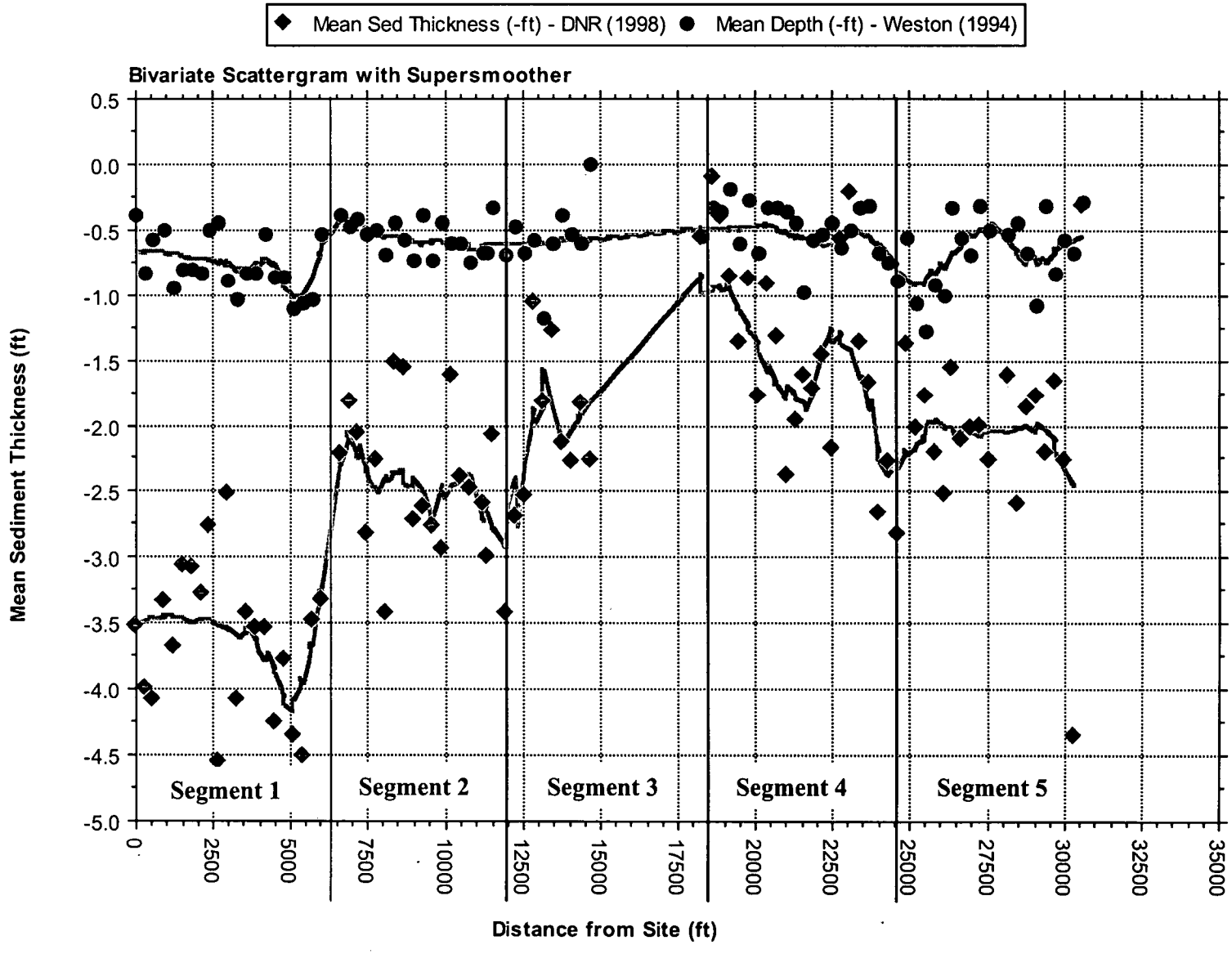


Figure 5-2. Predesign vertical extent of sediment (Weston, 1994) vs. observed hydrocarbon odor in this study

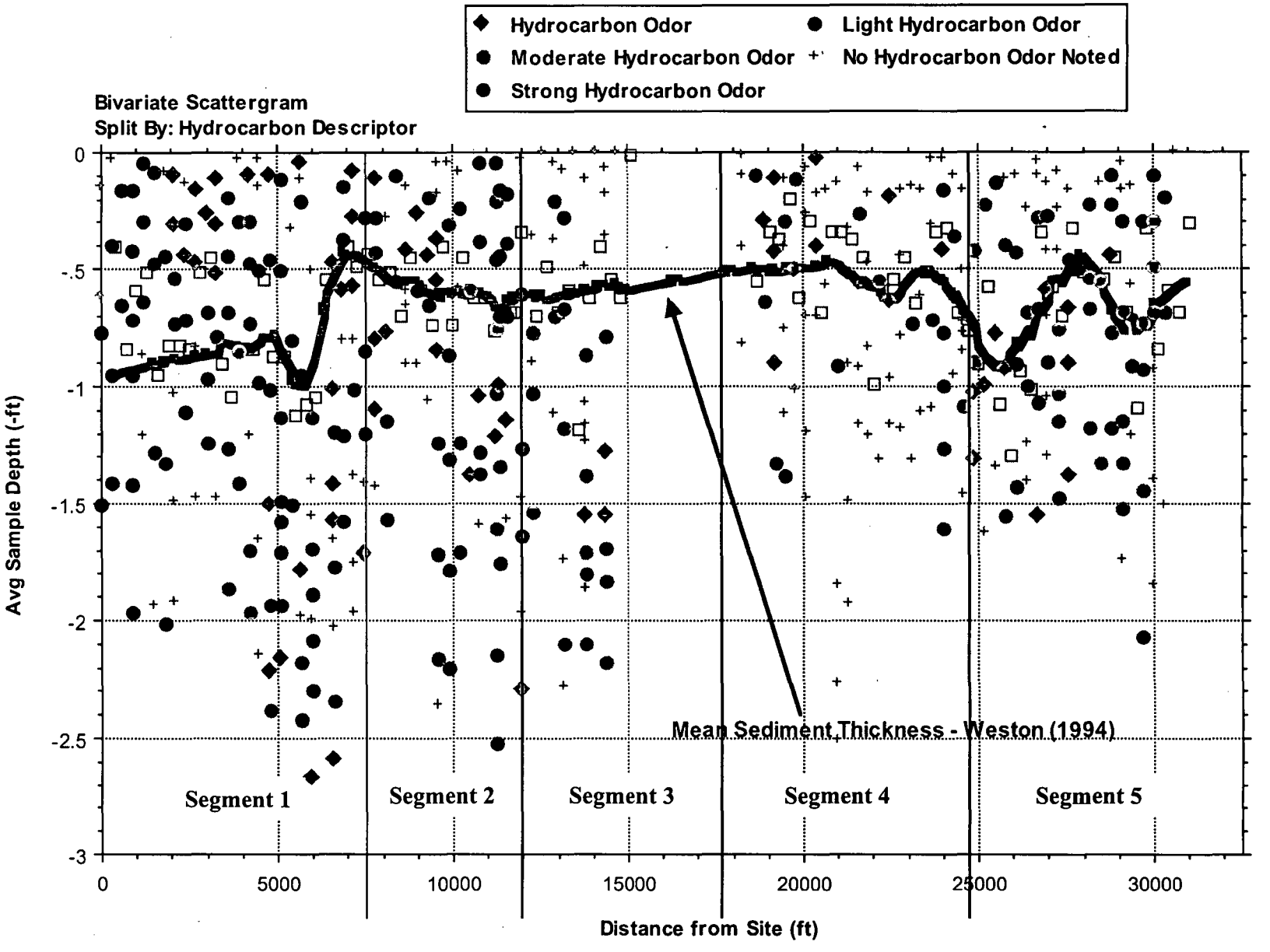


Figure 5-3. Sediment PAH concentrations as determined in this study

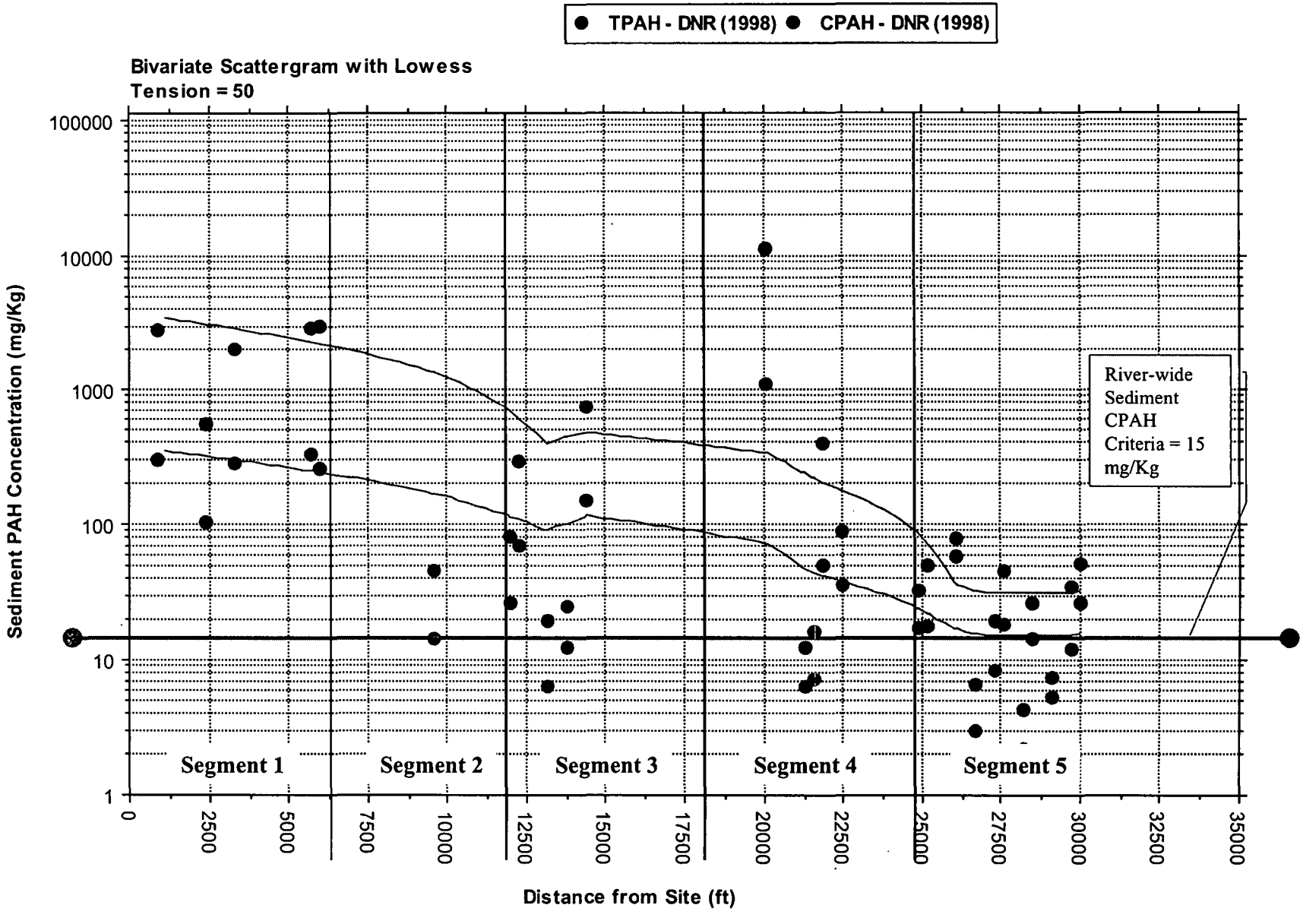
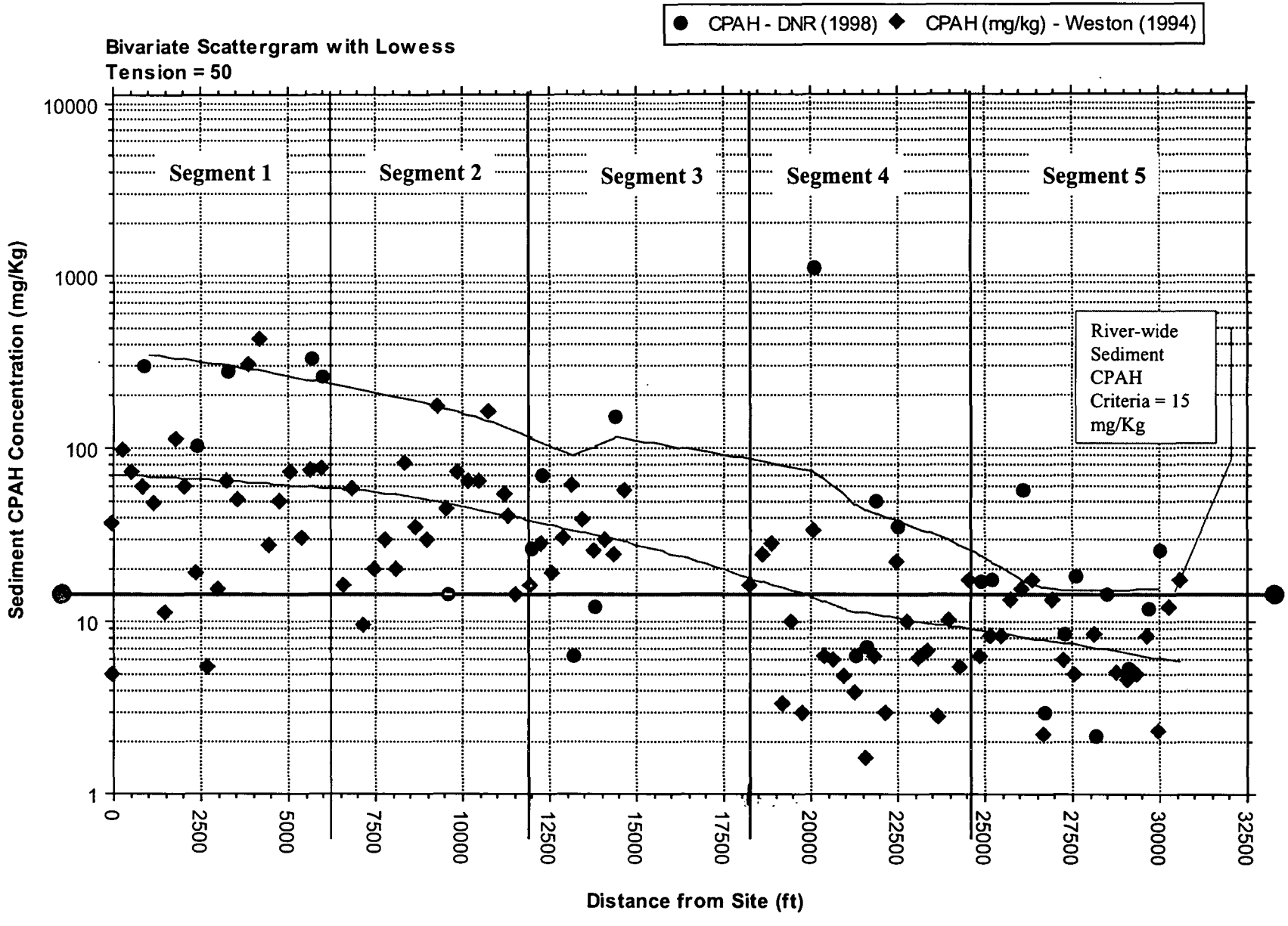
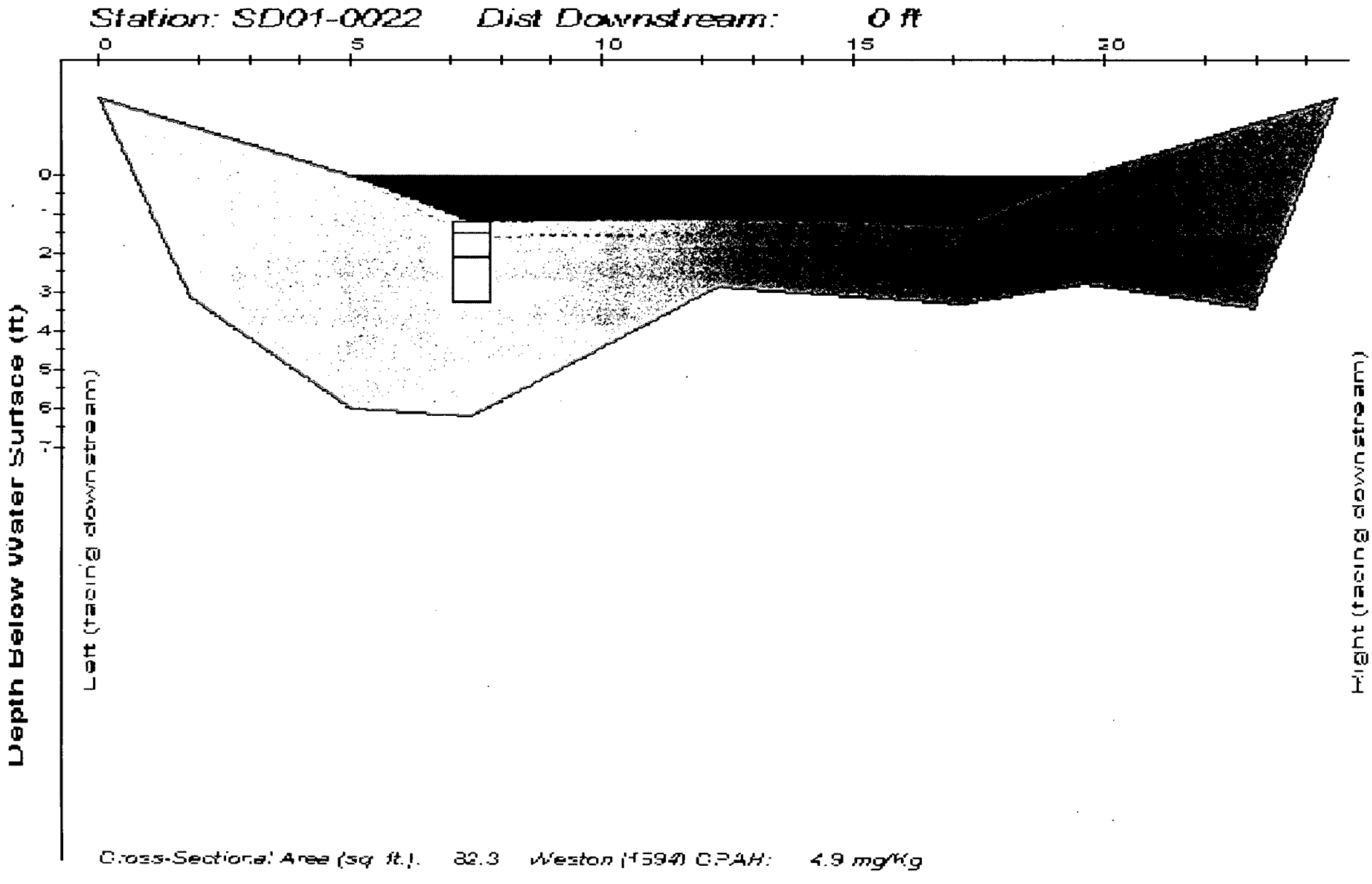
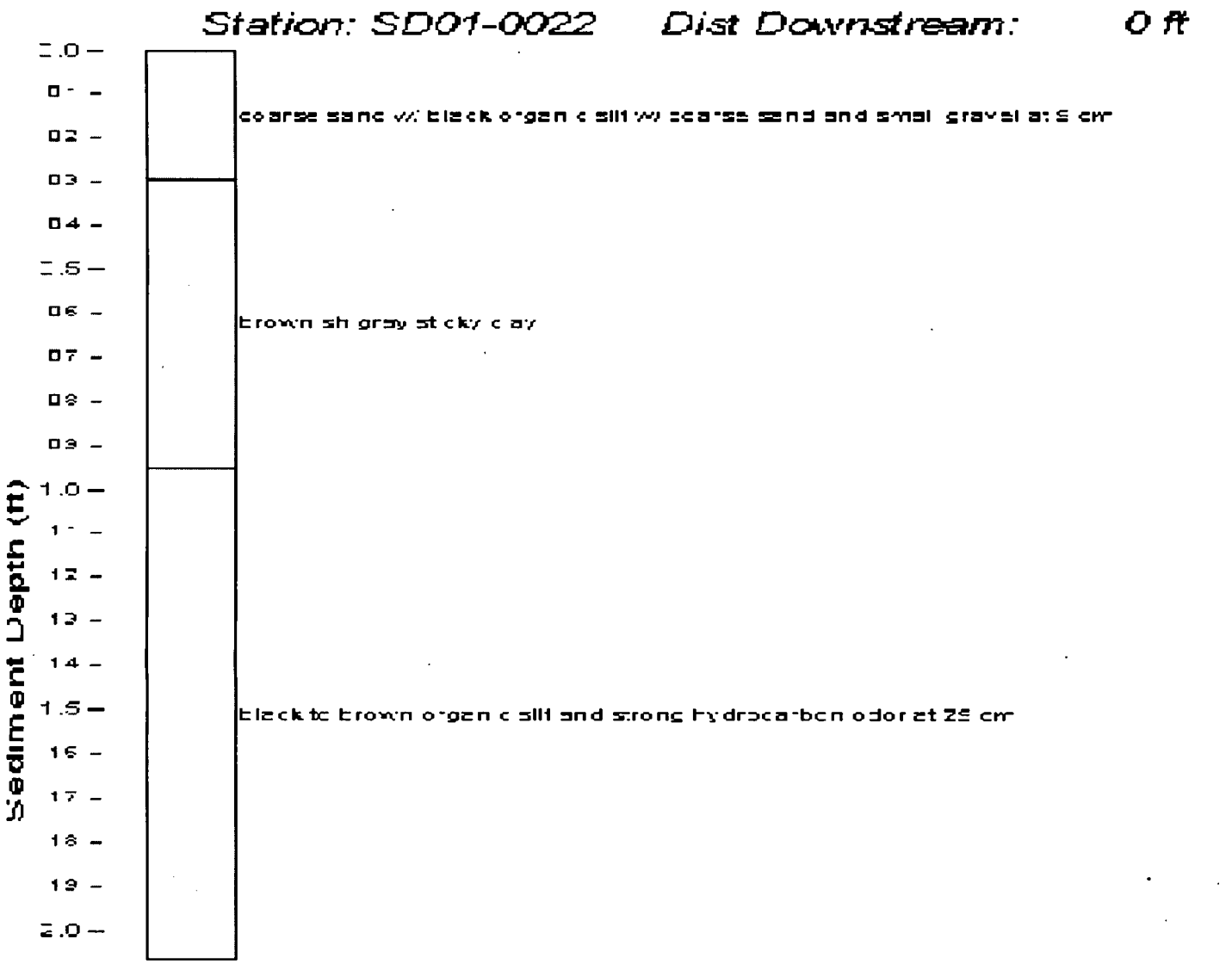
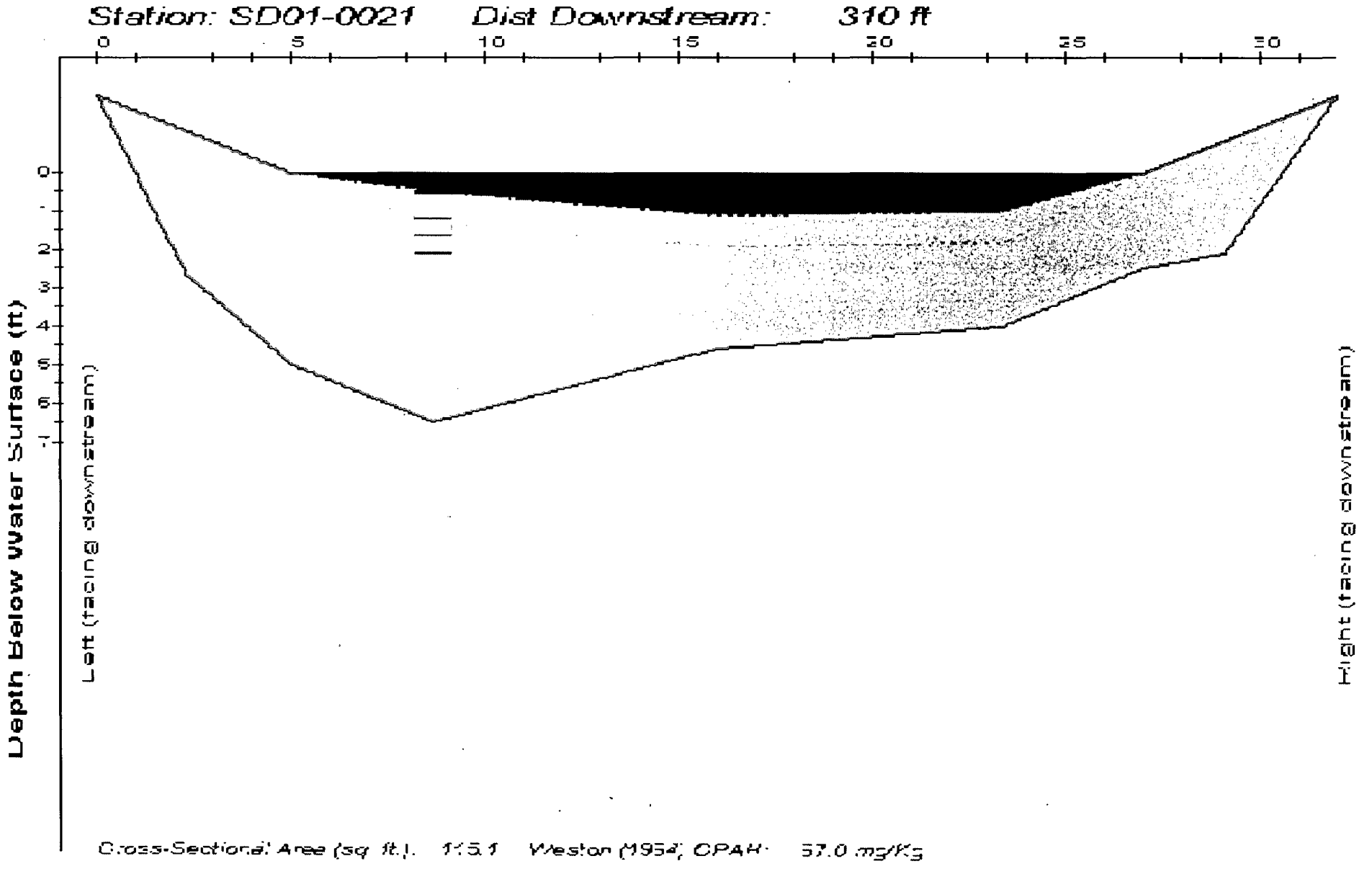


Figure 5-4. Predesign CPAH concentrations (Weston, 1994) vs. CPAH concentrations determined by this study

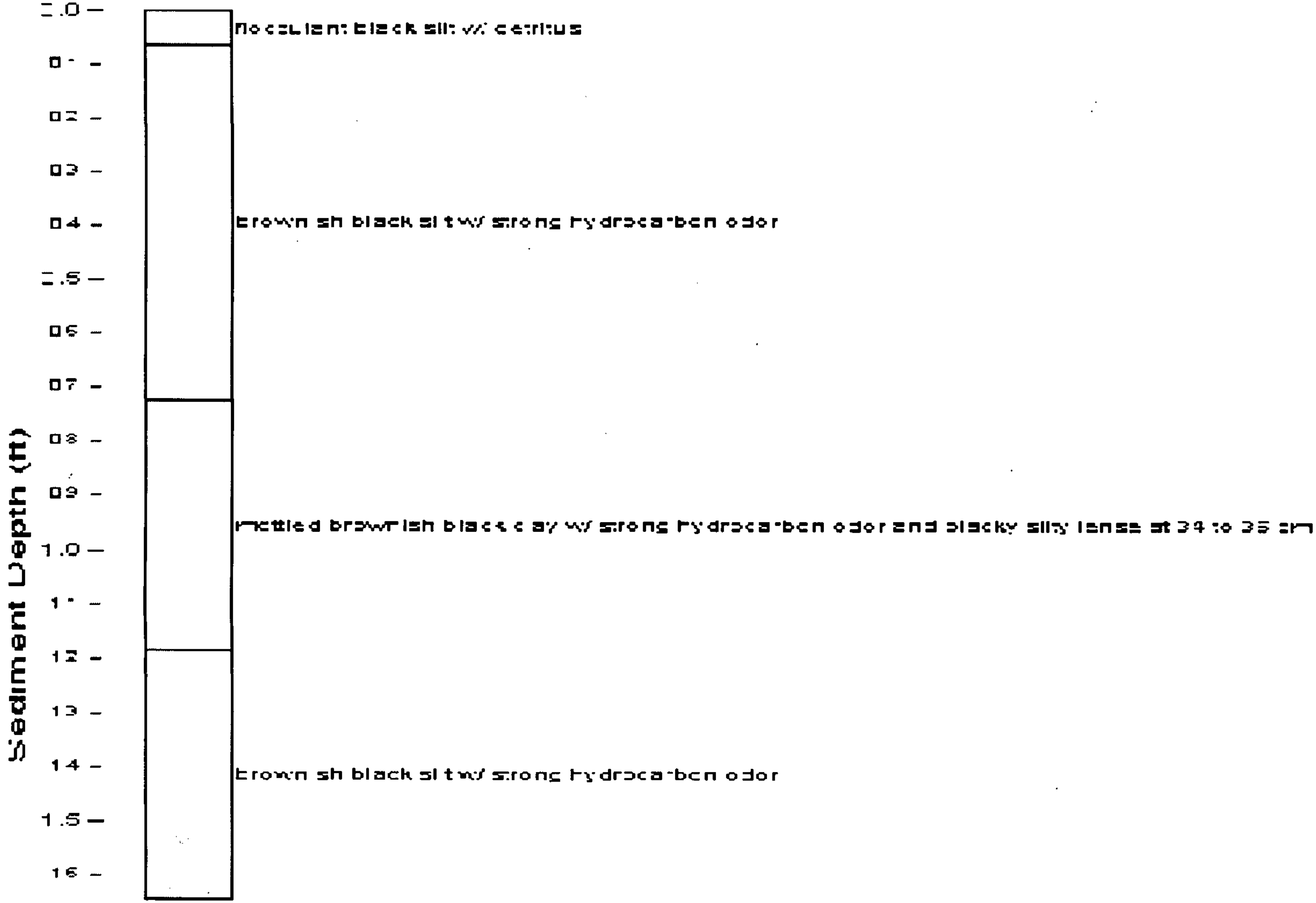


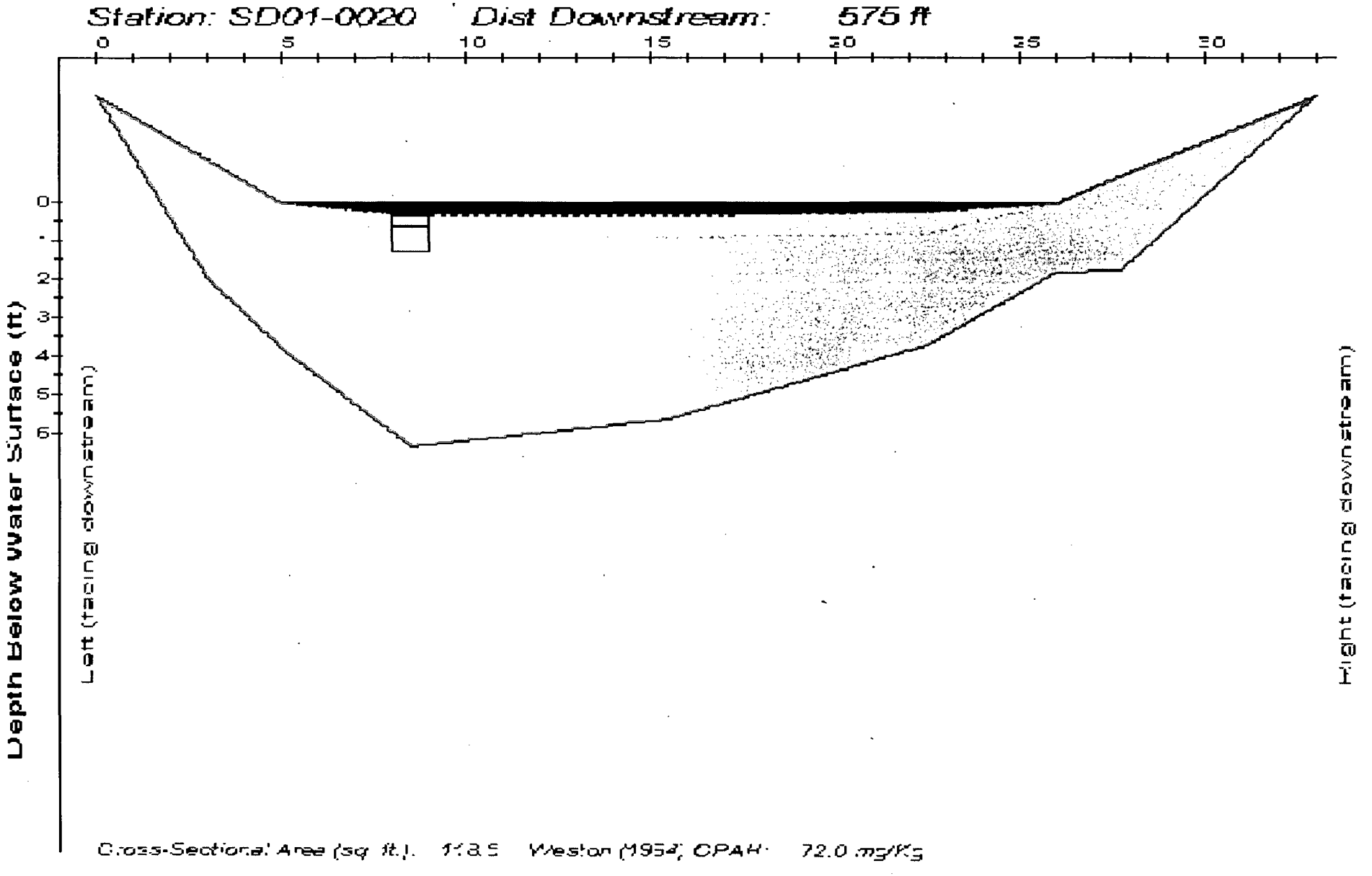

Station: SD01-0022
Dist Downstream: 0 ft
0
5
10
15
20
0
2
3
4
5
6
7
Depth Below Water Surface (ft)
Left (facing downstream)
Right (facing downstream)
Cross-Sectional Area (sq. ft.): 32.3
Weston (1994) CPAH: 4.9 mg/Kg

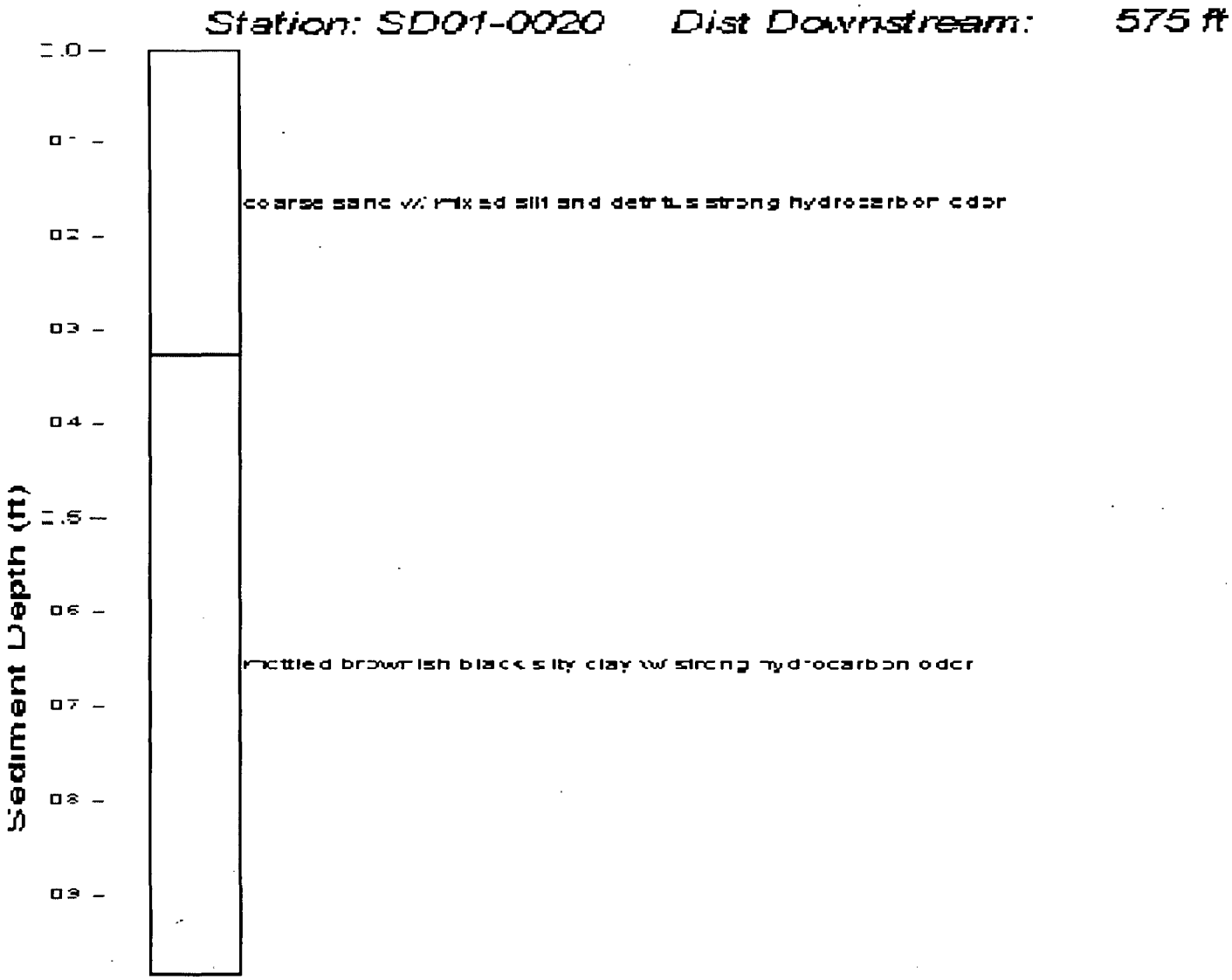

Station: SD01-0022
Dist Downstream:
0 ft
Sediment Depth (ft)
coarse sand w/ black organic silt w/ coarse sand and small gravel at 5 cm
Brown sh gray sticky clay
Black to brown organic silt and strong hydrocarbon odor at 25 cm

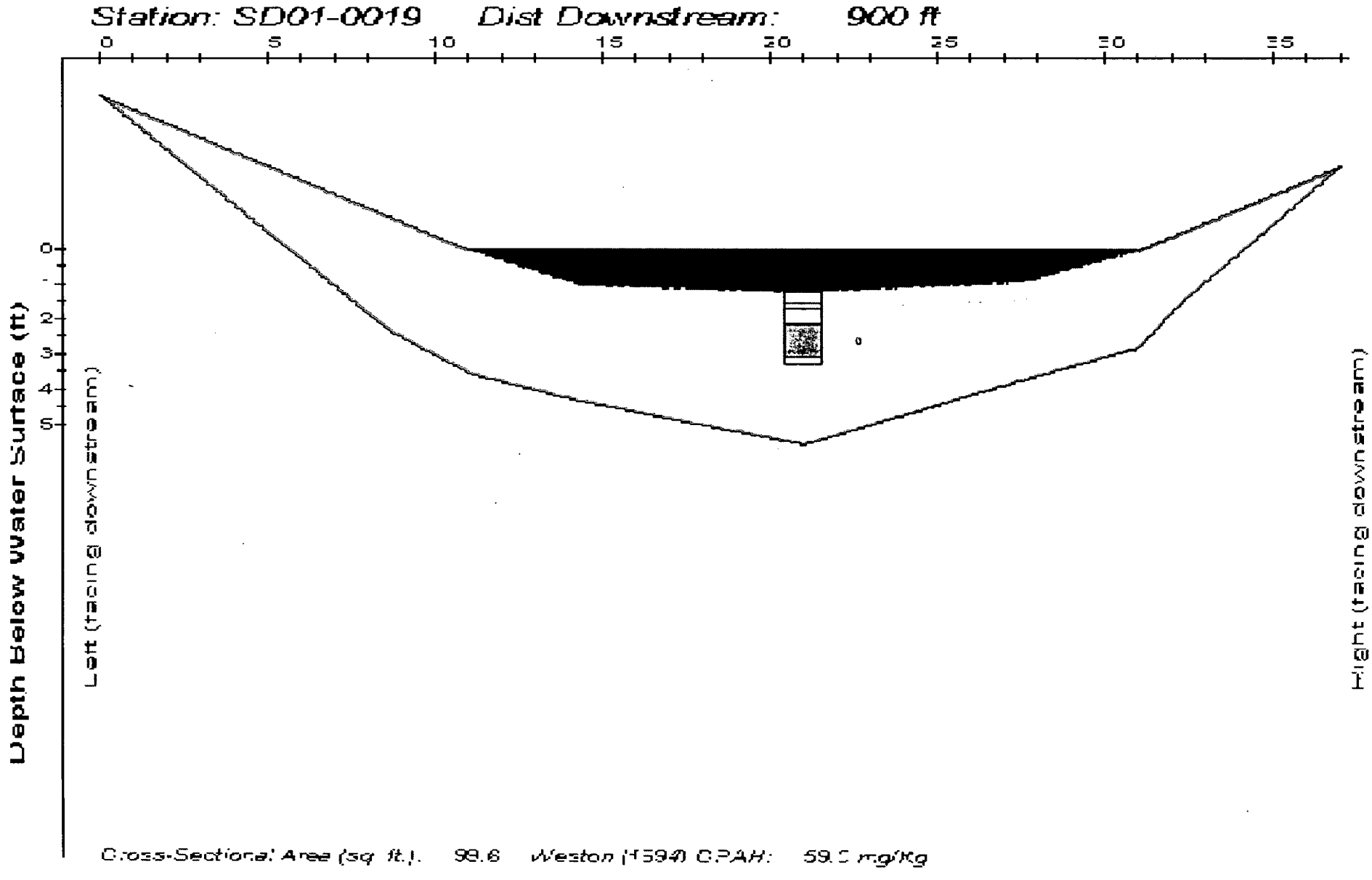

Station: SD01-0021 Dist Downstream: 310 ft
0
5
10
15
20
25
30
Depth Below Water Surface (ft)
0
1
2
3
4
5
6
7
Left (facing downstream)
Right (facing downstream)
Cross-Sectional Area (sq. ft.): 115.1 Weston (1994) CPAH: 57.0 mg/Kg

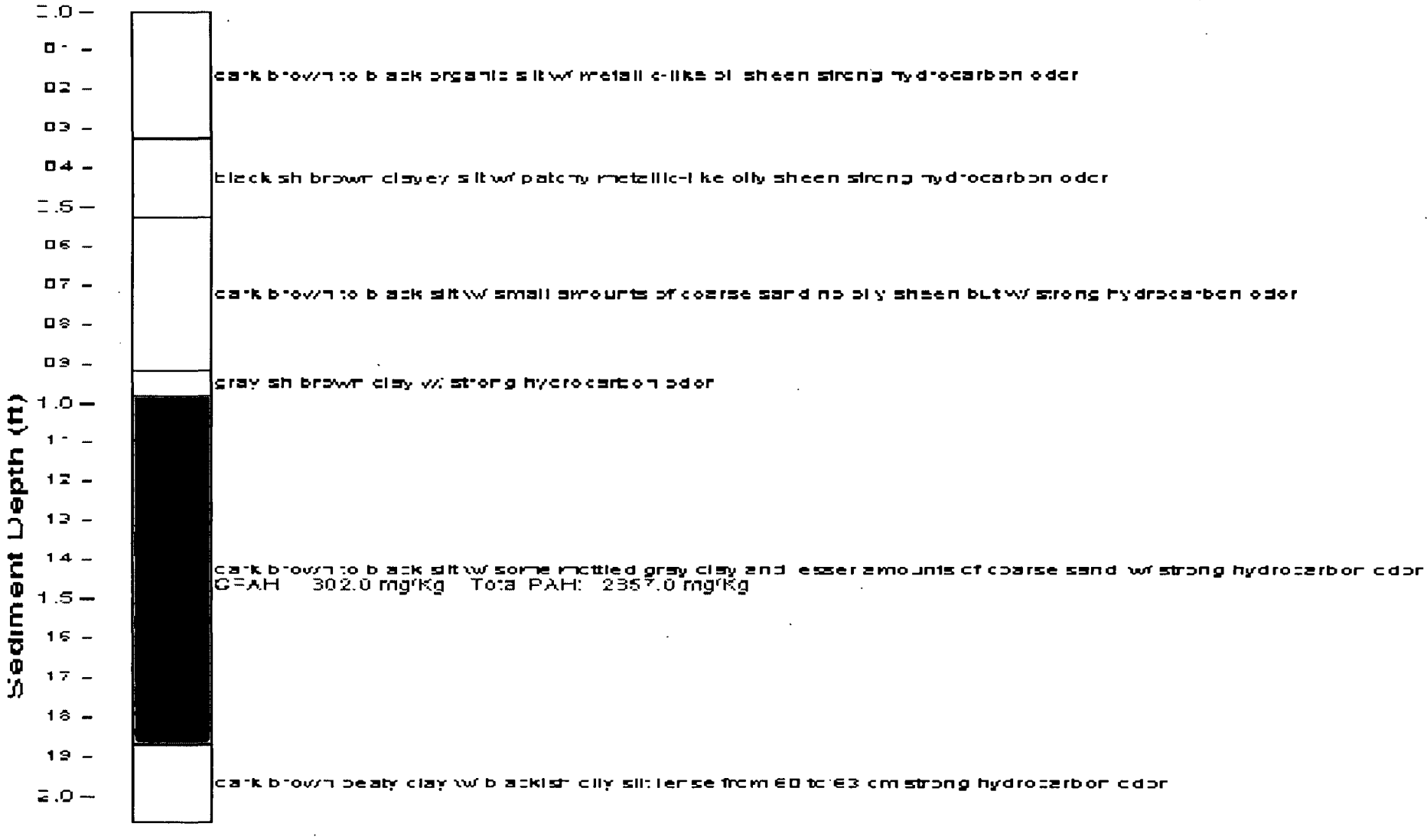
Station: SD01-0021 Dist Downstream: 310 ft

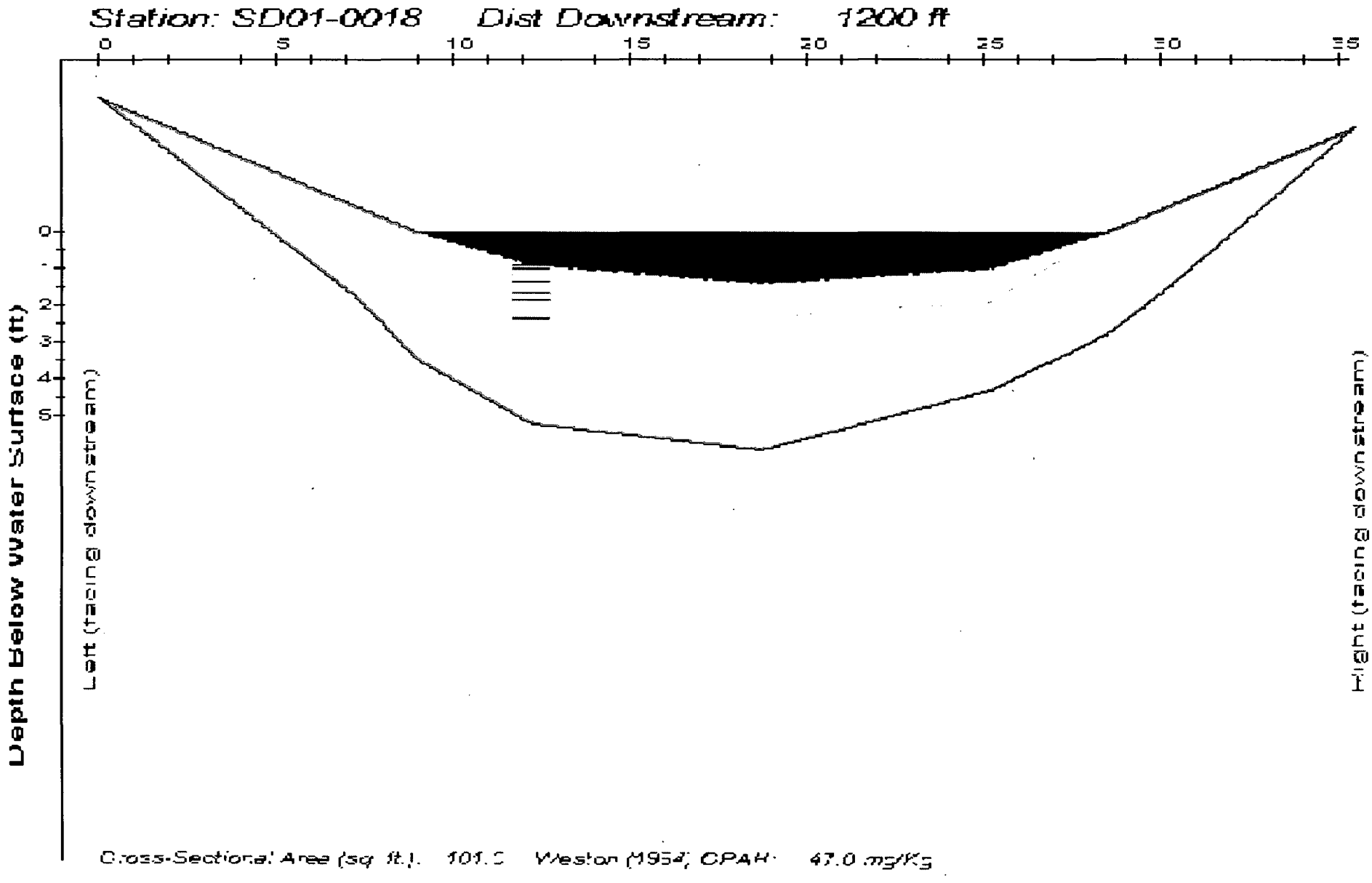



Station: SD01-0020
Dist Downstream: 575 ft
0
5
10
15
20
25
30
0
1
2
3
4
5
6
Depth Below Water Surface (ft)
Left (facing downstream)
Right (facing downstream)
Cross-Sectional Area (sq. ft.): 114.5
Weston (1954) CPAH: 72.0 mg/Kg

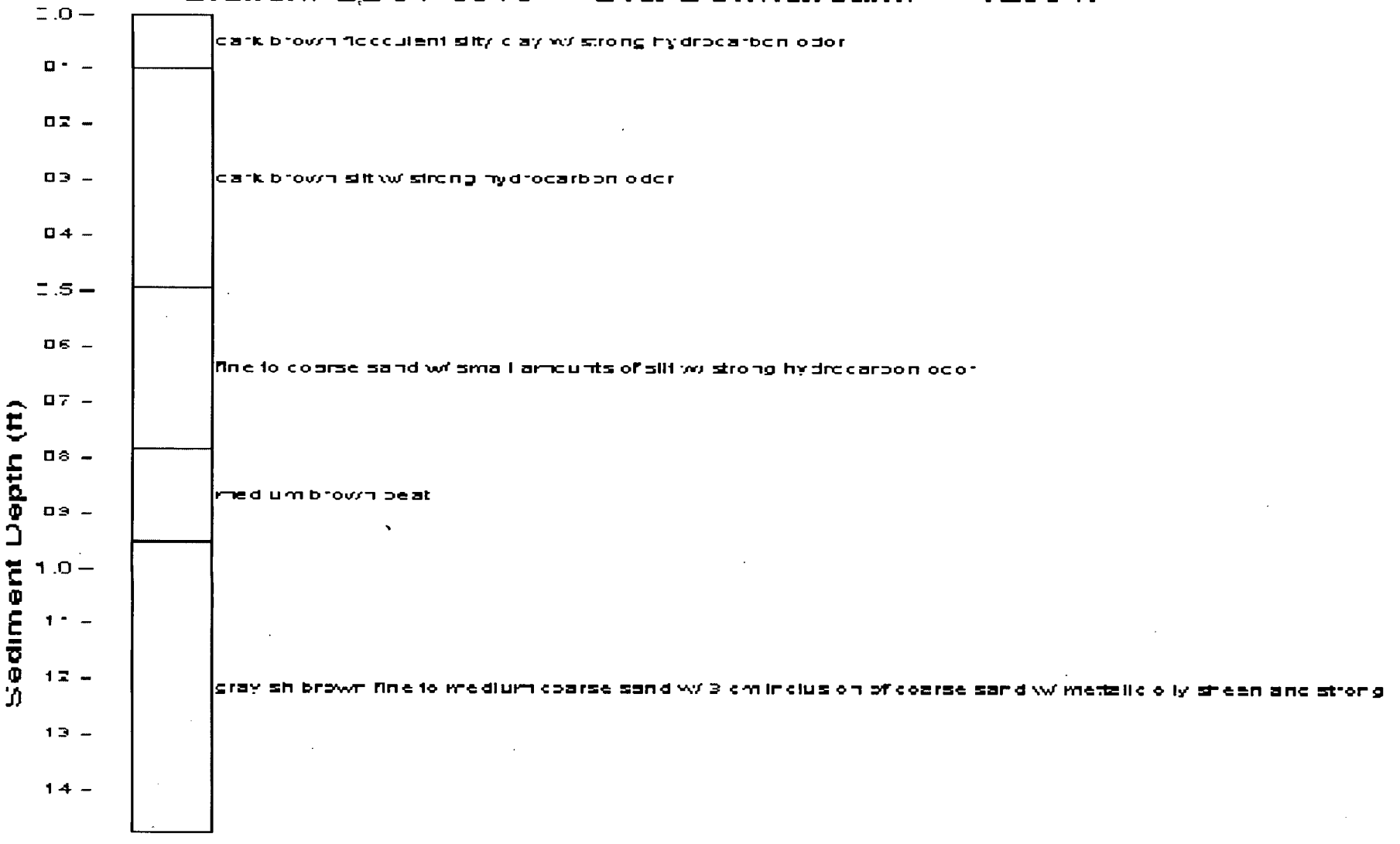

Station: SD01-0020
Dist Downstream:
575 ft
Sediment Depth (ft)
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
coarse sand w/ mixed silt and detritus strong hydrocarbon odor
mottled brownish black silty clay w/ strong hydrocarbon odor

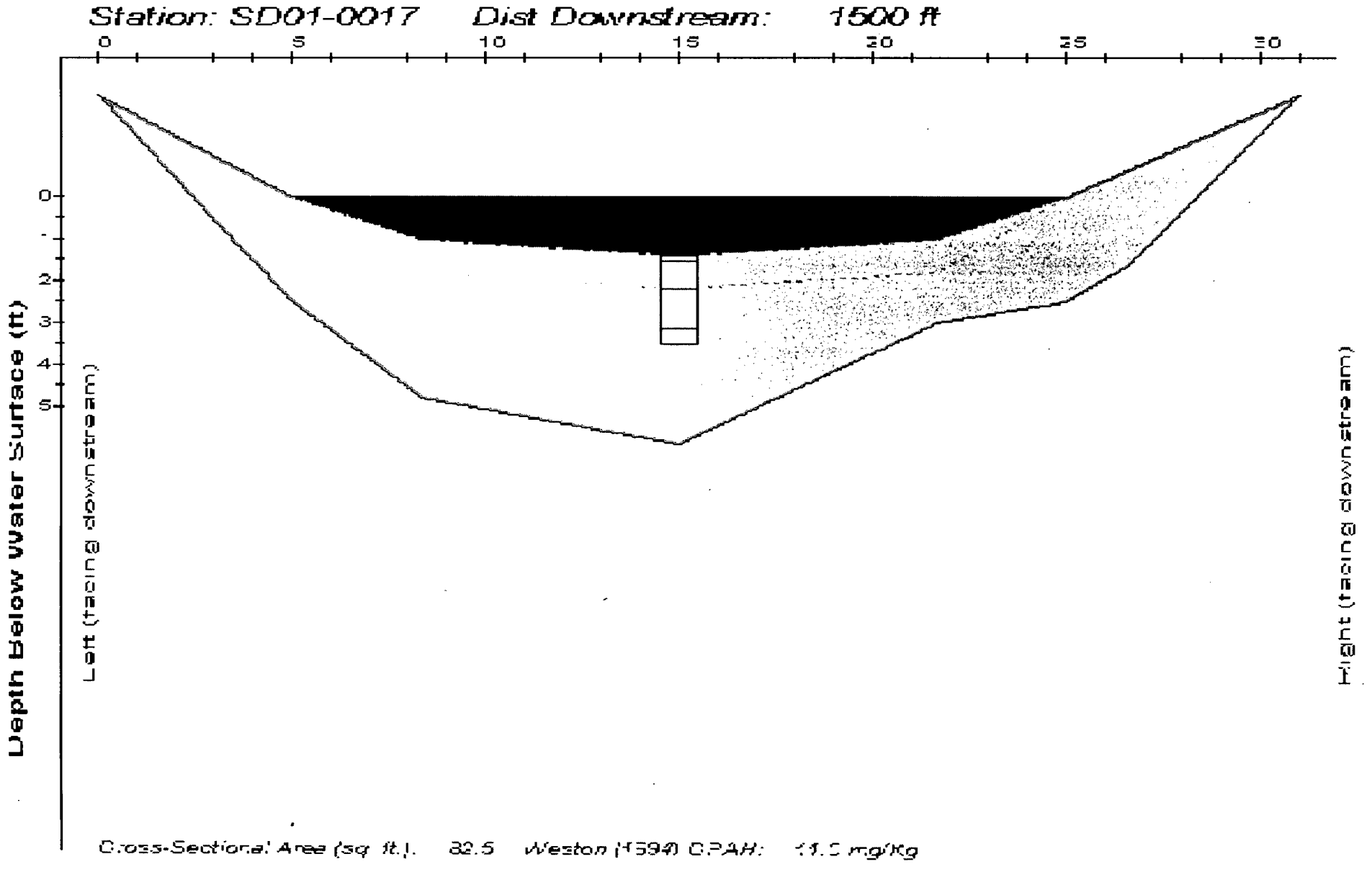

Station: SD01-0019 Dist Downstream: 900 ft
0
5
10
15
20
25
30
35
Depth Below Water Surface (ft)
0
1
2
3
4
5
Left (facing downstream)
Right (facing downstream)
Cross-Sectional Area (sq. ft.): 98.6 Weston (1994) CPAH: 59.0 mg/Kg


Station: SD01-0019 Dist Downstream: 900 ft
Sediment Depth (ft)
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
1.1
1.2
1.3
1.4
1.5
1.6
1.7
1.8
1.9
2.0
dark brown to black organic silt w/ metallic-like oil sheen strong hydrocarbon odor
blackish brown clayey silt w/ patchy metallic-like oily sheen strong hydrocarbon odor
dark brown to black silt w/ small amounts of coarse sand no oily sheen but w/ strong hydrocarbon odor
gray sh brown clay w/ strong hydrocarbon odor
dark brown to black silt w/ some mottled gray clay and lesser amounts of coarse sand w/ strong hydrocarbon odor
CPAH 302.0 mg/Kg Total PAH: 2357.0 mg/Kg
dark brown peaty clay w/ blackish oily silt lenses from 60 to 63 cm strong hydrocarbon odor

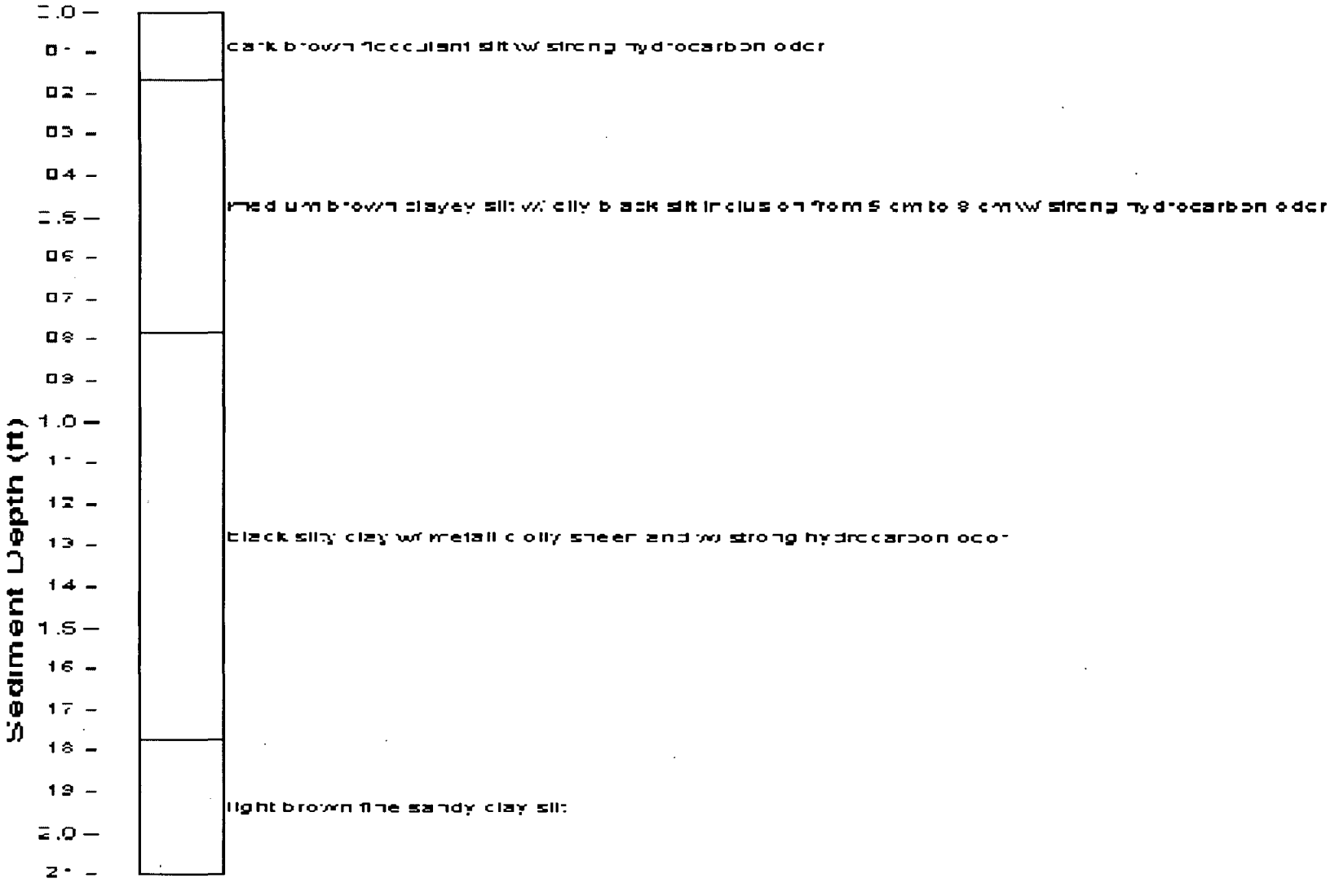

Station: SD01-0018 Dist Downstream: 1200 ft
0
5
10
15
20
25
30
35
0
1
2
3
4
5
Depth Below Water Surface (ft)
Left (facing downstream)
Right (facing downstream)
Cross-Sectional Area (sq. ft.): 101.0 Weston (1954) CPAH: 47.0 mg/Kg

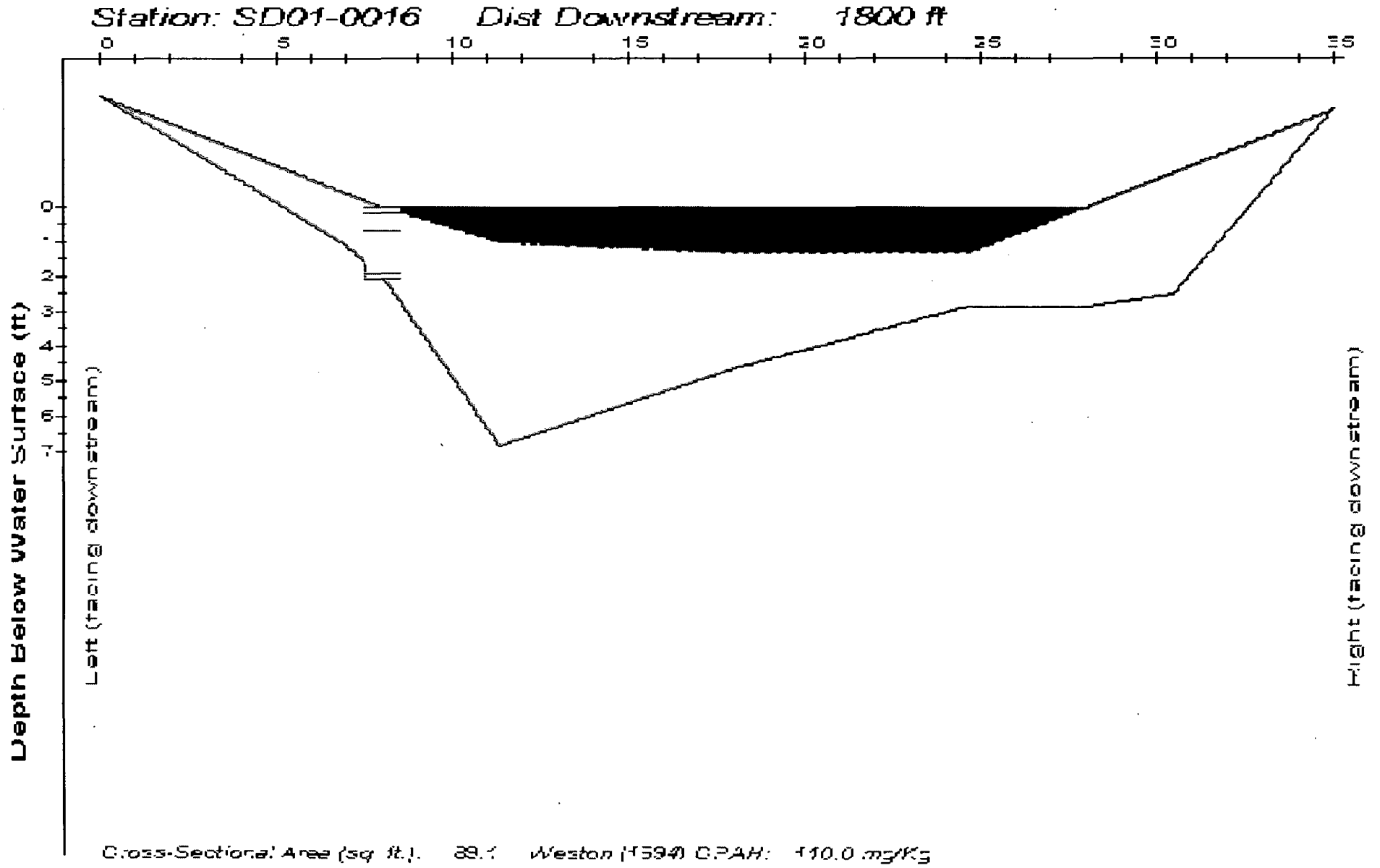
Station: SD01-0018 Dist Downstream: 1200 ft



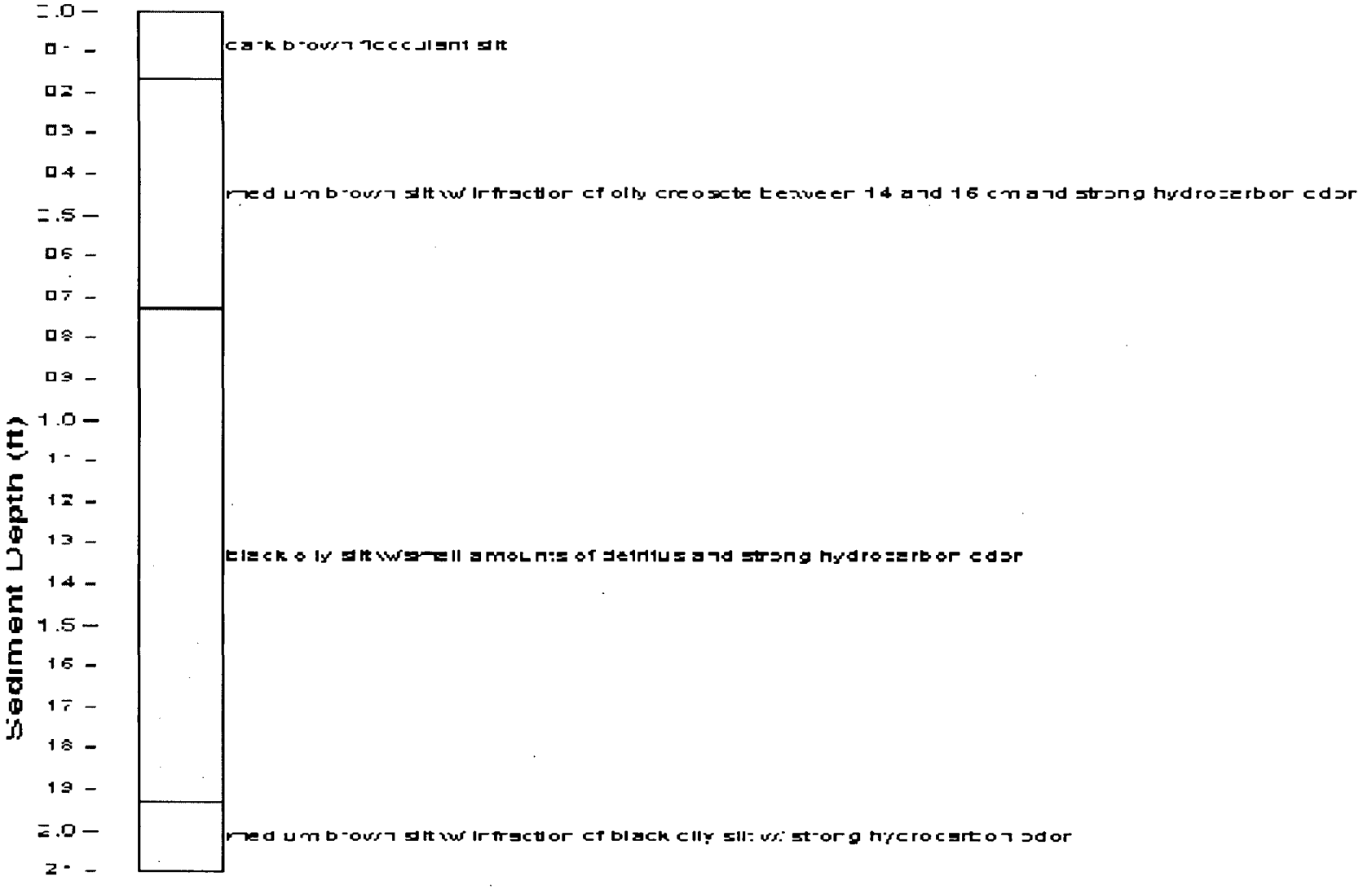

Station: SD01-0017 Dist Downstream: 1500 ft
0
5
10
15
20
25
30
0
2
3
4
5
Depth Below Water Surface (ft)
Left (facing downstream)
Right (facing downstream)
Cross-Sectional Area (sq. ft.): 82.5 Weston (1994) CPAH: 11.0 mg/Kg

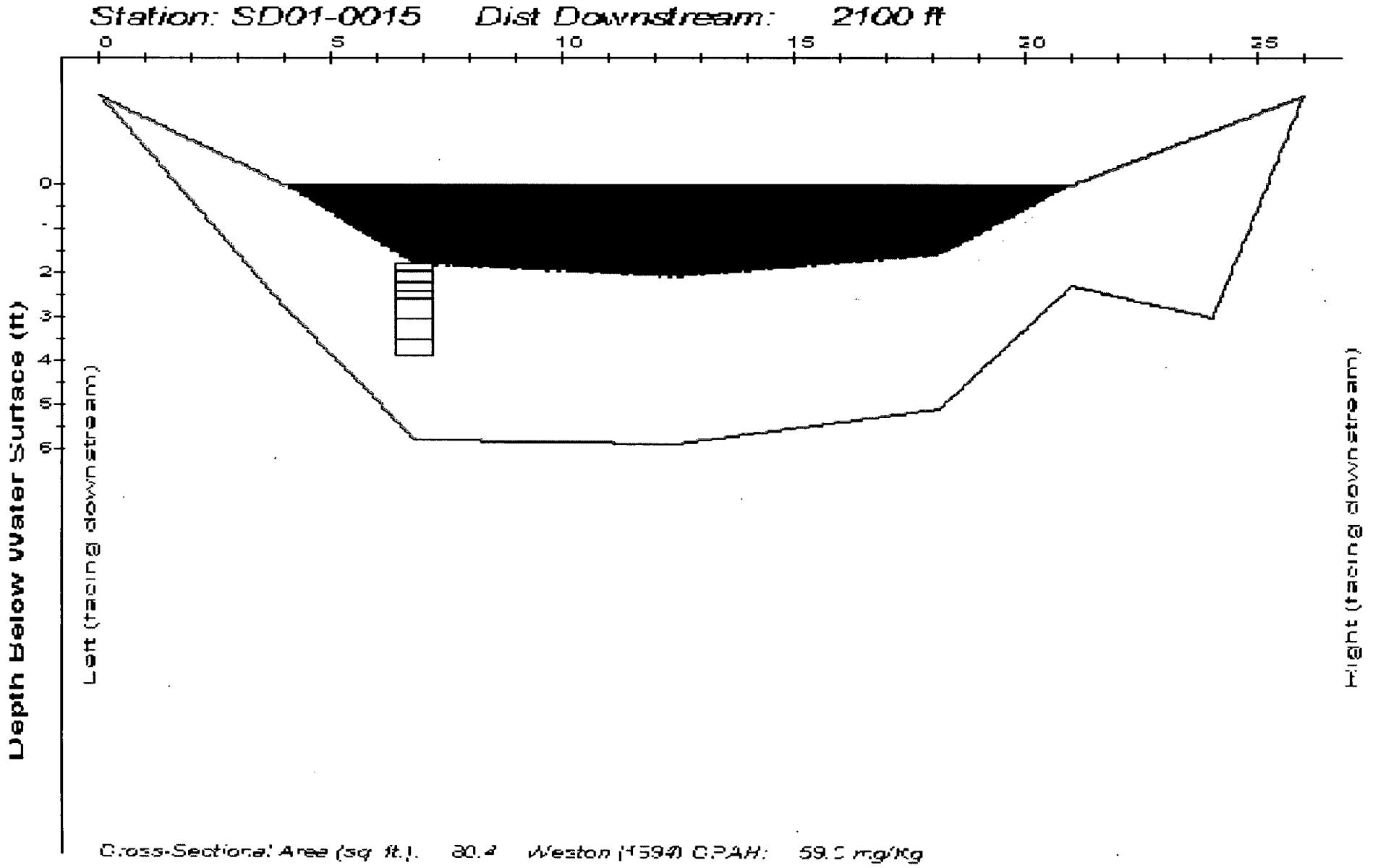
Station: SD01-0017 Dist Downstream: 1500 ft



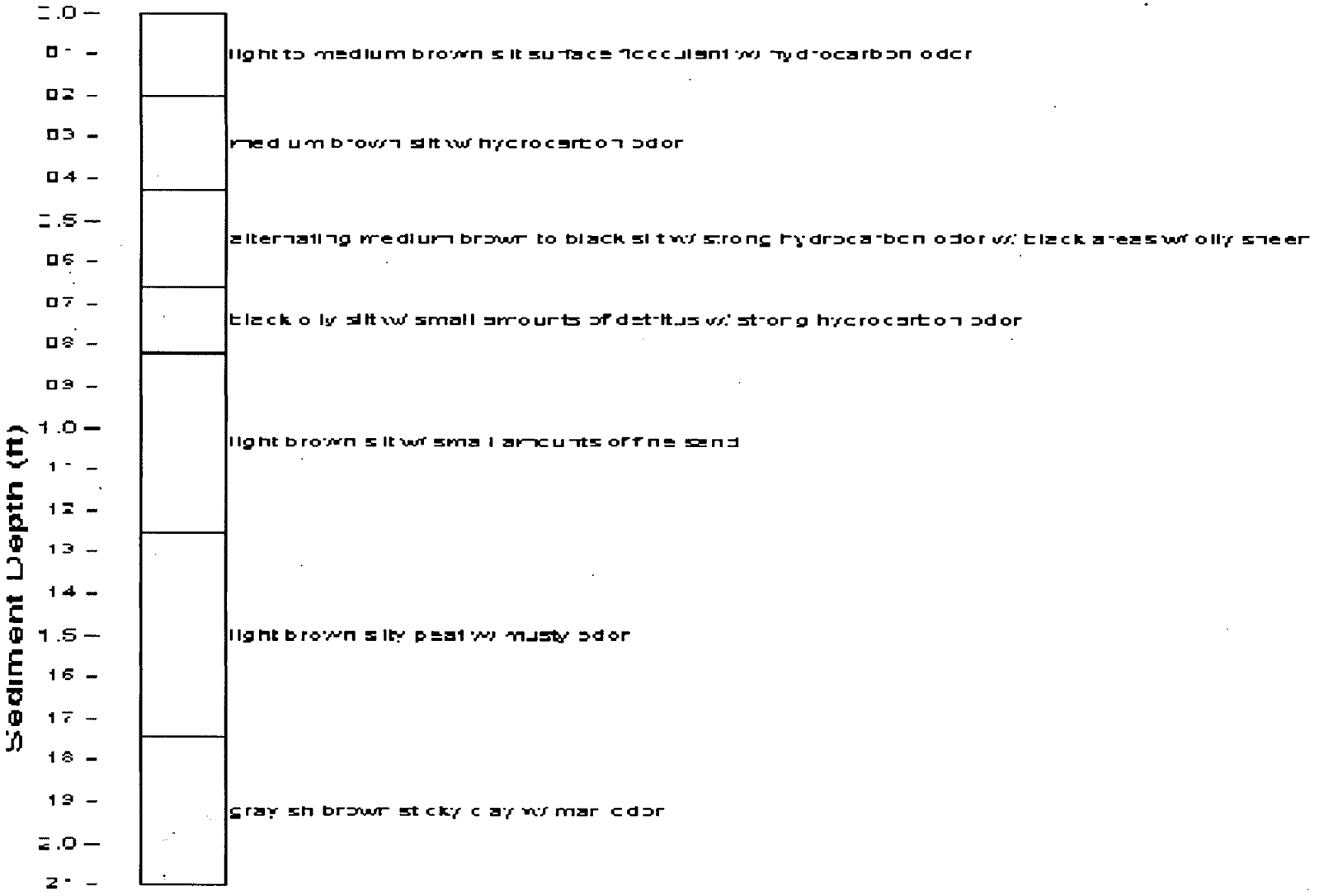

Station: SD01-0016 Dist Downstream: 1800 ft
0
5
10
15
20
25
30
35
Depth Below Water Surface (ft)
0
1
2
3
4
5
6
7
Left (facing downstream)
Right (facing downstream)
Cross-Sectional Area (sq. ft.): 89.1 Weston (1994) CPAH: 110.0 mg/Kg

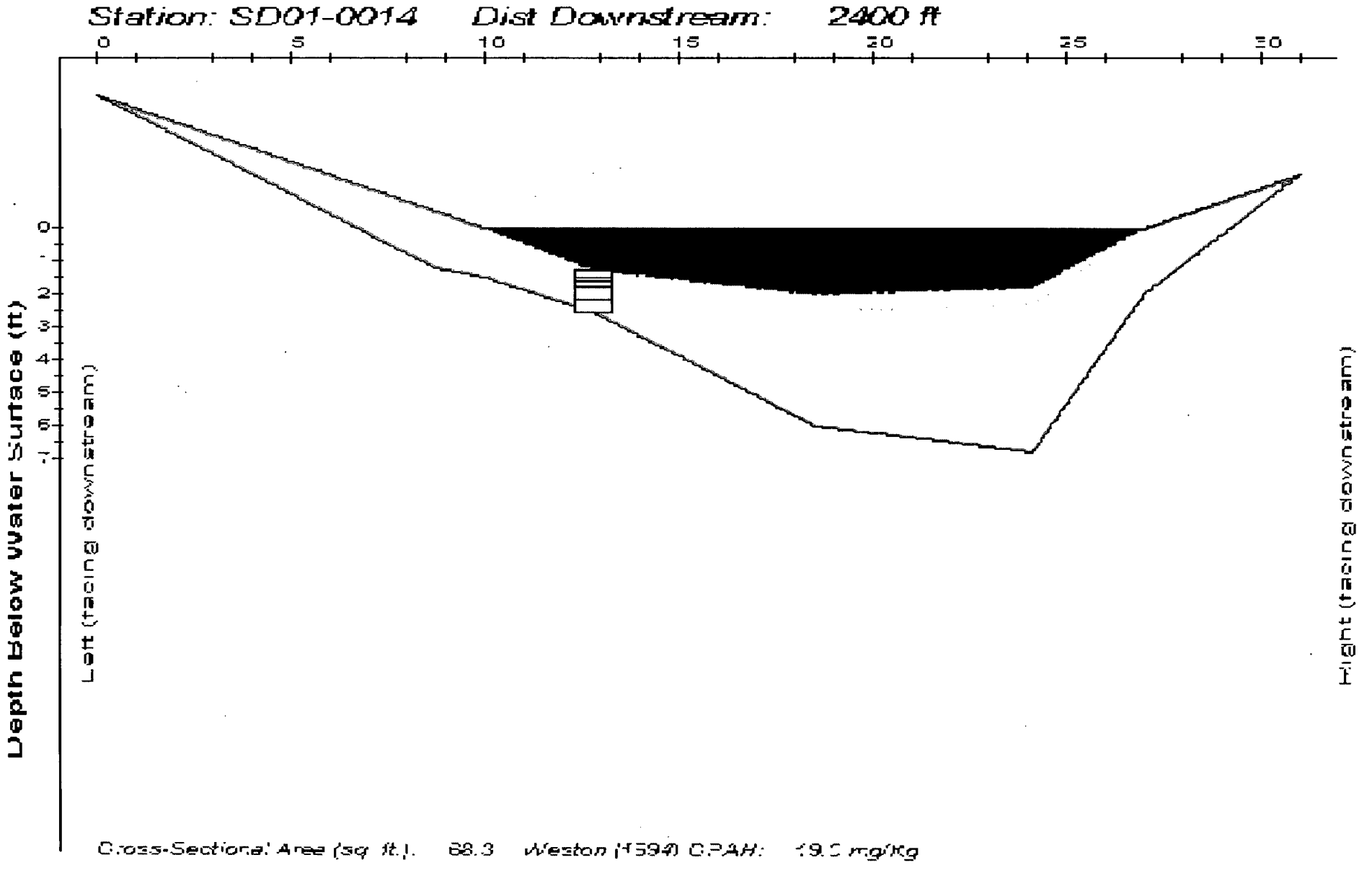
Station: SD01-0016 Dist Downstream: 1800 ft

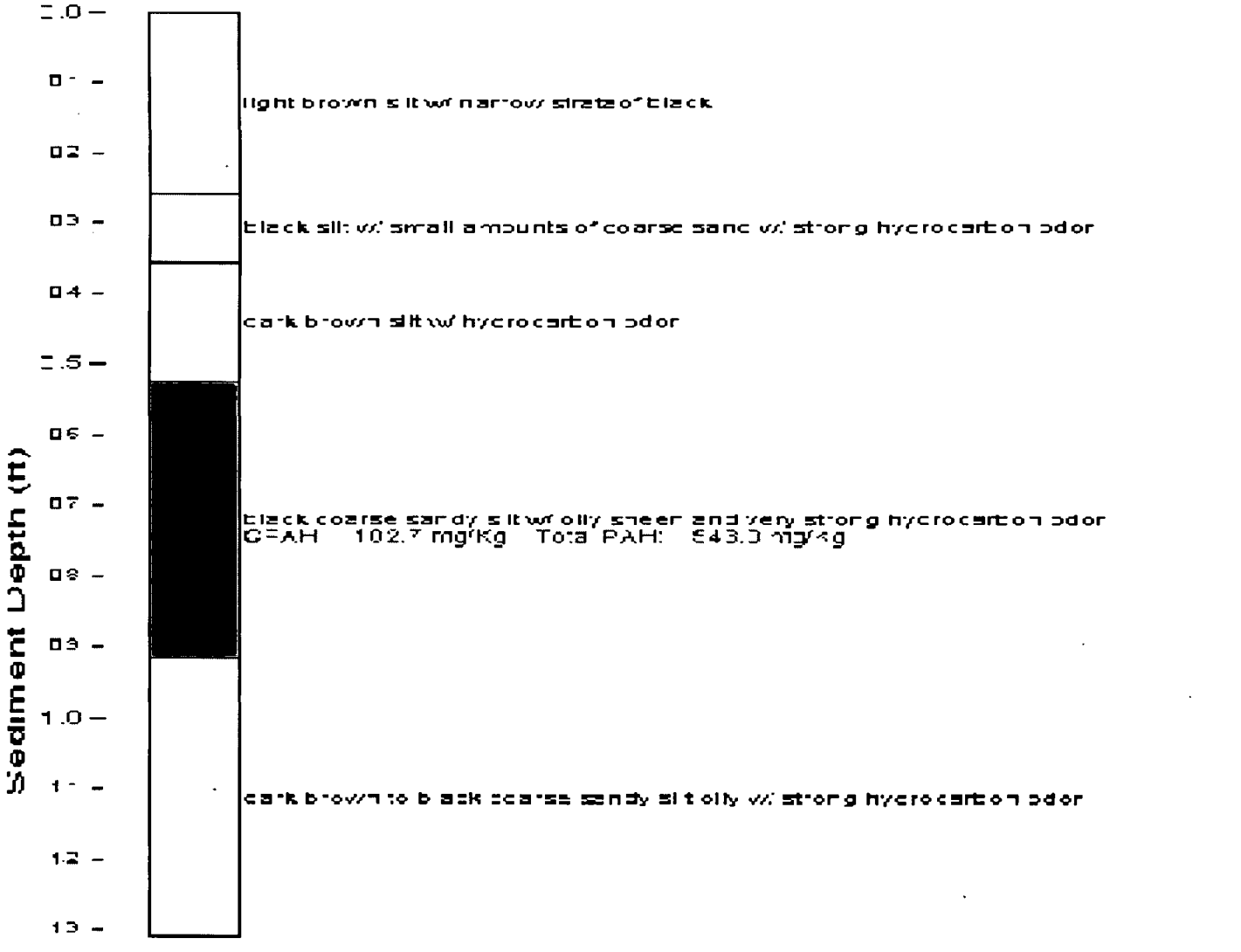


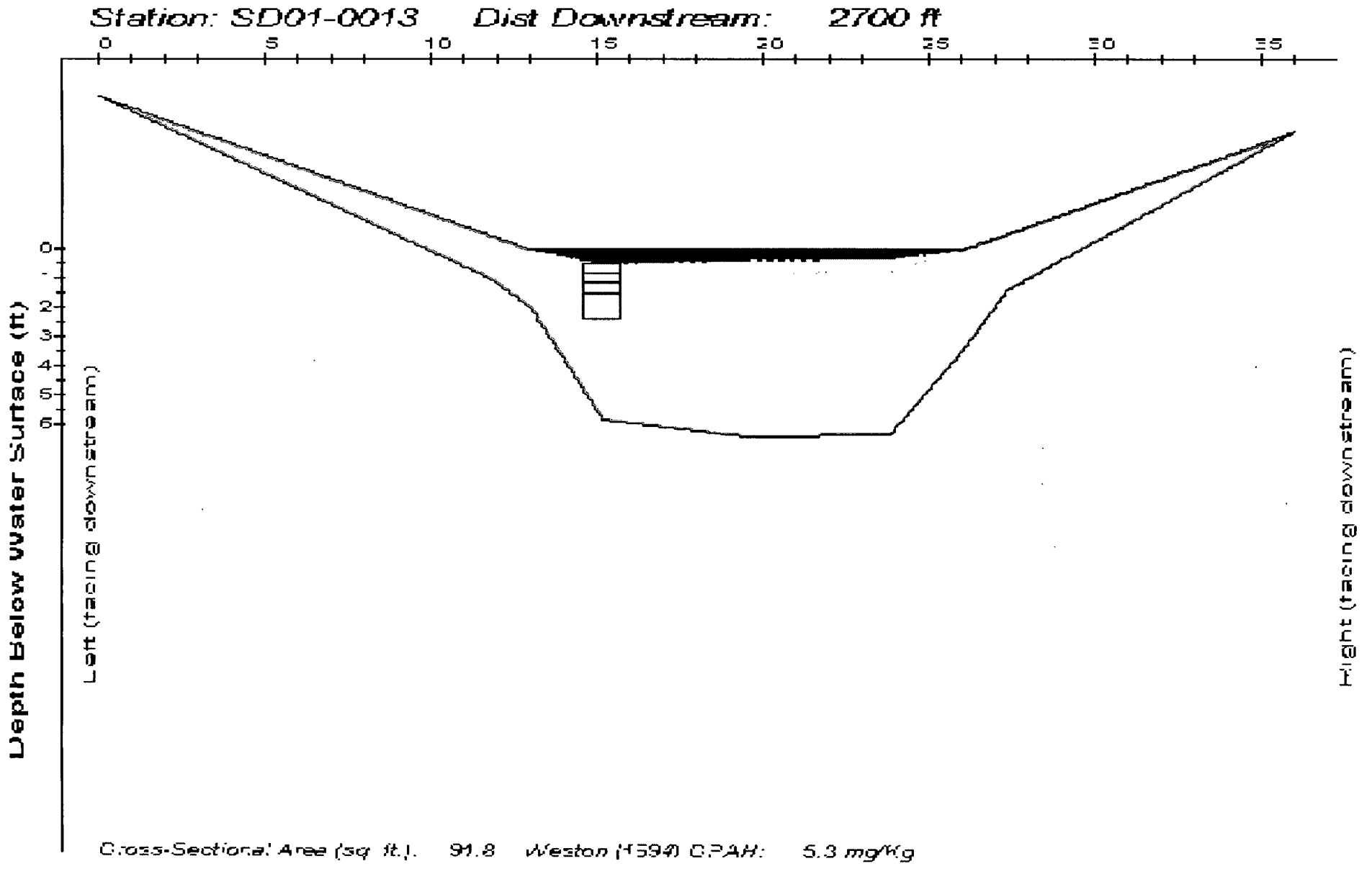

Station: SD01-0015 Dist Downstream: 2100 ft
0
5
10
15
20
25
0
2
3
4
5
6
Depth Below Water Surface (ft)
Left (facing downstream)
Right (facing downstream)
Cross-Sectional Area (sq. ft.): 80.4 Weston (1994) CPAH: 59.5 mg/Kg

Station: SD01-0015 Dist Downstream: 2100 ft

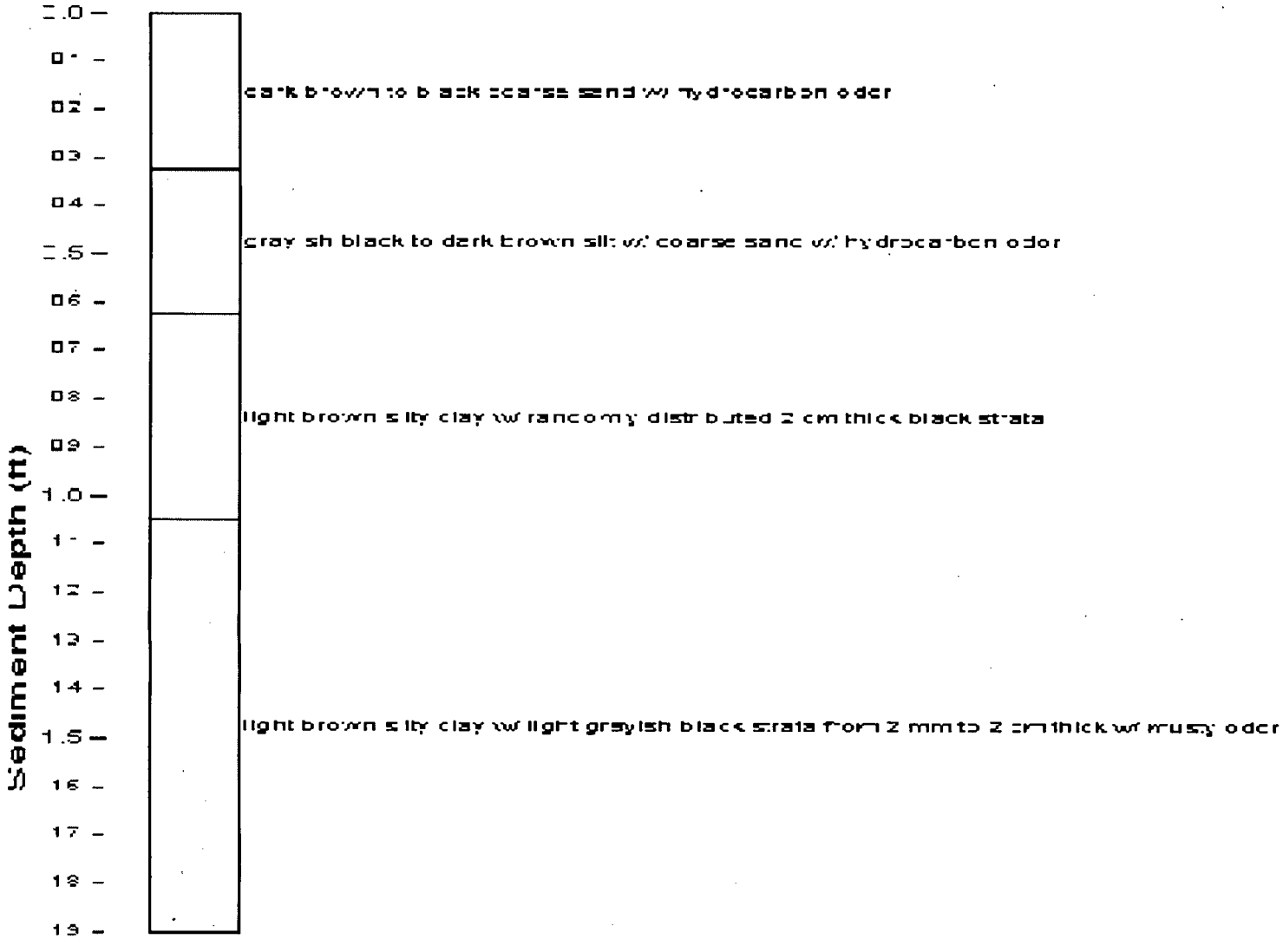



Station: SD01-0014 Dist Downstream: 2400 ft
0
5
10
15
20
25
30
Depth Below Water Surface (ft)
0
2
3
4
5
6
7
Left (facing downstream)
Right (facing downstream)
Cross-Sectional Area (sq. ft.): 88.3 Weston (1994) CPAH: 19.0 mg/Kg

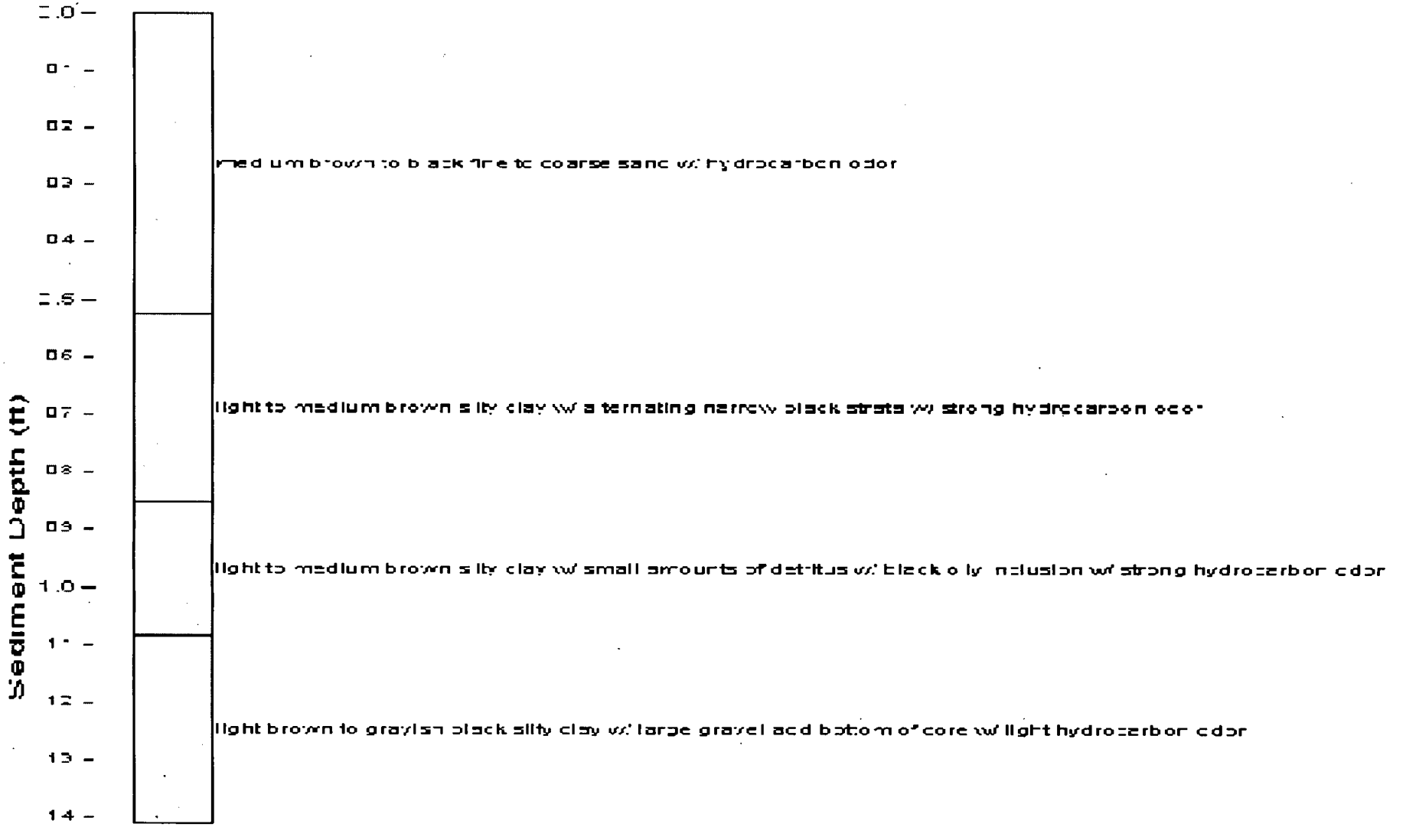

Station: SD01-0014 Dist Downstream: 2400 ft
Sediment Depth (ft)
light brown silt w/ narrow strata of black
black silt w/ small amounts of coarse sand w/ strong hydrocarbon odor
dark brown silt w/ hydrocarbon odor
black coarse sandy silt w/ oily sheen and very strong hydrocarbon odor
dark brown to black coarse sandy silt oily w/ strong hydrocarbon odor


Station: SD01-0013 Dist Downstream: 2700 ft
0
5
10
15
20
25
30
35
Depth Below Water Surface (ft)
0
2
3
4
5
6
Left (facing downstream)
Right (facing downstream)
Cross-Sectional Area (sq. ft.): 91.8 Weston (1994) CPAH: 5.3 mg/Kg

Station: SD01-0013 Dist Downstream: 2700 ft

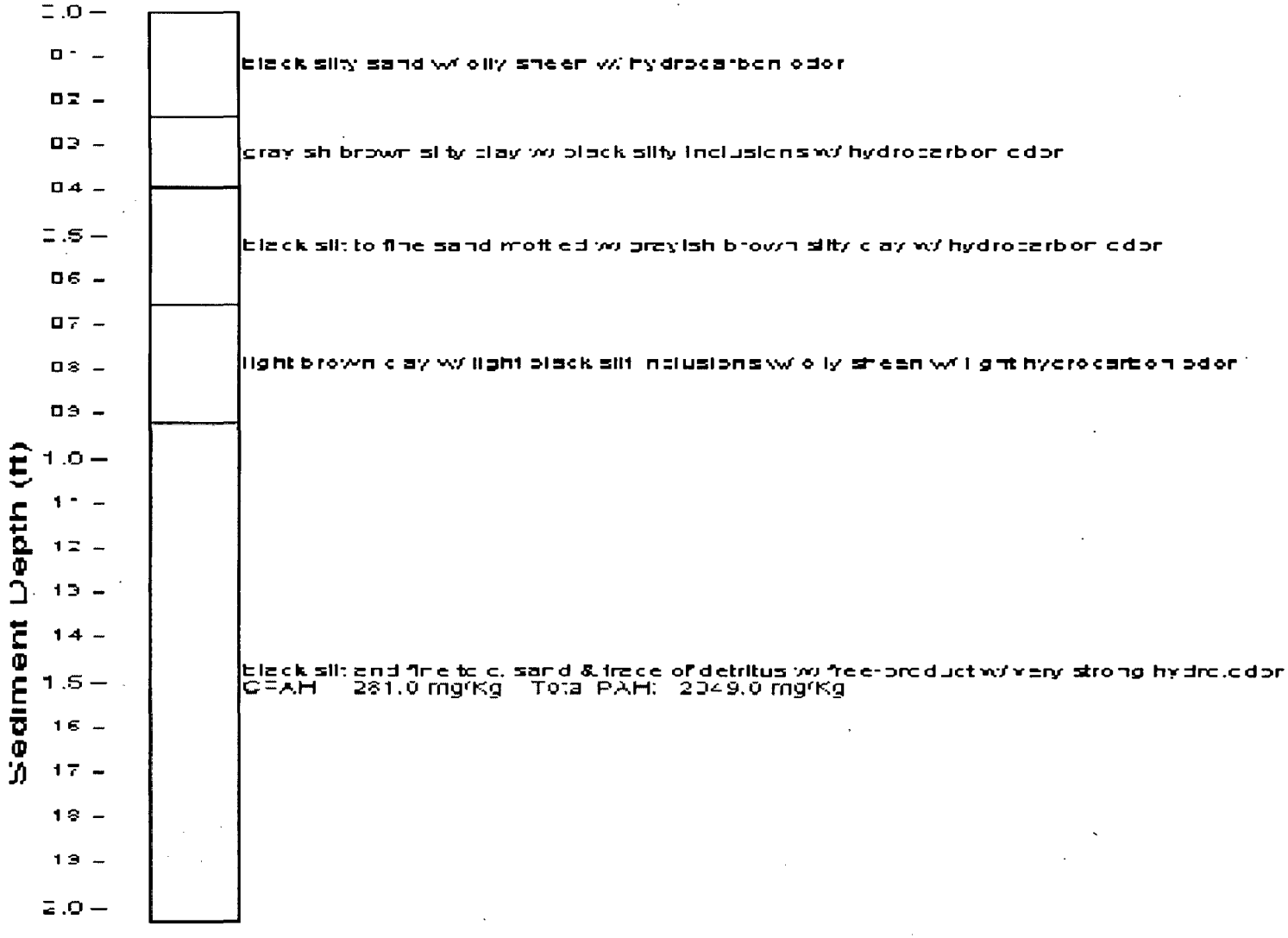


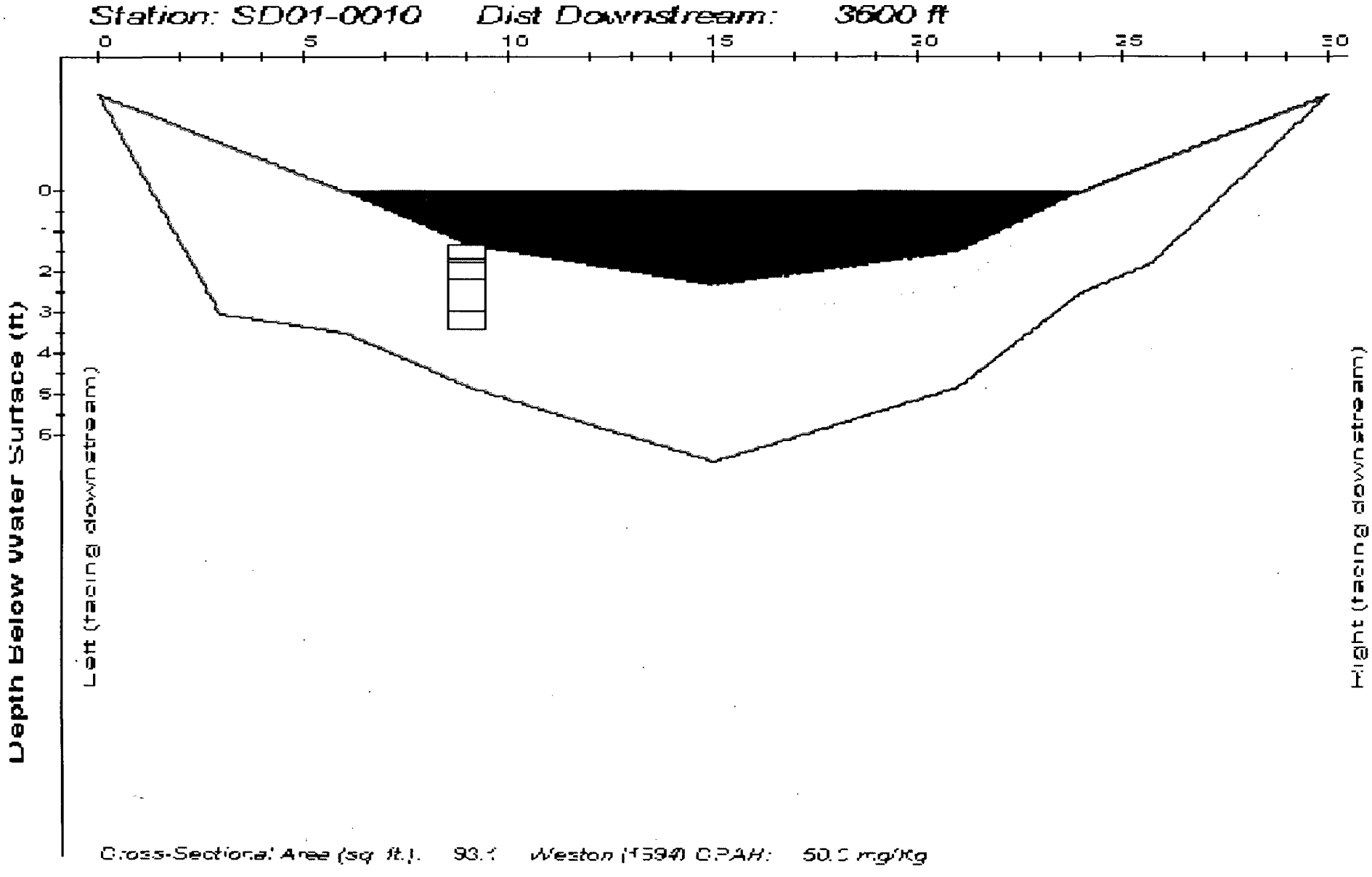
Station: SD01-0012 Dist Downstream: 3000 ft
0
5
10
15
20
25
30
35
Depth Below Water Surface (ft)
0
2
3
Left (facing downstream)
Right (facing downstream)
Cross-Sectional Area (sq. ft.): 58.5 Weston (1994) CPAH: 15.0 mg/Kg

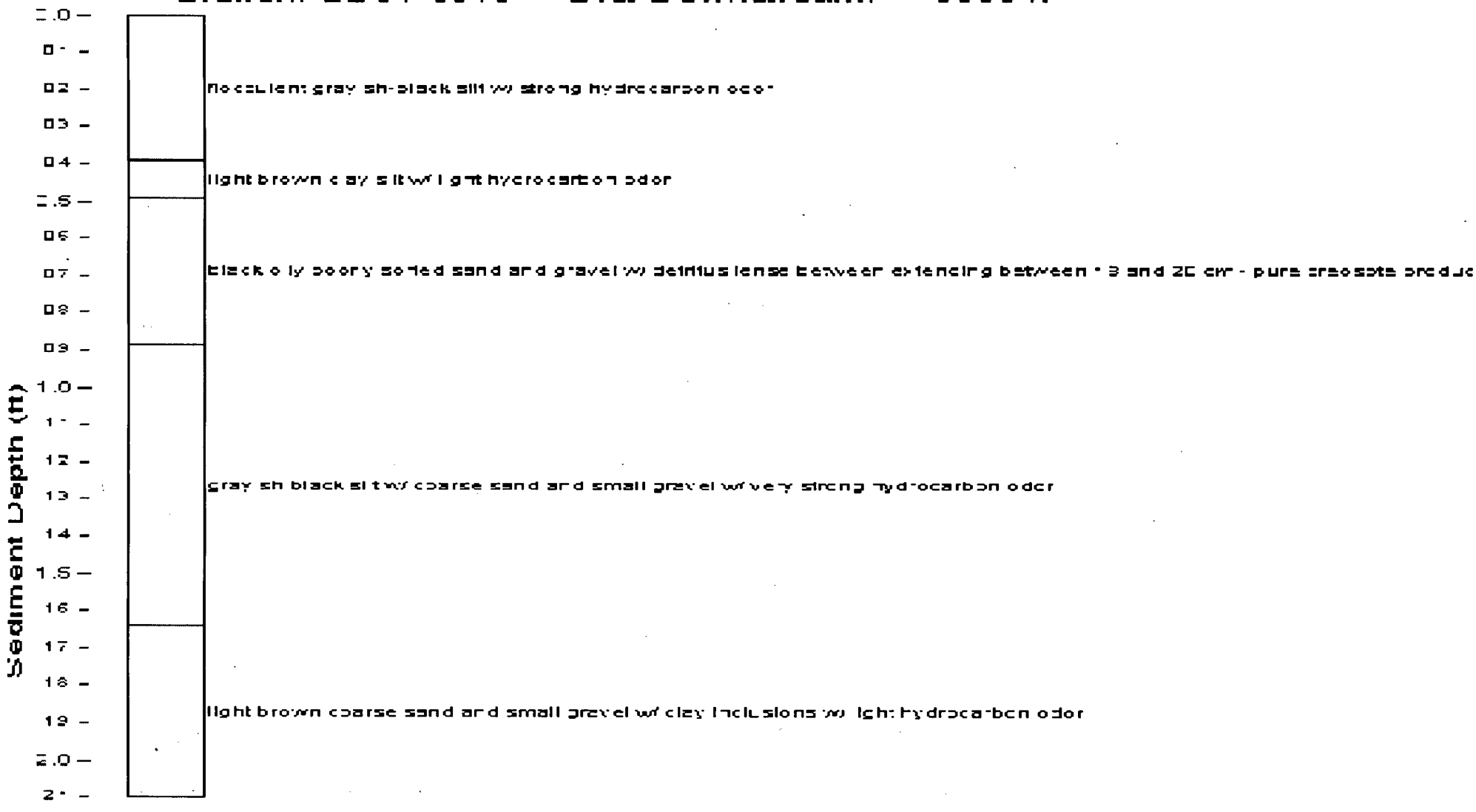

Station: SD01-0012 Dist Downstream: 3000 ft
Sediment Depth (ft)
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
1.1
1.2
1.3
1.4
medium brown to black fine to coarse sand w/ hydrocarbon odor
light to medium brown silty clay w/ alternating narrow black strata w/ strong hydrocarbon odor
light to medium brown silty clay w/ small amounts of detritus w/ black oily inclusion w/ strong hydrocarbon odor
light brown to grayish black silty clay w/ large gravel and bottom of core w/ light hydrocarbon odor

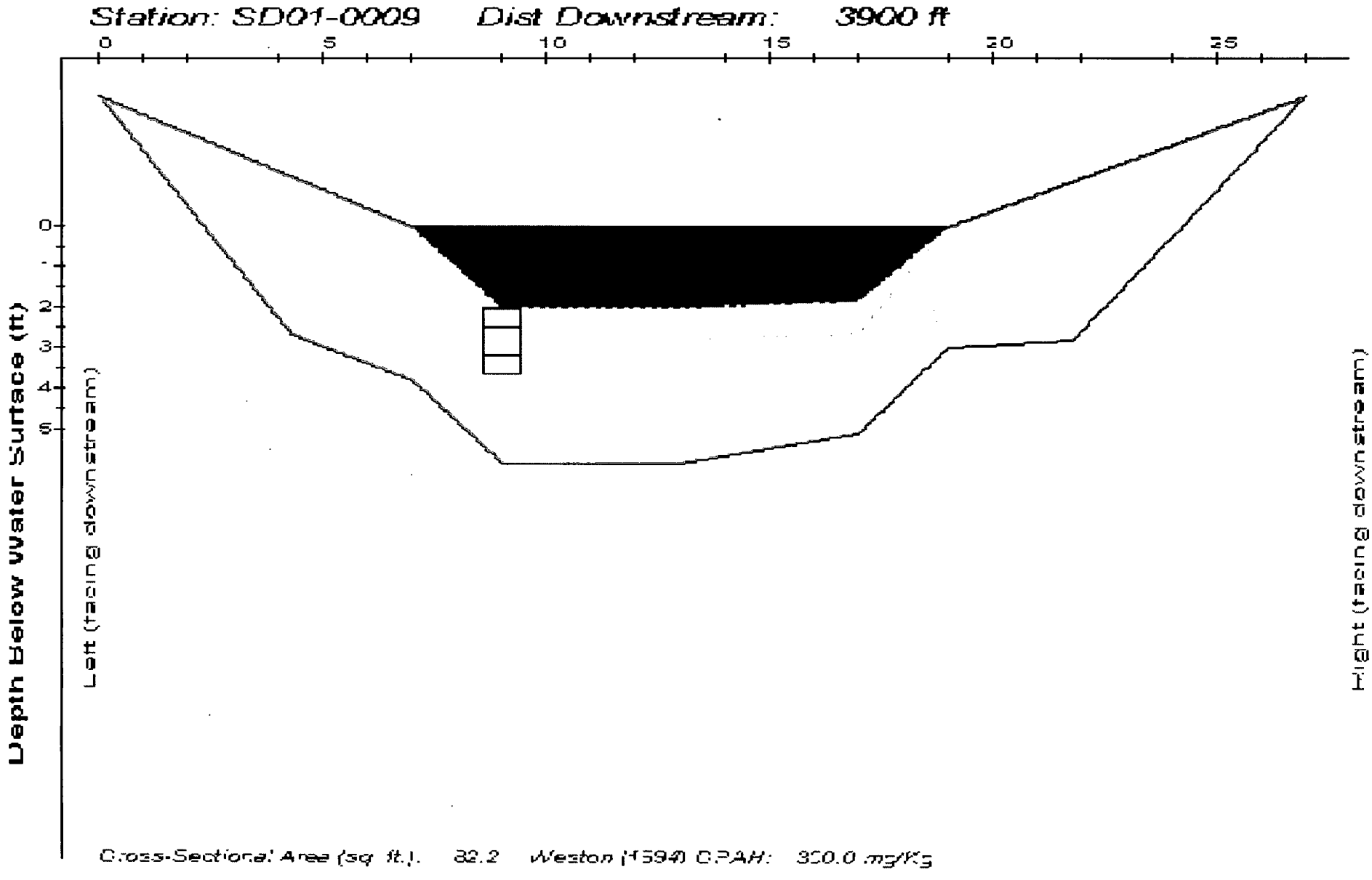
Station: SD01-0011
Dist Downstream: 3300 ft
0
5
10
15
20
25
30
Depth Below Water Surface (ft)
0
1
2
3
4
5
6
Left (facing downstream)
Right (facing downstream)
Cross-Sectional Area (sq. ft.): 91.5
Weston (1994) CPAH: 64.0 mg/Kg

Station: SD01-0011 Dist Downstream: 3300 ft

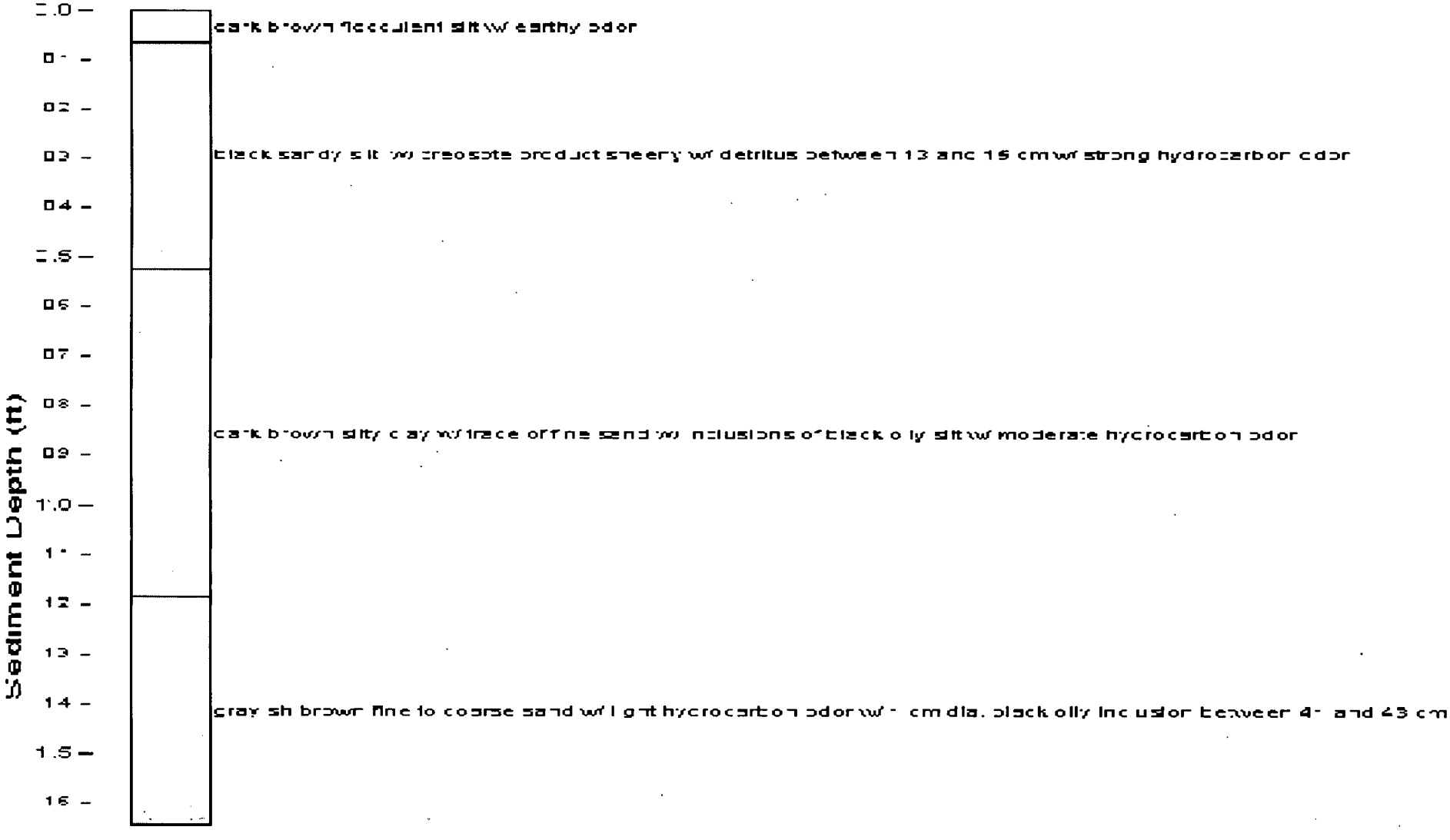


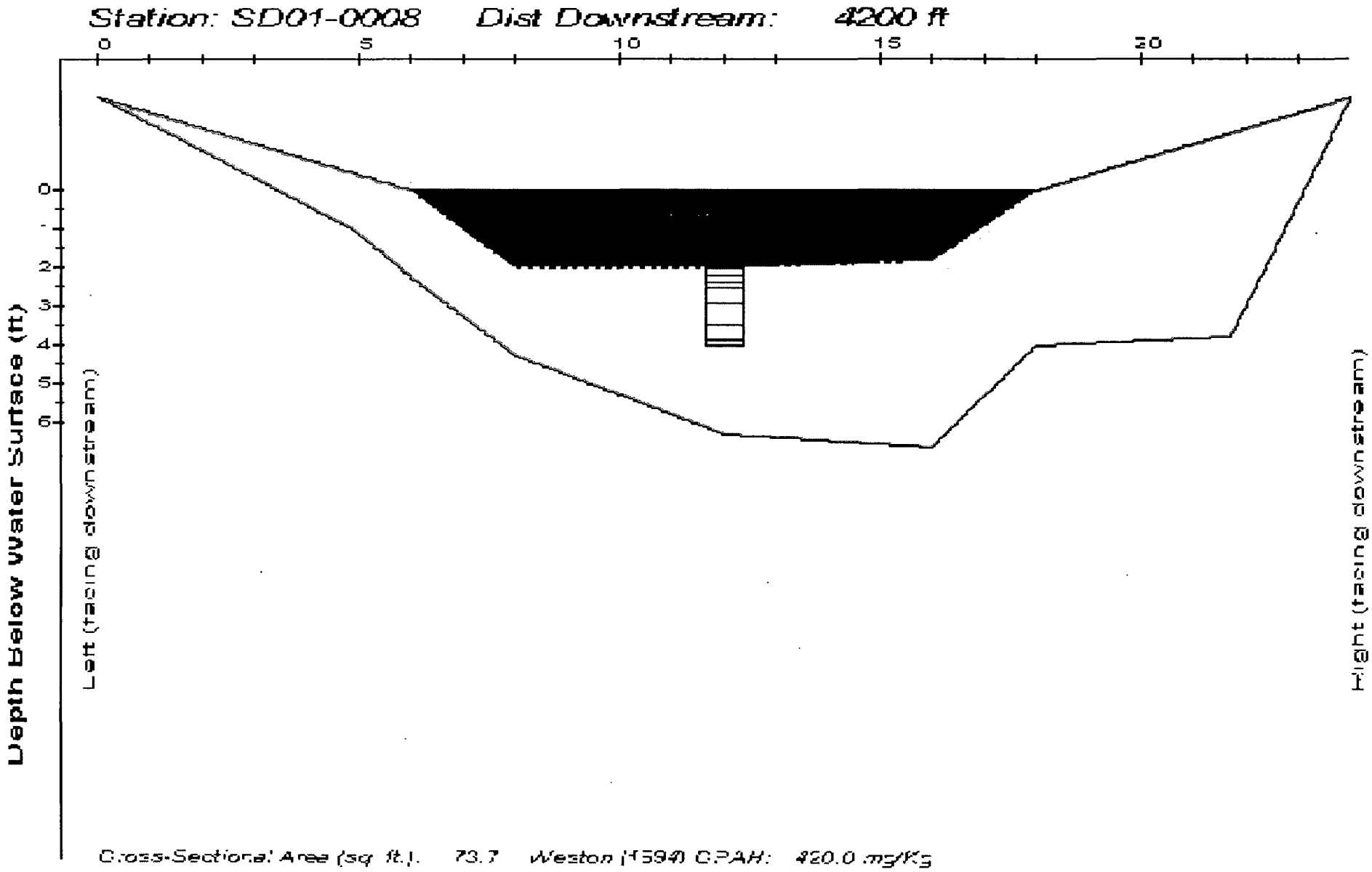

Station: SD01-0010 Dist Downstream: 3600 ft
0
5
10
15
20
25
30
0
2
3
4
5
6
Depth Below Water Surface (ft)
Left (facing downstream)
Right (facing downstream)
Cross-Sectional Area (sq. ft.): 93.1
Weston (1994) CPAH: 50.0 mg/Kg


Station: SD01-0010
Dist Downstream: 3600 ft
Sediment Depth (ft)
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
1.1
1.2
1.3
1.4
1.5
1.6
1.7
1.8
1.9
2.0
2.1
fine to medium gray sh-black silt w/ strong hydrocarbon odor
light brown clay silt w/ light hydrocarbon odor
black oily poorly sorted sand and gravel w/ detritus lense between extending between 18 and 20 cm - pure creosote product
gray sh black silt w/ coarse sand and small gravel w/ very strong hydrocarbon odor
light brown coarse sand and small gravel w/ clay inclusions w/ light hydrocarbon odor

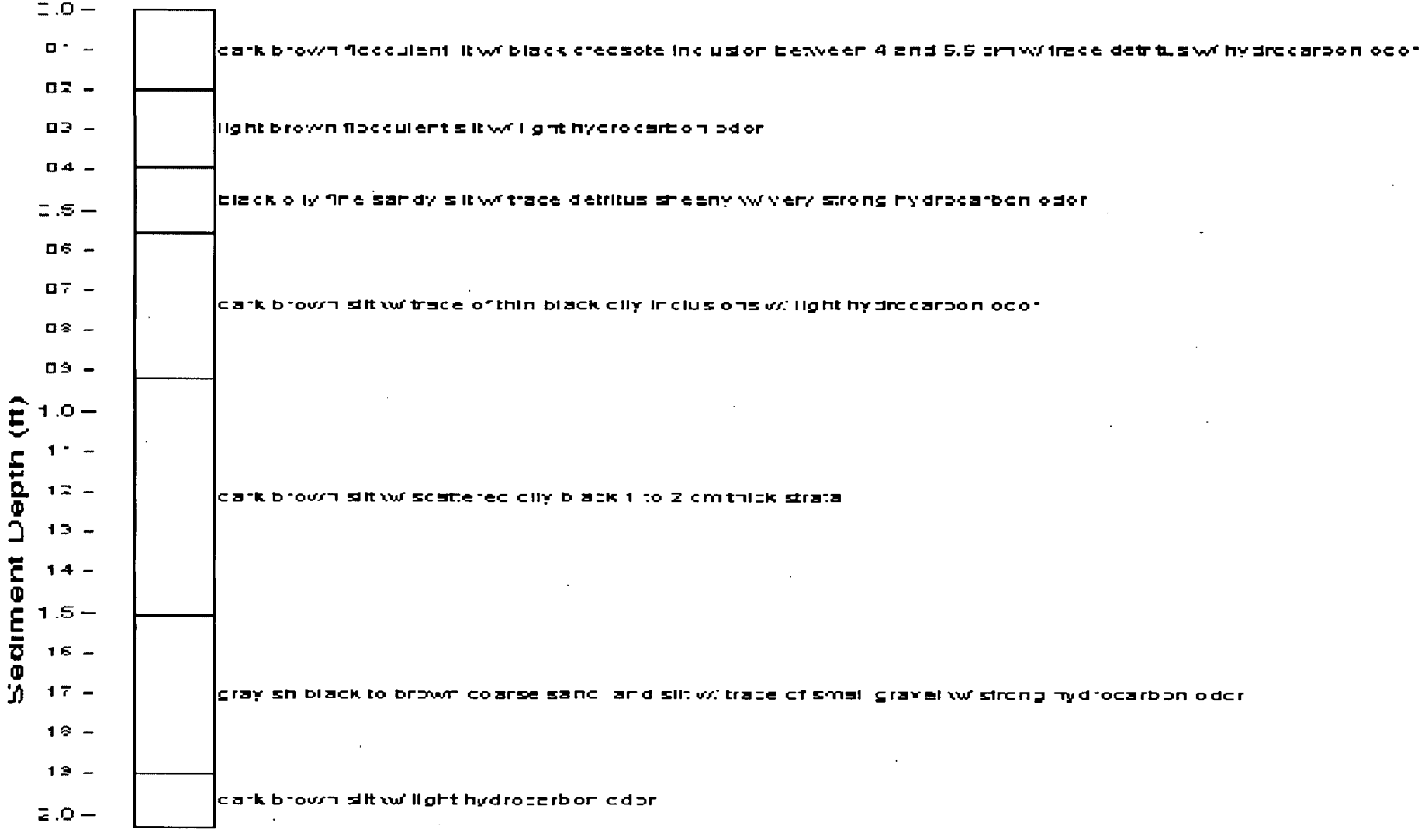

Station: SD01-0009
Dist Downstream: 3900 ft
0
5
10
15
20
25
0
2
3
4
5
Depth Below Water Surface (ft)
Left (facing downstream)
Right (facing downstream)
Cross-Sectional Area (sq. ft.): 32.2
Weston (1994) CPAH: 300.0 mg/Kg

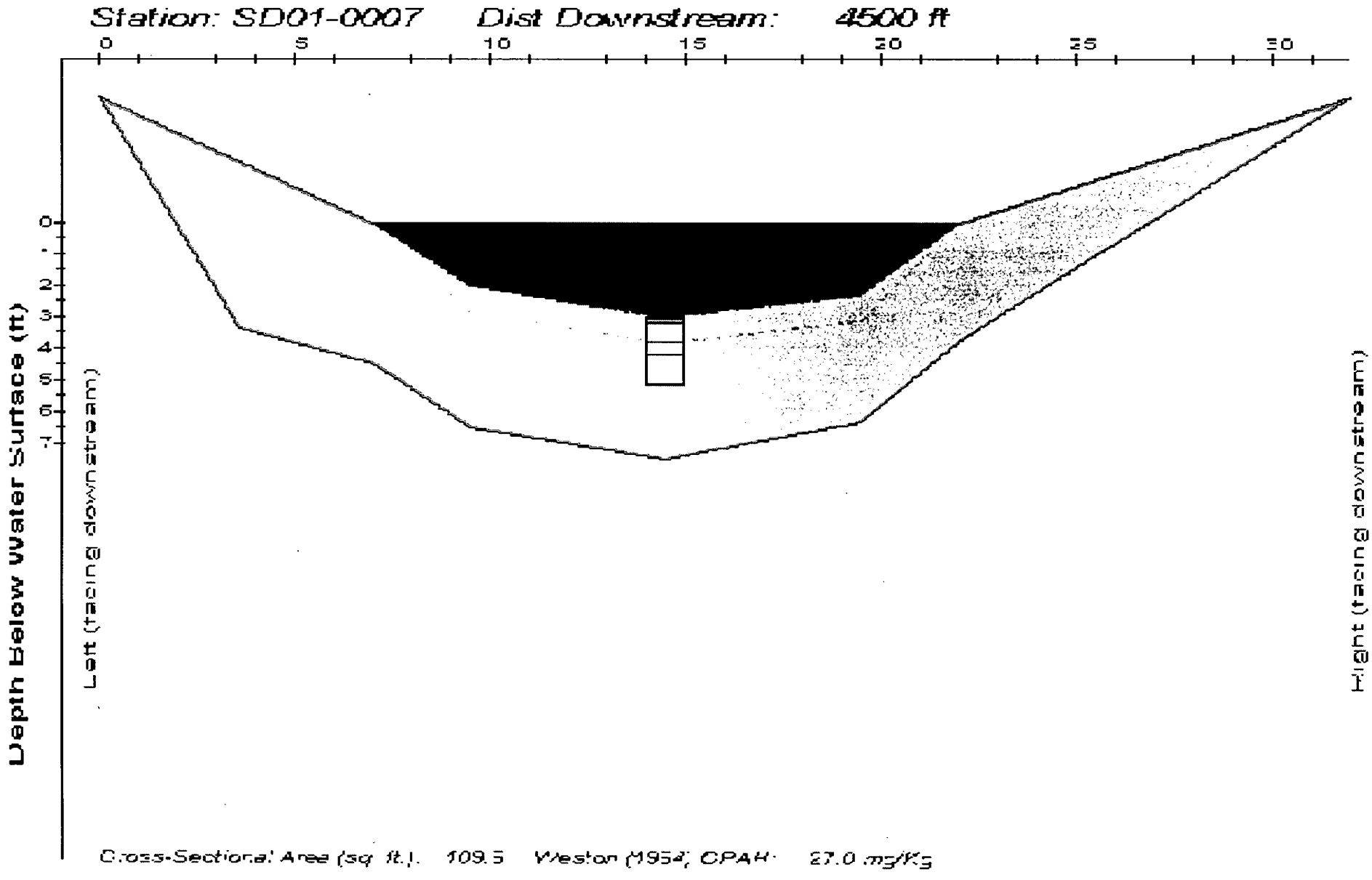
Station: SD01-0009 Dist Downstream: 3900 ft



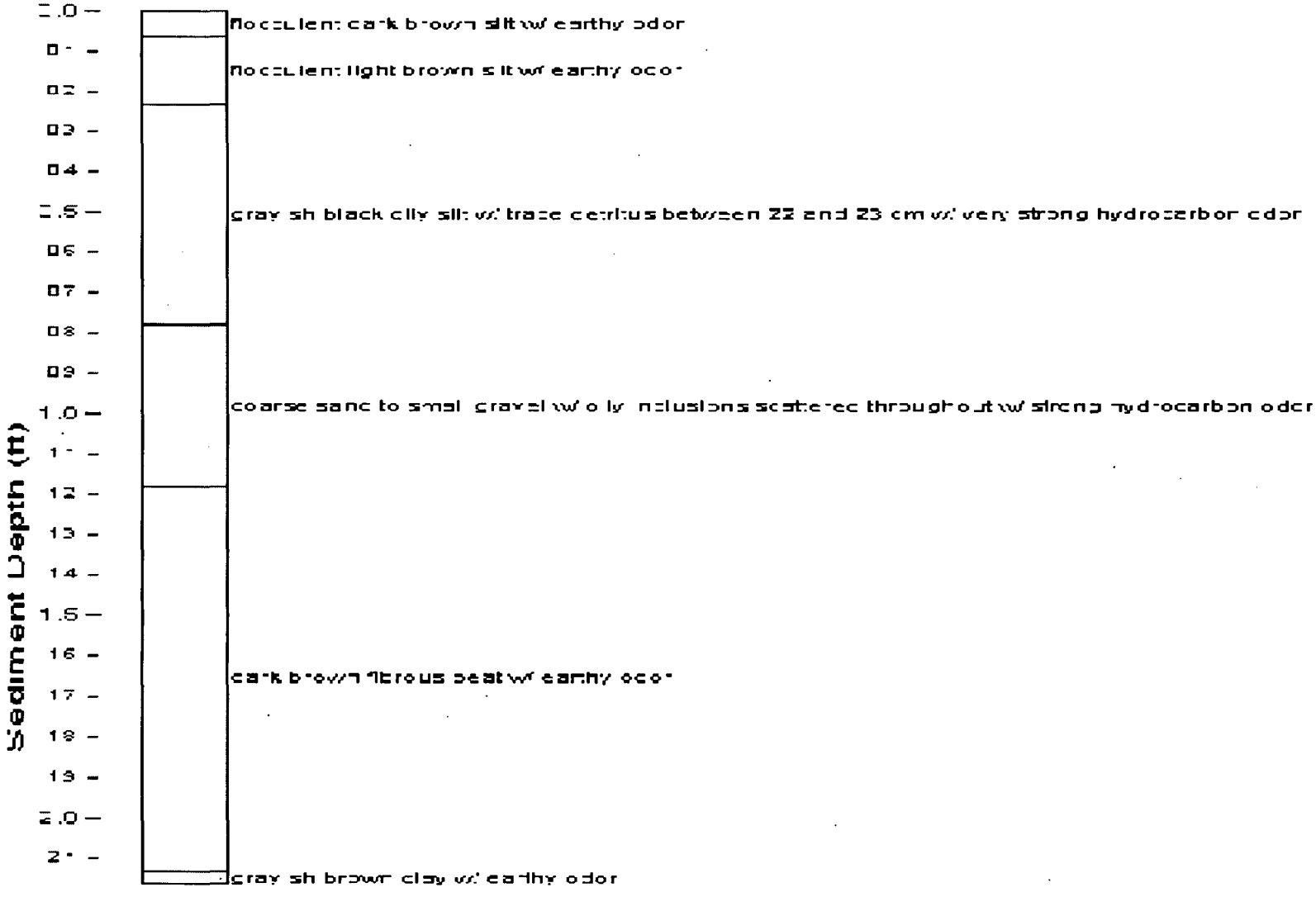

Station: SD01-0008
Dist Downstream: 4200 ft
0
5
10
15
20
0
2
3
4
5
6
Depth Below Water Surface (ft)
Left (facing downstream)
Right (facing downstream)
Cross-Sectional Area (sq. ft.): 73.7
Weston (1994) CPAH: 420.0 mg/Kg

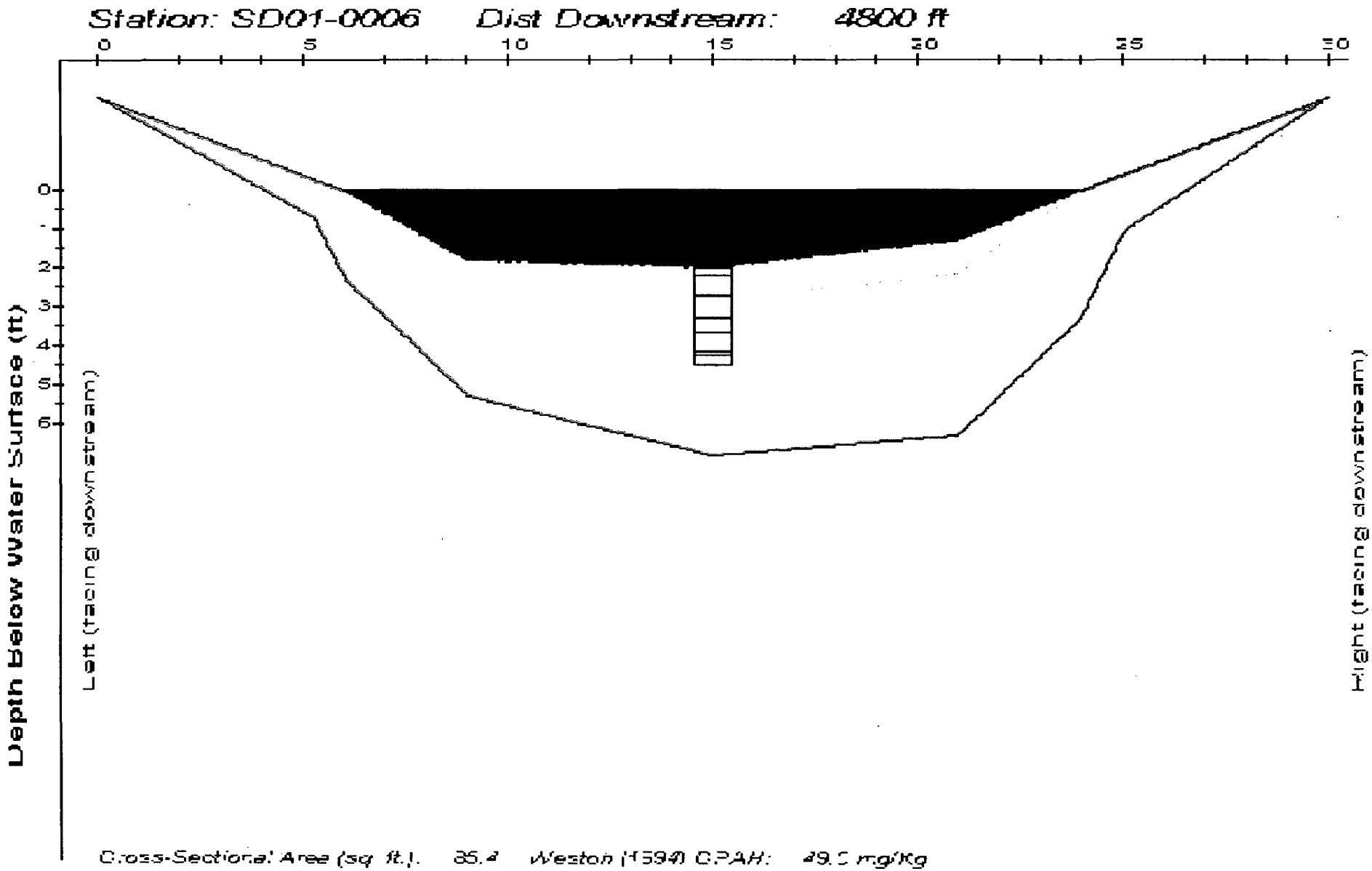
Station: SD01-0008 Dist Downstream: 4200 ft

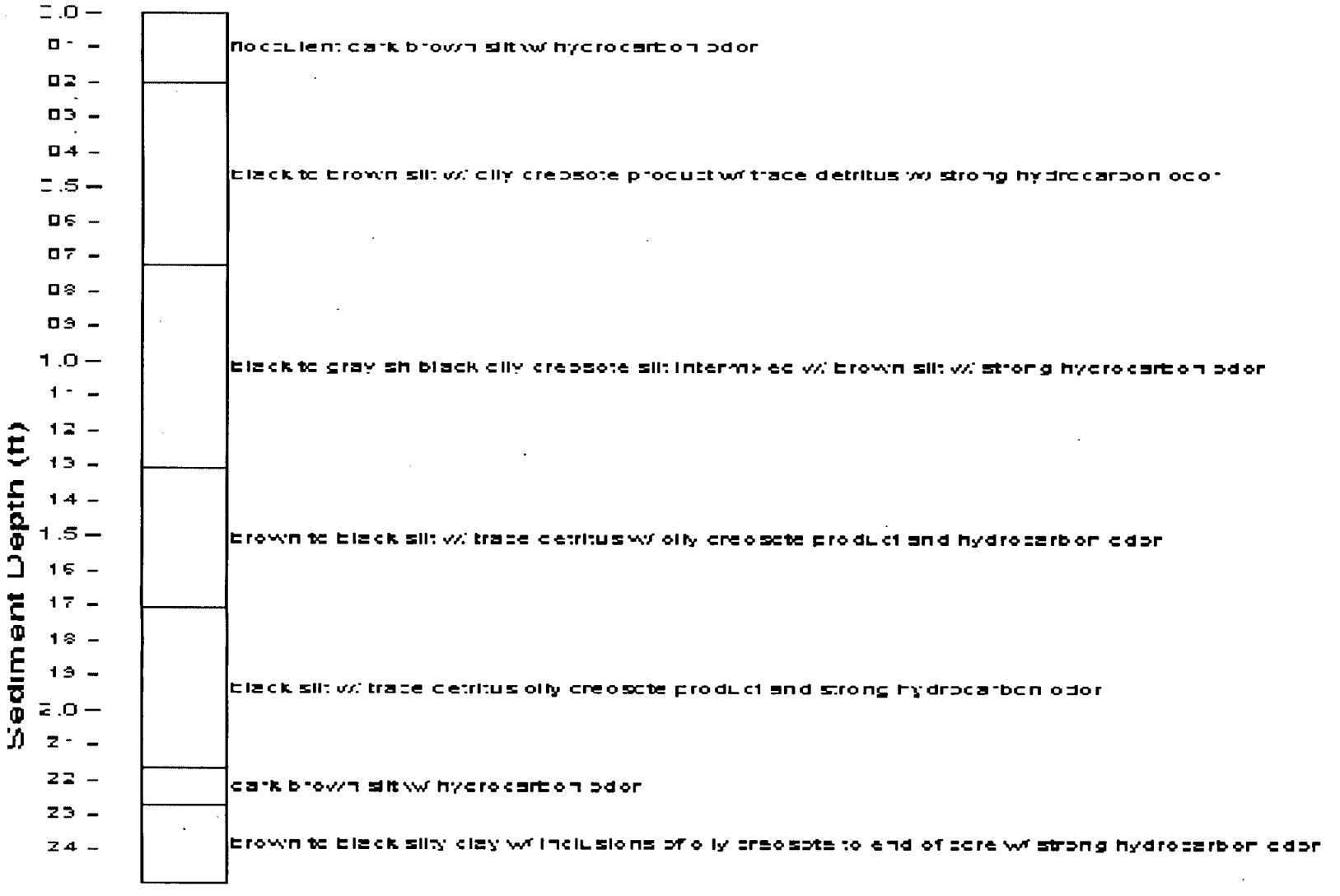


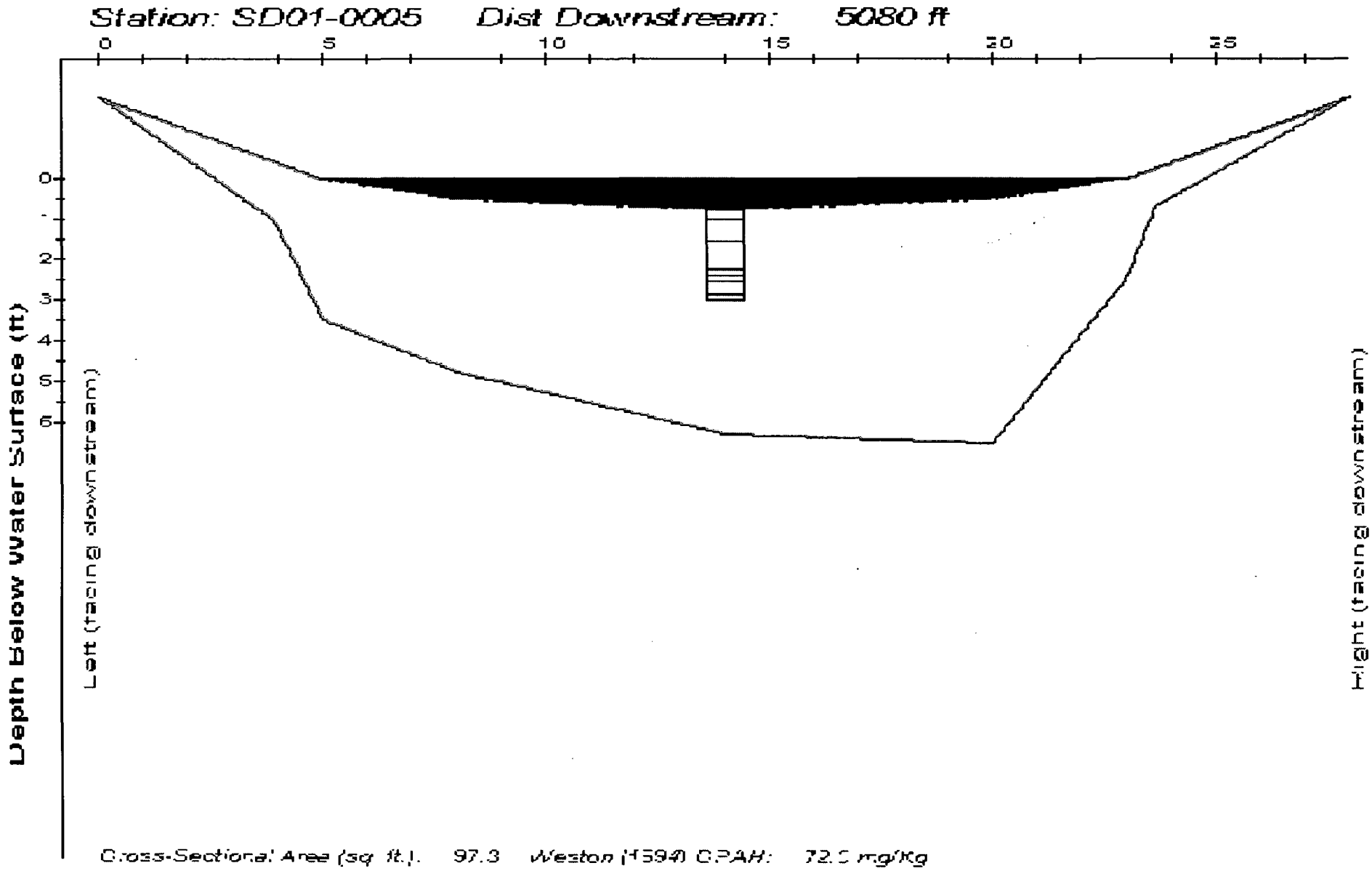

Station: SD01-0007 Dist Downstream: 4500 ft
0
5
10
15
20
25
30
Depth Below Water Surface (ft)
0
2
3
4
5
6
7
Left (facing downstream)
Right (facing downstream)
Cross-Sectional Area (sq. ft.). 109.5 Weston (1954) CPAH: 27.0 mg/Kg

Station: SD01-0007 Dist Downstream: 4500 ft

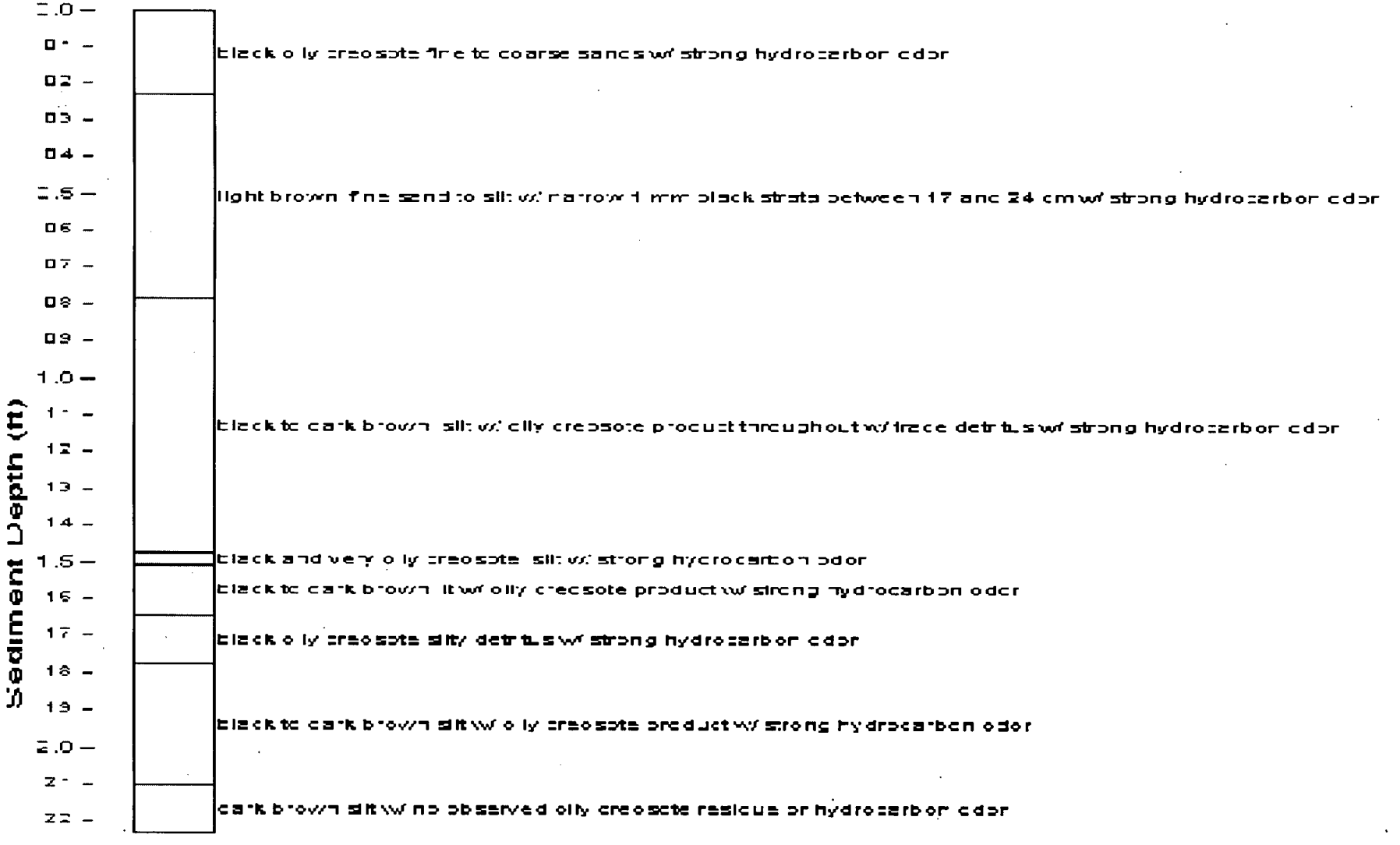


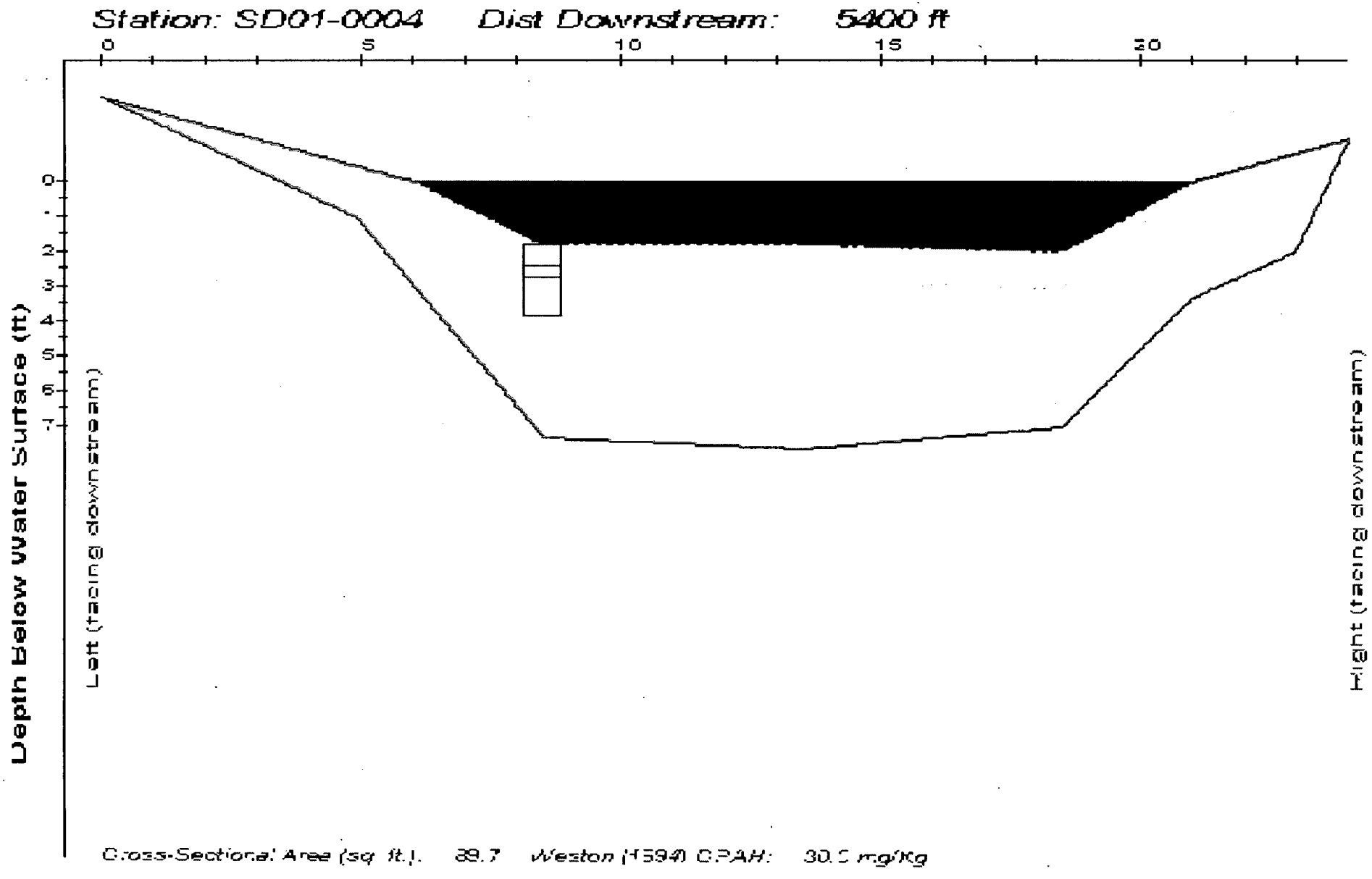

Station: SD01-0006 Dist Downstream: 4800 ft
0
5
10
15
20
25
30
0
2
3
4
5
6
Depth Below Water Surface (ft)
Left (facing downstream)
Right (facing downstream)
Cross-Sectional Area (sq. ft.): 85.4 Weston (1994) CPAH: 49.0 mg/Kg

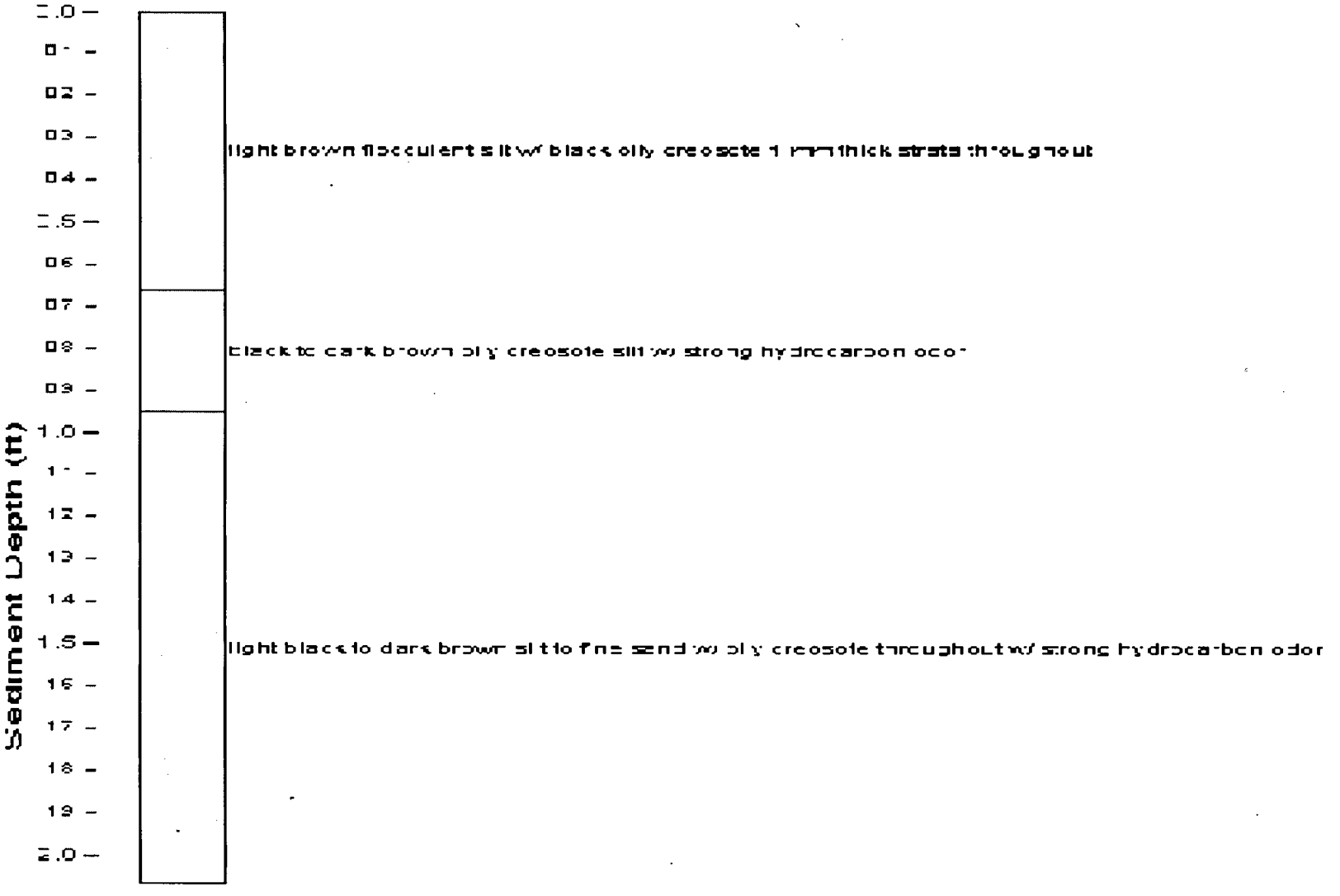

Station: SD01-0006
Dist Downstream: 4800 ft
Sediment Depth (ft)
0.0
0.5
1.0
1.5
2.0
2.5
Flocculent dark brown silt w/ hydrocarbon odor
Black to brown silt w/ oily creosote product w/ trace detritus w/ strong hydrocarbon odor
Black to gray sh black oily creosote silt interm>ed w/ brown silt w/ strong hydrocarbon odor
Brown to black silt w/ trace detritus w/ oily creosote product and hydrocarbon odor
Black silt w/ trace detritus oily creosote product and strong hydrocarbon odor
dark brown silt w/ hydrocarbon odor
Brown to black silty clay w/ inclusions of oily creosote to end of core w/ strong hydrocarbon odor

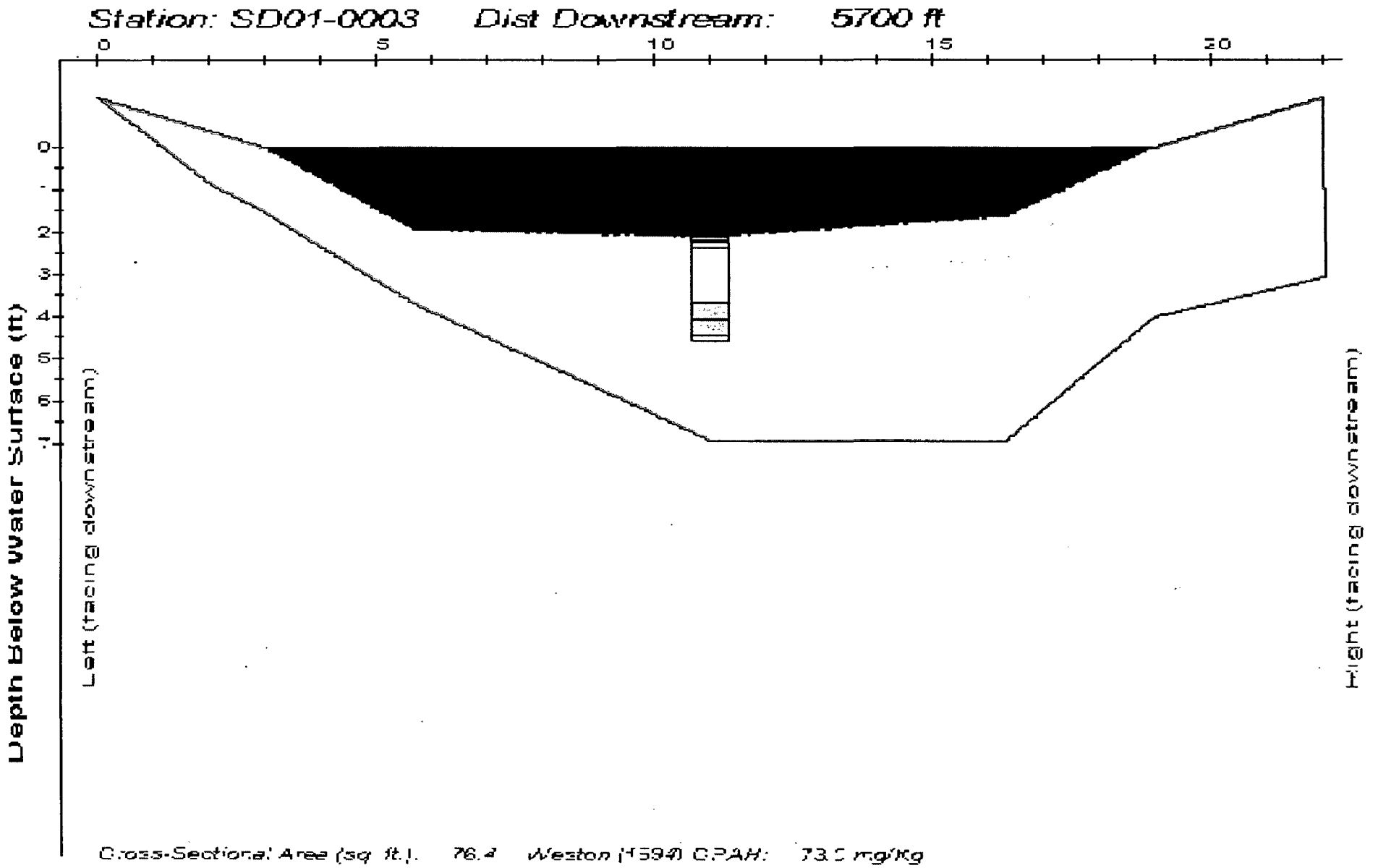

Station: SD01-0005
Dist Downstream: 5080 ft
0
5
10
15
20
25
0
1
2
3
4
5
6
Depth Below Water Surface (ft)
Left (facing downstream)
Right (facing downstream)
Cross-Sectional Area (sq. ft.): 97.3
Weston (1994) CPAH: 72.0 mg/Kg

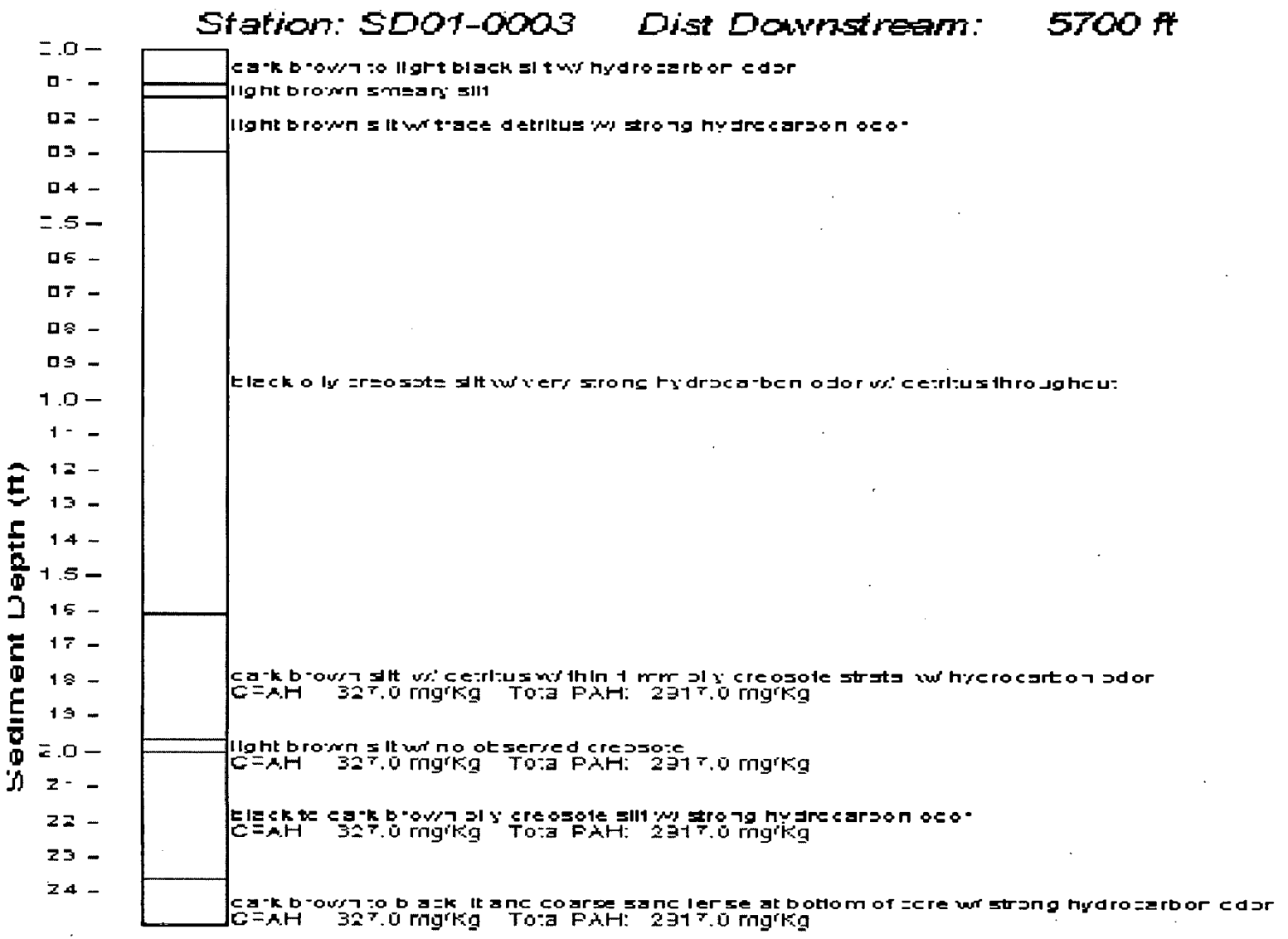
Station: SD01-0005 Dist Downstream: 5080 ft

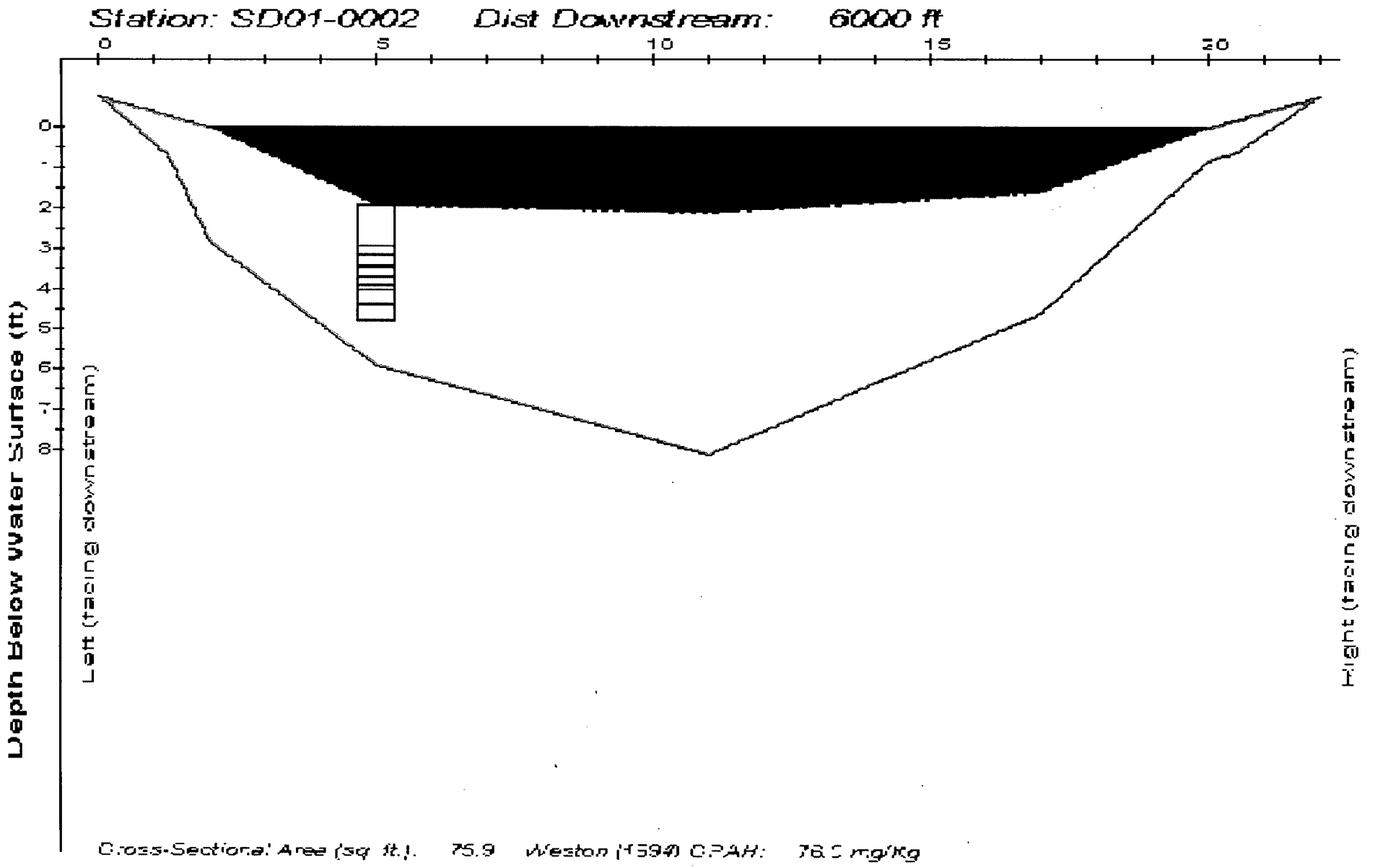


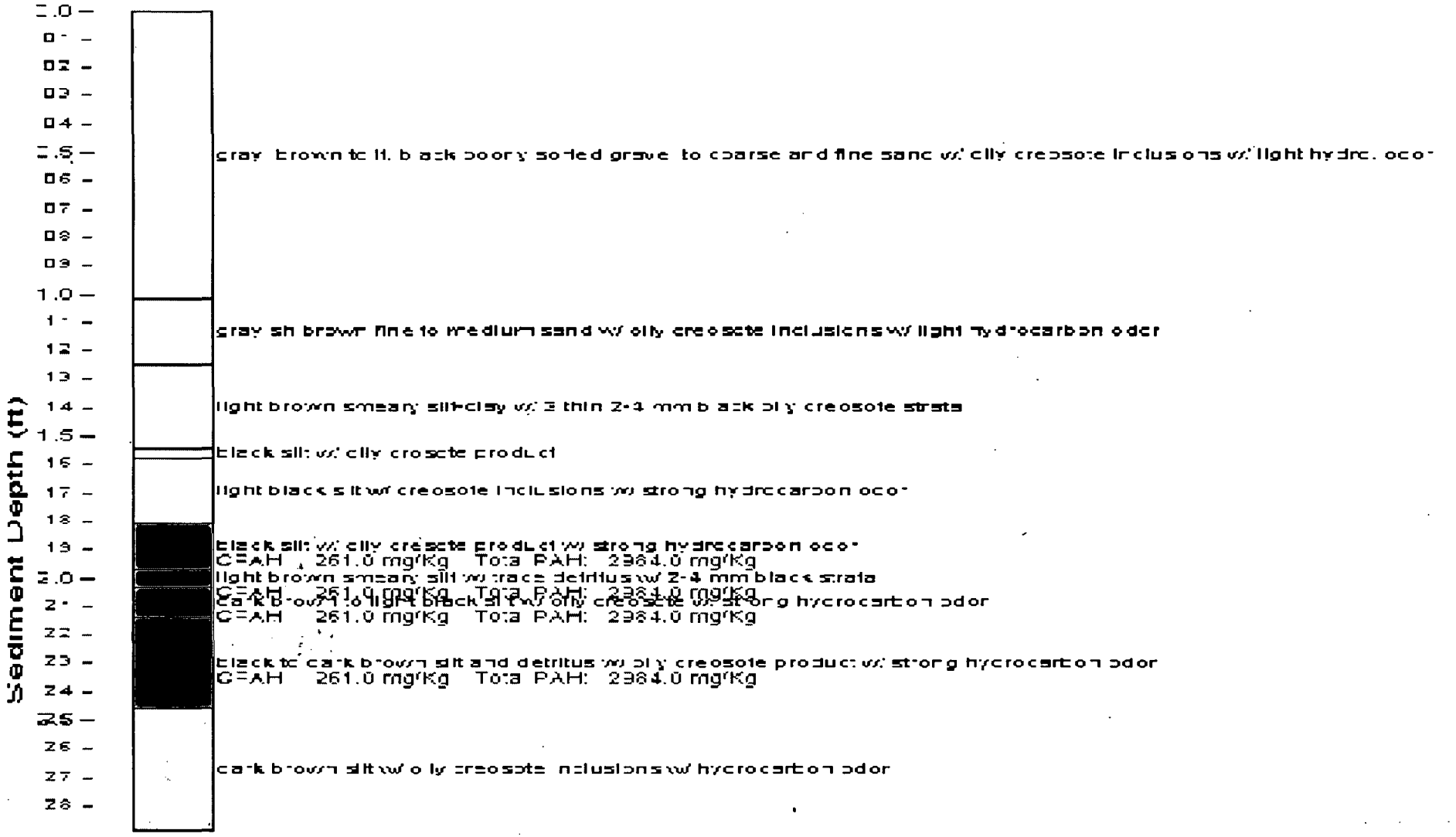

Station: SD01-0004
Dist Downstream: 5400 ft
0
5
10
15
20
0
1
2
3
4
5
6
7
Depth Below Water Surface (ft)
Left (facing downstream)
Right (facing downstream)
Cross-Sectional Area (sq. ft.): 38.7
Weston (1994) CPAH: 30.0 mg/Kg

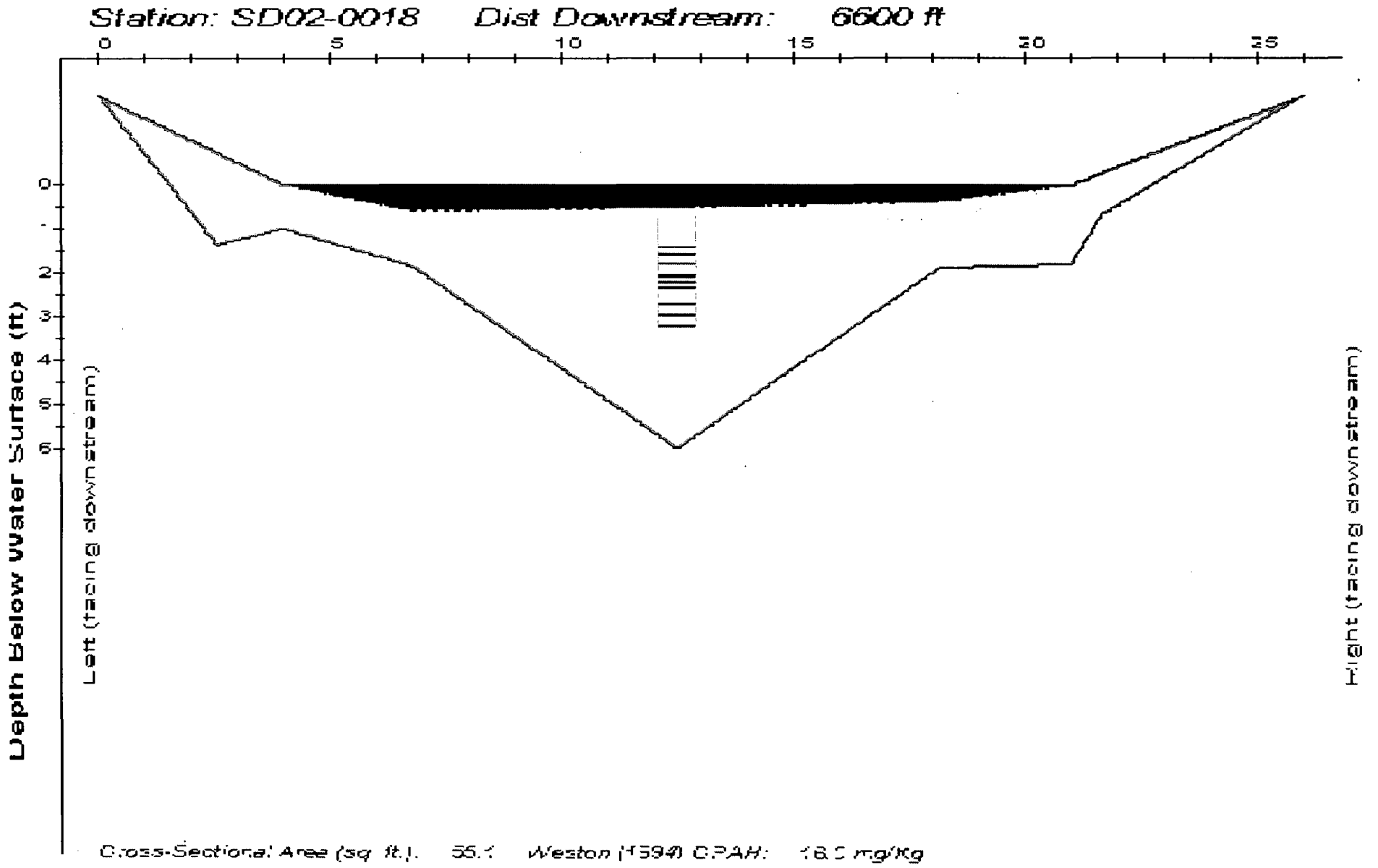

Station: SD01-0004
Dist Downstream: 5400 ft
Sediment Depth (ft)
light brown flocculent silt w/ black oily creosote 1 mm thick strata throughout
black to dark brown oily creosote silt w/ strong hydrocarbon odor
light black to dark brown silt to fine sand w/ oily creosote throughout w/ strong hydrocarbon odor


Station: SD01-0003 Dist Downstream: 5700 ft
0
5
10
15
20
0
1
2
3
4
5
6
7
Depth Below Water Surface (ft)
Left (facing downstream)
Right (facing downstream)
Cross-Sectional Area (sq. ft.): 76.4 Weston (1994) CPAH: 73.0 mg/Kg

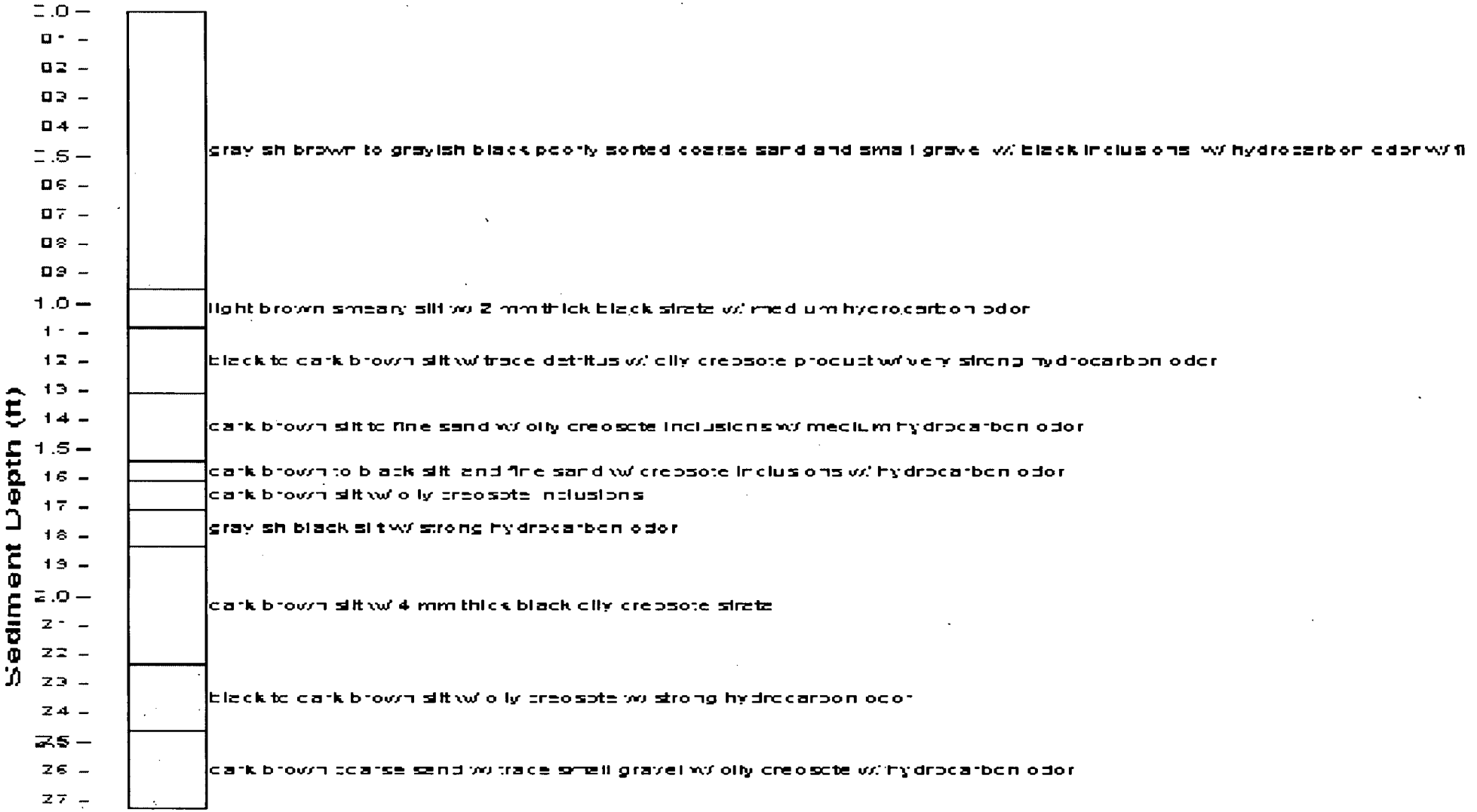

Station: SD01-0003 Dist Downstream: 5700 ft
Sediment Depth (ft)
dark brown to light black silt w/ hydrocarbon odor
light brown smeary silt
light brown silt w/ trace detritus w/ strong hydrocarbon odor
black oily creosote silt w/ very strong hydrocarbon odor w/ detritus throughout
dark brown silt w/ detritus w/ thin 1 mm oily creosote strata w/ hydrocarbon odor
C=AH 327.0 mg/Kg Total PAH: 2917.0 mg/Kg
light brown silt w/ no observed creosote
C=AH 327.0 mg/Kg Total PAH: 2917.0 mg/Kg
black to dark brown oily creosote silt w/ strong hydrocarbon odor
C=AH 327.0 mg/Kg Total PAH: 2917.0 mg/Kg
dark brown to black silt and coarse sand lense at bottom of core w/ strong hydrocarbon odor
C=AH 327.0 mg/Kg Total PAH: 2917.0 mg/Kg

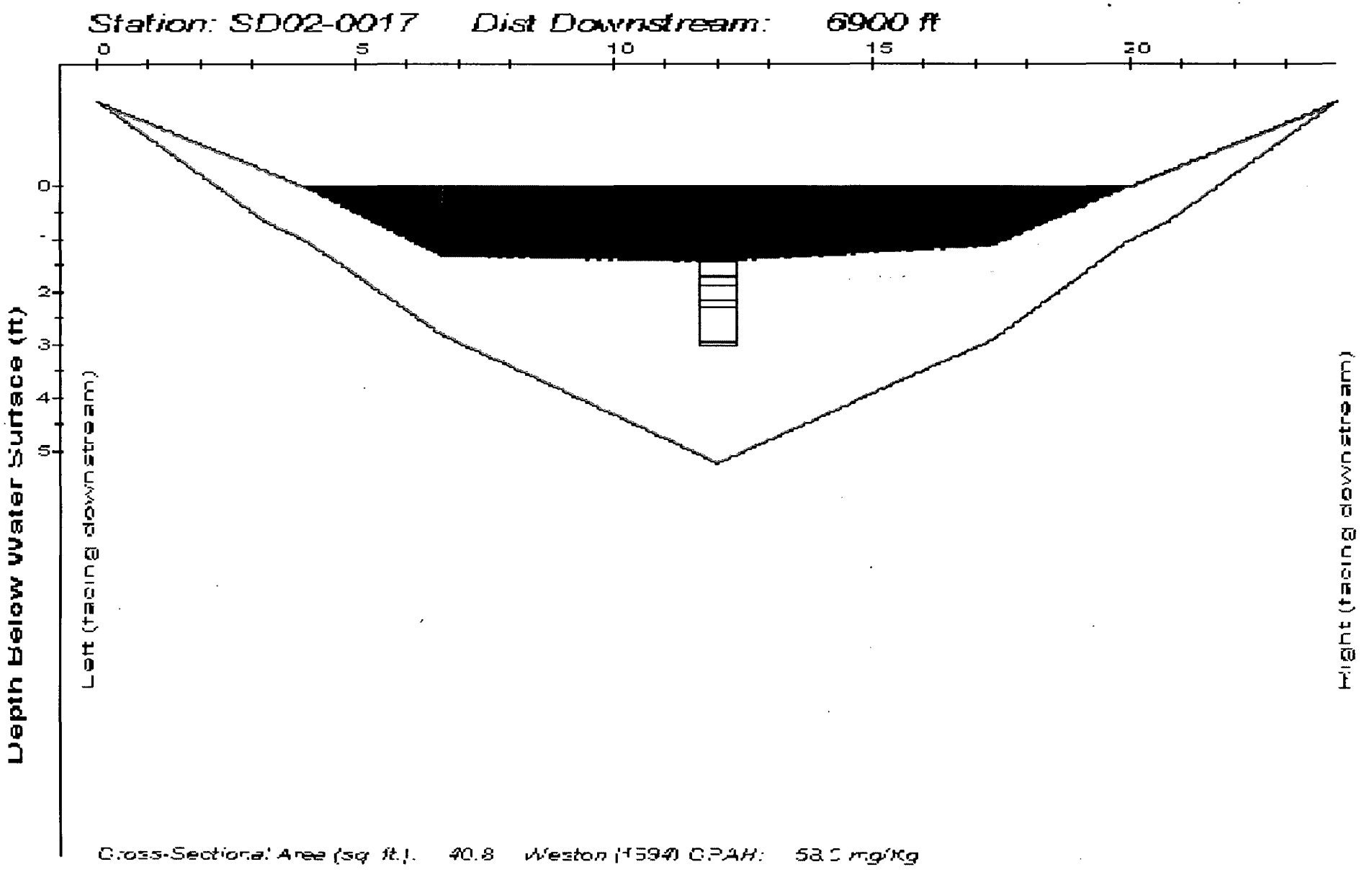

Station: SD01-0002
Dist Downstream: 6000 ft
0
5
10
15
20
0
2
3
4
5
6
8
Depth Below Water Surface (ft)
Left (facing downstream)
Right (facing downstream)
Cross-Sectional Area (sq. ft.): 75.9
Weston (1994) CPAH: 78.0 mg/kg

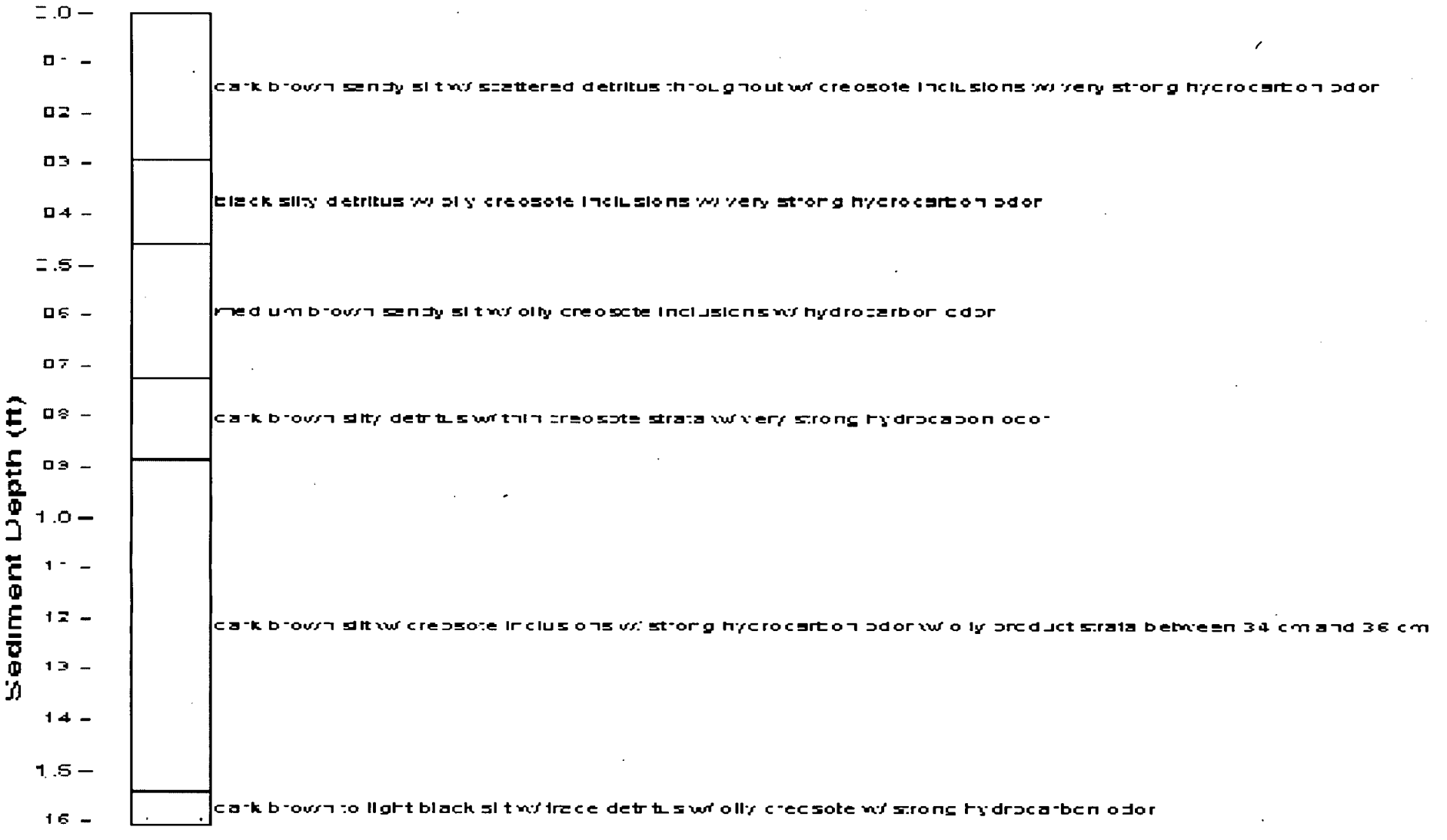

Station: SD01-0002 Dist Downstream: 6000 ft
Sediment Depth (ft)
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
1.1
1.2
1.3
1.4
1.5
1.6
1.7
1.8
1.9
2.0
2.1
2.2
2.3
2.4
2.5
2.6
2.7
2.8
gray brown to lt. black poorly sorted gravel to coarse and fine sand w/ oily creosote inclusions w/ light hydrc. odor
gray sh brown fine to medium sand w/ oily creosote inclusions w/ light hydrocarbon odor
light brown smeary silt-clay w/ 3 thin 2-4 mm black oily creosote strata
black silt w/ oily creosote product
light black silt w/ creosote inclusions w/ strong hydrocarbon odor
black silt w/ oily creosote product w/ strong hydrocarbon odor
CPAH 261.0 mg/Kg Total PAH: 2384.0 mg/Kg
light brown smeary silt w/ trace detritus w/ 2-4 mm black strata
CPAH 261.0 mg/Kg Total PAH: 2384.0 mg/Kg
Dark brown 1.0 light black silt w/ oily creosote w/ strong hydrocarbon odor
CPAH 261.0 mg/Kg Total PAH: 2384.0 mg/Kg
black to dark brown silt and detritus w/ oily creosote product w/ strong hydrocarbon odor
CPAH 261.0 mg/Kg Total PAH: 2384.0 mg/Kg
dark brown silt w/ oily creosote inclusions w/ hydrocarbon odor


Station: SD02-0018 Dist Downstream: 6600 ft
0
5
10
15
20
25
0
2
3
4
5
6
Depth Below Water Surface (ft)
Left (facing downstream)
Right (facing downstream)
Cross-Sectional Area (sq. ft.): 55.1
Weston (1994) CPAH: 18.0 mg/Kg

Station: SD02-0018 Dist Downstream: 6600 ft

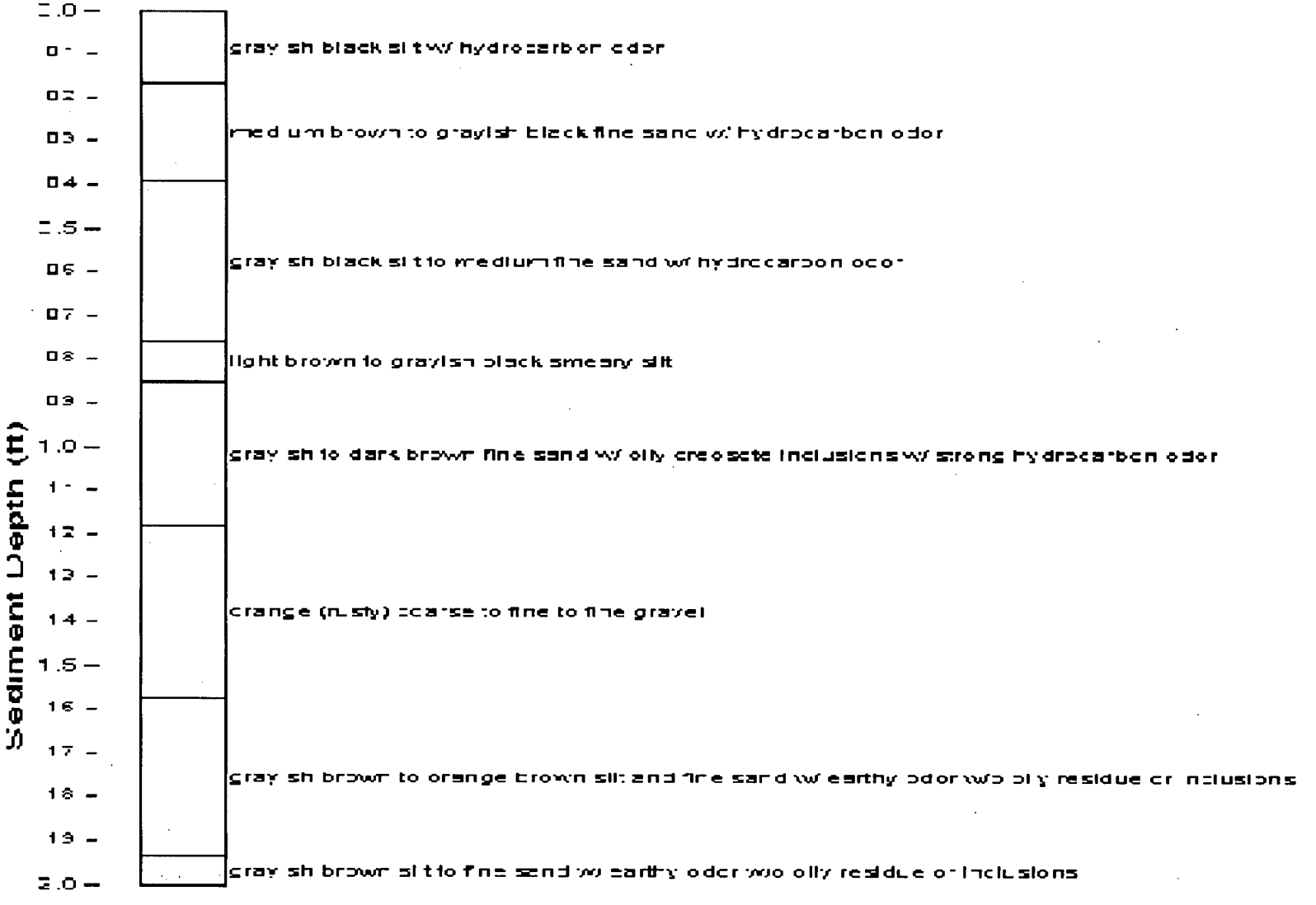


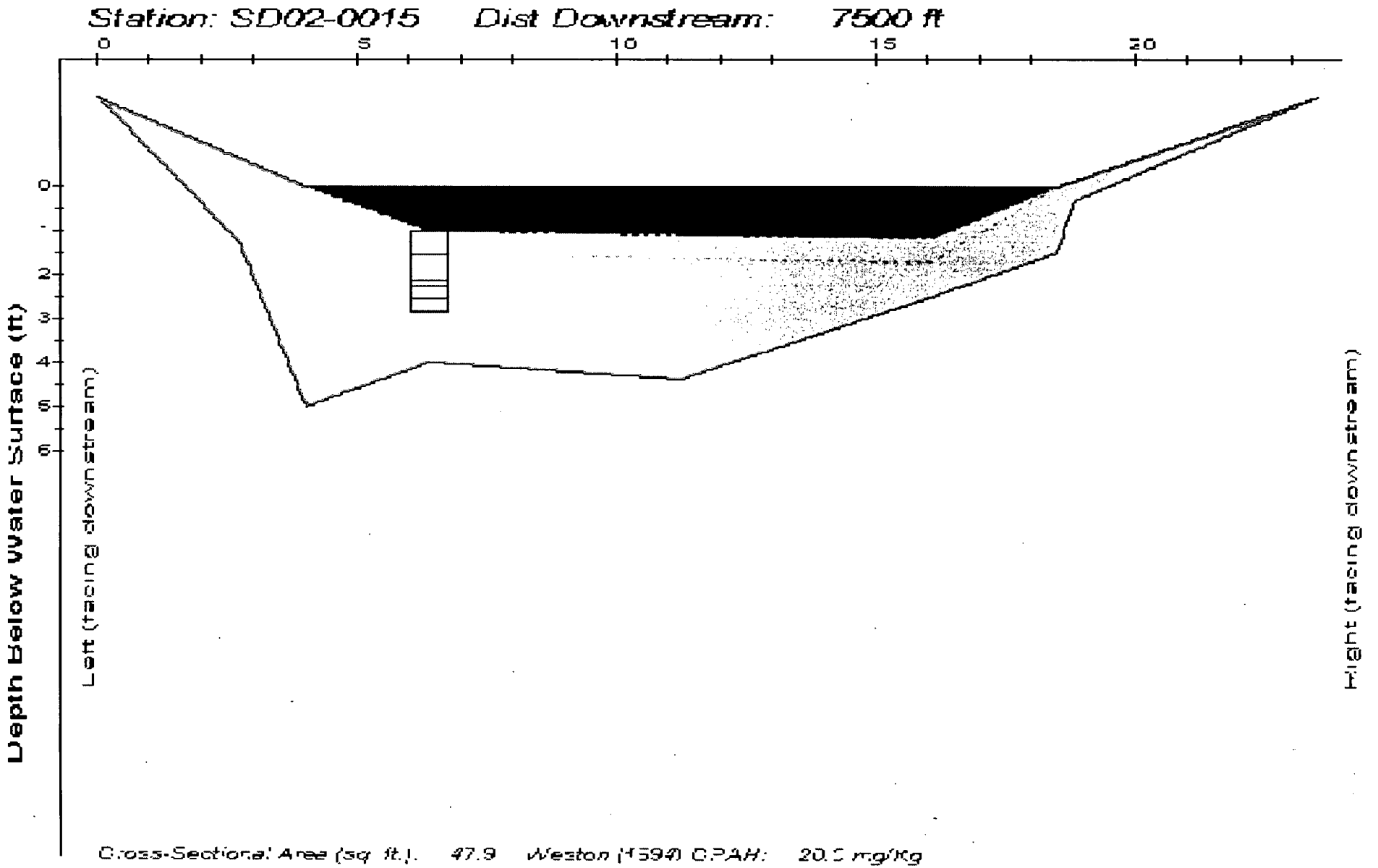

Station: SD02-0017 Dist Downstream: 6900 ft
0
5
10
15
20
0
2
3
4
5
Depth Below Water Surface (ft)
Left (facing downstream)
Right (facing downstream)
Cross-Sectional Area (sq. ft.): 40.8 Weston (1994) CPAH: 58.0 mg/Kg


Station: SD02-0017 Dist Downstream: 6900 ft
Sediment Depth (ft)
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
1.1
1.2
1.3
1.4
1.5
1.6
dark brown sandy silt w/ scattered detritus throughout w/ creosote inclusions w/ very strong hydrocarbon odor
black silty detritus w/ oily creosote inclusions w/ very strong hydrocarbon odor
med um brown sandy silt w/ oily creosote inclusions w/ hydrocarbon odor
dark brown silty detritus w/ thin creosote strata w/ very strong hydrocarbon odor
dark brown silt w/ creosote inclusions w/ strong hydrocarbon odor w/ oily product strata between 34 cm and 36 cm
dark brown to light black silt w/ trace detritus w/ oily creosote w/ strong hydrocarbon odor

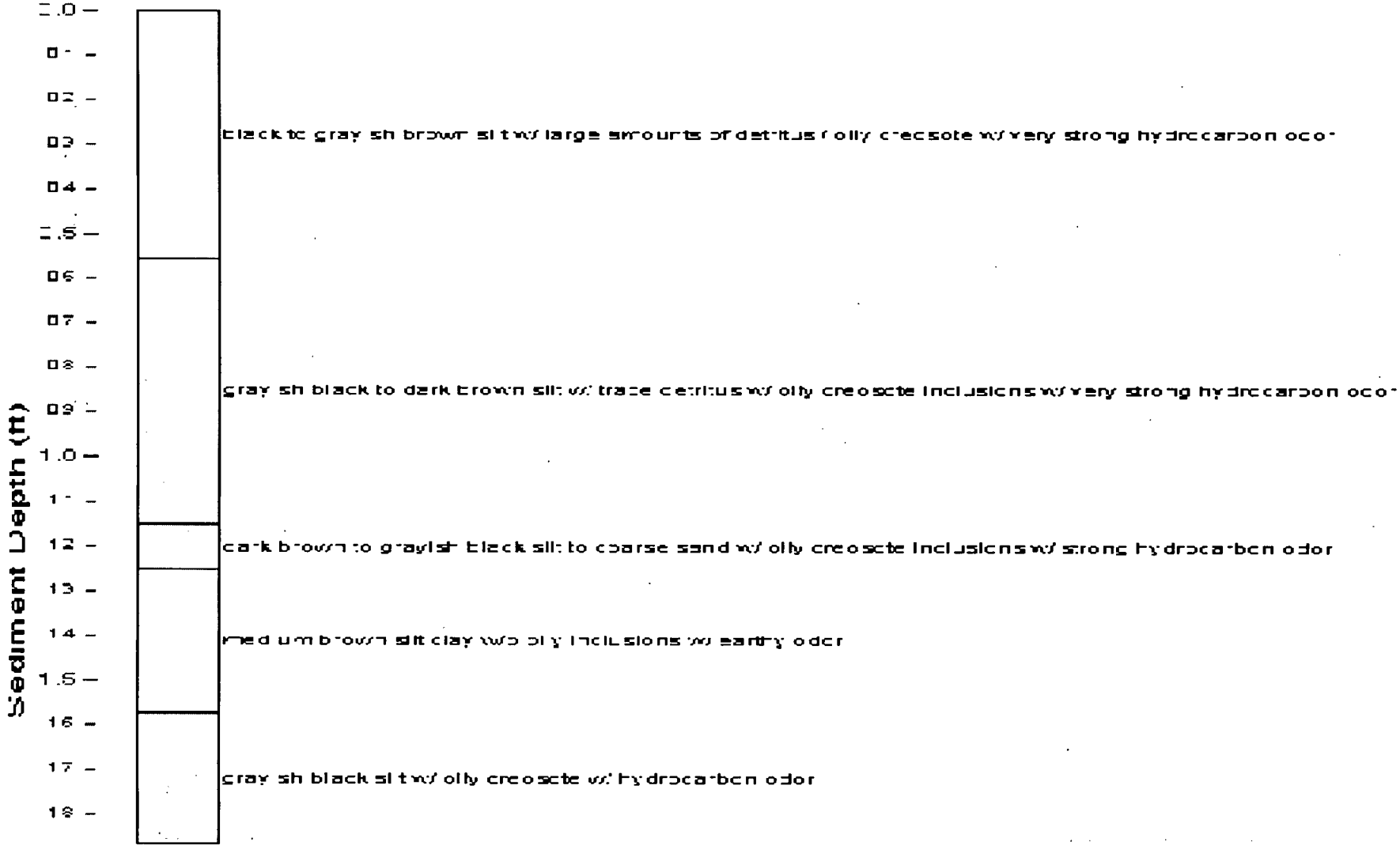
Station: SD02-0016
Dist Downstream: 7200 ft
0
5
10
15
20
25
0
2
3
4
Depth Below Water Surface (ft)
Left (facing downstream)
Right (facing downstream)
Cross-Sectional Area (sq. ft.): 48.5
Weston (1994) CPAH: 9.3 mg/Kg

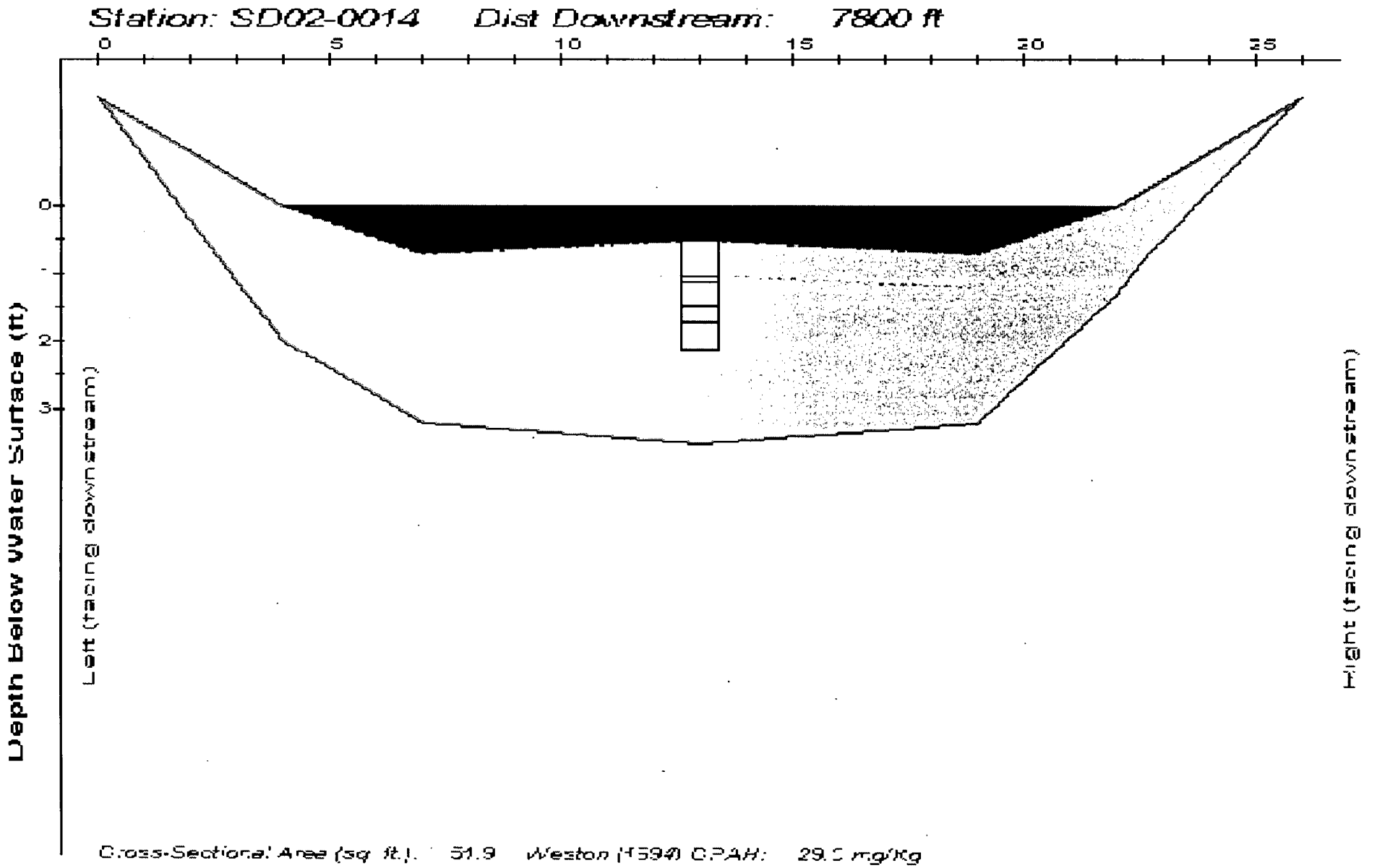
Station: SD02-0016 Dist Downstream: 7200 ft



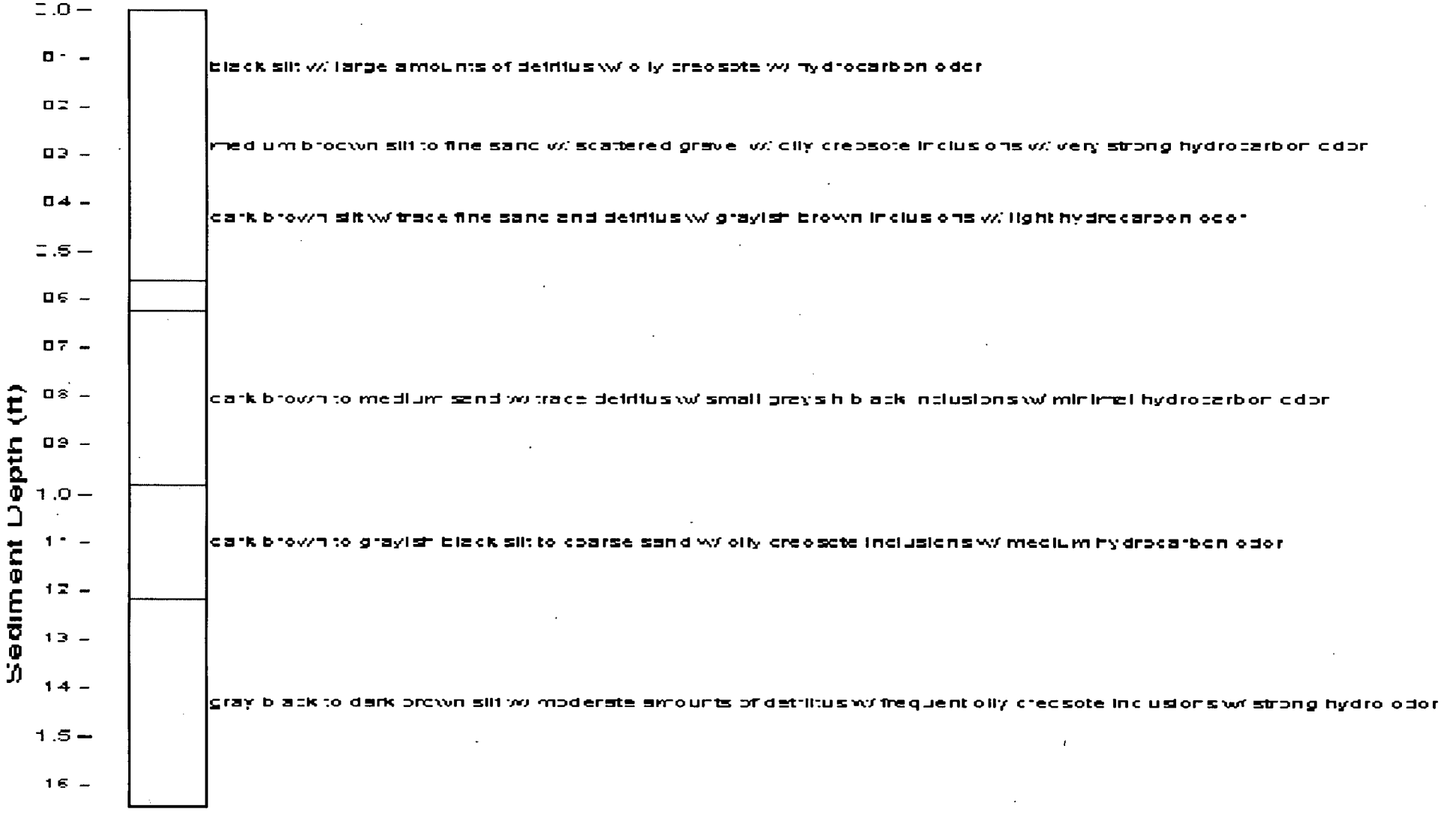

Station: SD02-0015
Dist Downstream: 7500 ft
0
5
10
15
20
0
2
3
4
5
6
Depth Below Water Surface (ft)
Left (facing downstream)
Right (facing downstream)
Cross-Sectional Area (sq. ft.): 47.9
Weston (1994) CPAH: 20.3 mg/Kg

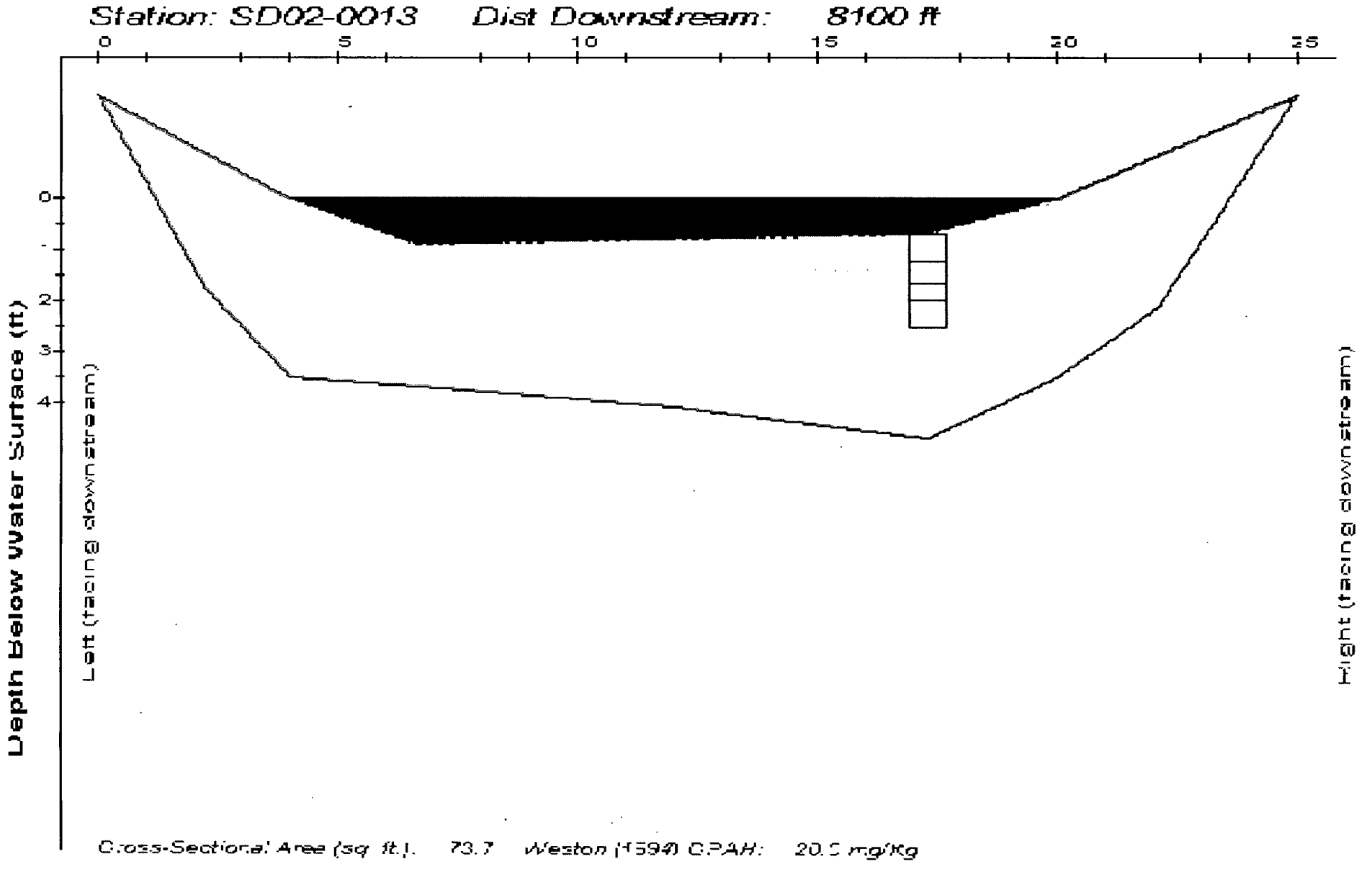
Station: SD02-0015 Dist Downstream: 7500 ft



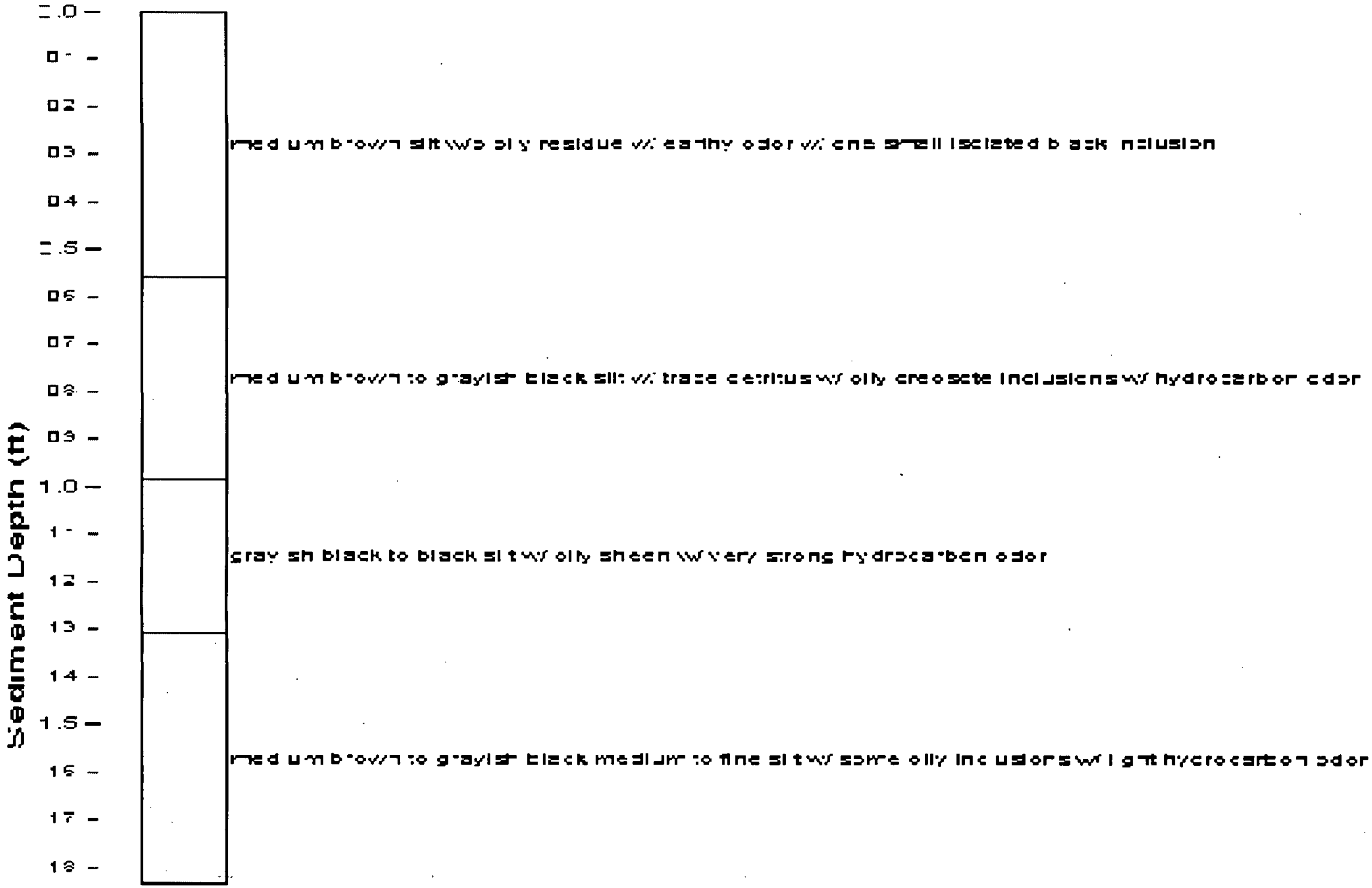

Station: SD02-0014 Dist Downstream: 7800 ft
0
5
10
15
20
25
0
2
3
Depth Below Water Surface (ft)
Left (facing downstream)
Right (facing downstream)
Cross-Sectional Area (sq. ft.): 51.9 Weston (1994) CPAH: 29.0 mg/kg

Station: SD02-0014 Dist Downstream: 7800 ft

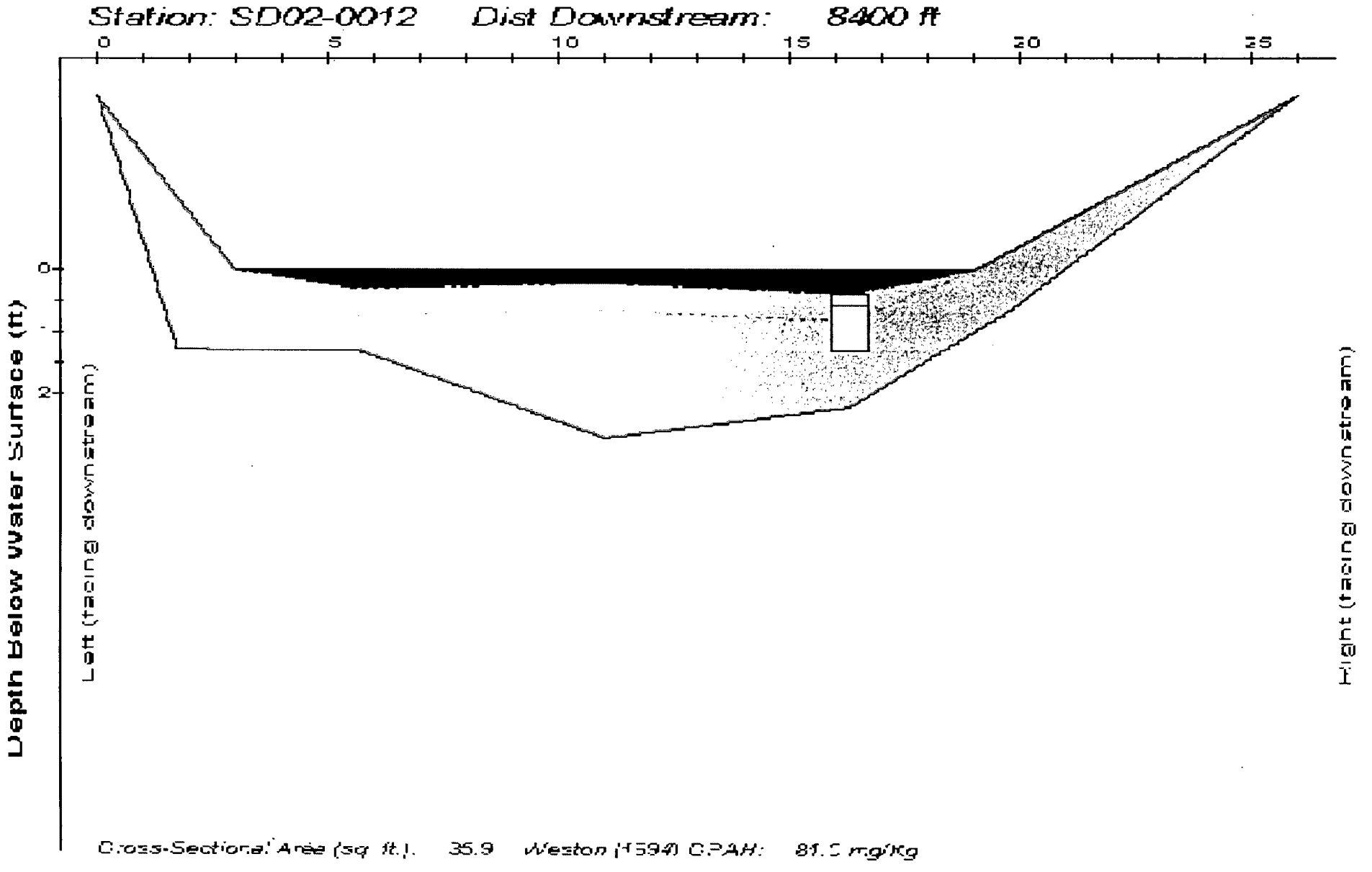


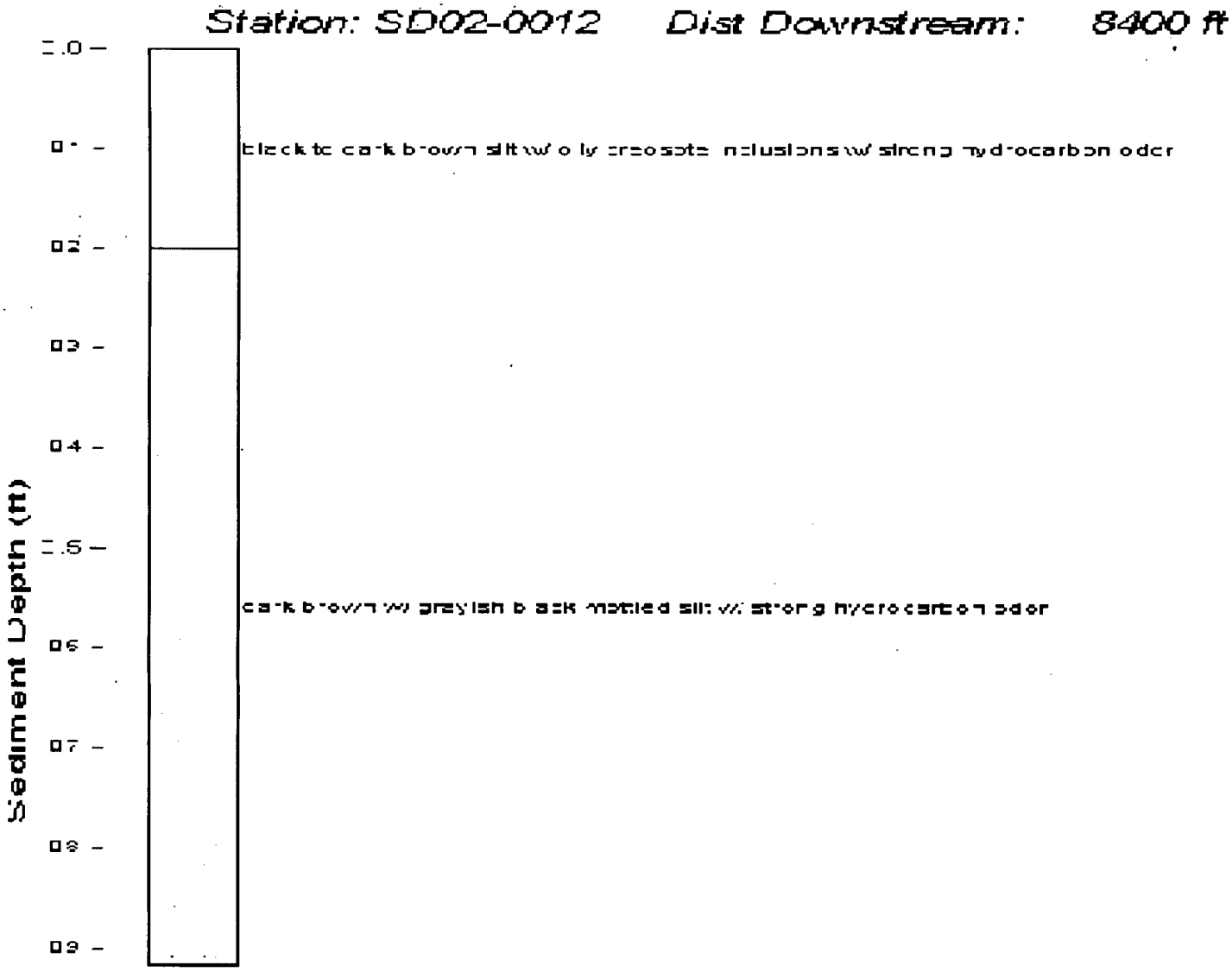

Station: SD02-0013
Dist Downstream: 8100 ft
0
5
10
15
20
25
0
2
3
4
Depth Below Water Surface (ft)
Left (facing downstream)
Right (facing downstream)
Cross-Sectional Area (sq. ft.): 73.7
Weston (1994) CPAH: 20.0 mg/Kg

Station: SD02-0013 Dist Downstream: 8100 ft

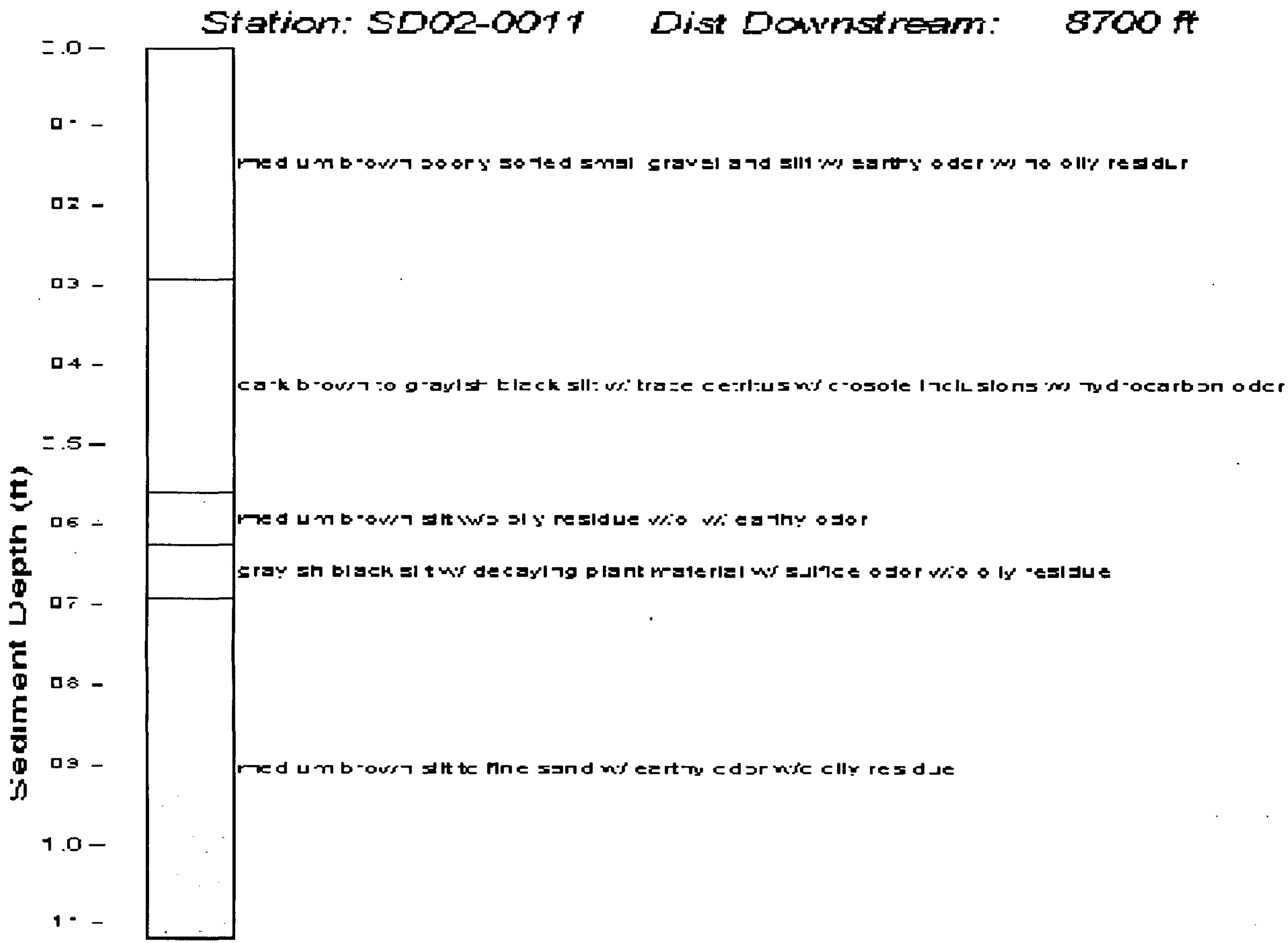


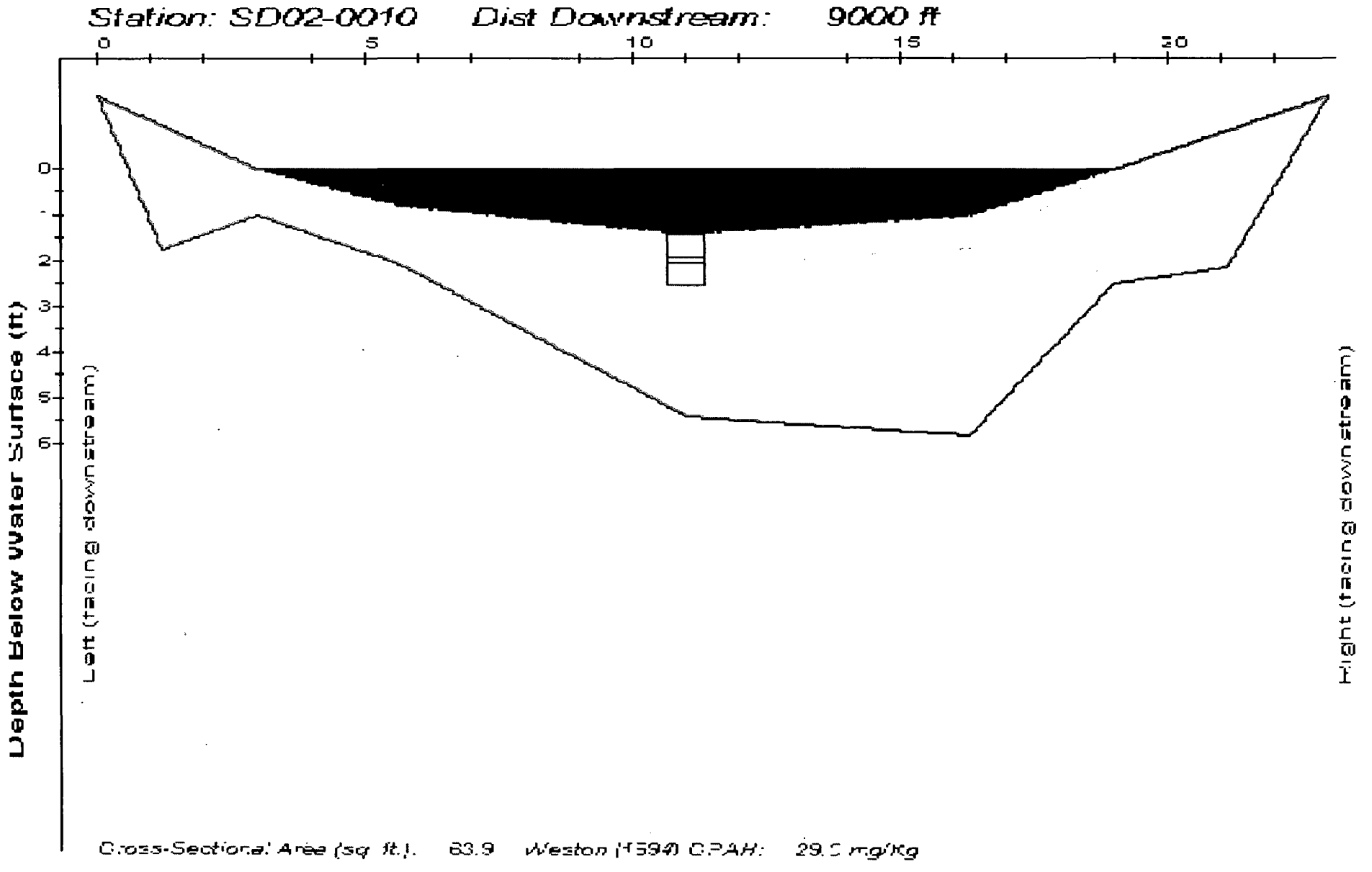
Sediment Depth (ft)
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
1.1
1.2
1.3
1.4
1.5
1.6
1.7
1.8
medium brown silt w/o oily residue w/ earthy odor w/ one small isolated black inclusion
medium brown to grayish black silt w/ trace detritus w/ oily creosote inclusions w/ hydrocarbon odor
grayish black to black silt w/ oily sheen w/ very strong hydrocarbon odor
medium brown to grayish black medium to fine silt w/ some oily inclusions w/ light hydrocarbon odor


Station: SD02-0012 Dist Downstream: 8400 ft
0
5
10
15
20
25
0
2
Depth Below Water Surface (ft)
Left (facing downstream)
Right (facing downstream)
Cross-Sectional Area (sq. ft.): 35.9 Weston (1994) CPAH: 81.3 mg/Kg


Station: SD02-0012
Dist Downstream: 8400 ft
Sediment Depth (ft)
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
black to dark brown silt w/ oily creosote inclusions w/ strong hydrocarbon odor
dark brown w/ greyish black mottled silt w/ strong hydrocarbon odor

Station: SD02-0011
Dist Downstream:
8700 ft
0
5
10
15
20
0
2
3
Depth Below Water Surface (ft)
Left (facing downstream)
Right (facing downstream)
Cross-Sectional Area (sq. ft.):
32.8
Weston (1994) CPAH:
35.0 mg/Kg


Station: SD02-0011 Dist Downstream: 8700 ft
Sediment Depth (ft)
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
1.1
medium brown poorly sorted small gravel and silt w/ earthy odor w/ no oily residue
dark brown to grayish black silt w/ trace detritus w/ creosote inclusions w/ hydrocarbon odor
medium brown silt w/o oily residue w/o w/ earthy odor
grayish black silt w/ decaying plant material w/ sulfide odor w/o oily residue
medium brown silt to fine sand w/ earthy odor w/o oily residue


Station: SD02-0010 Dist Downstream: 9000 ft
0
5
10
15
20
0
2
3
4
5
6
Depth Below Water Surface (ft)
Left (facing downstream)
Right (facing downstream)
Cross-Sectional Area (sq. ft.): 83.9 Weston (1994) CPAH: 29.0 mg/kg

Station: SD02-0010 Dist Downstream: 9000 ft

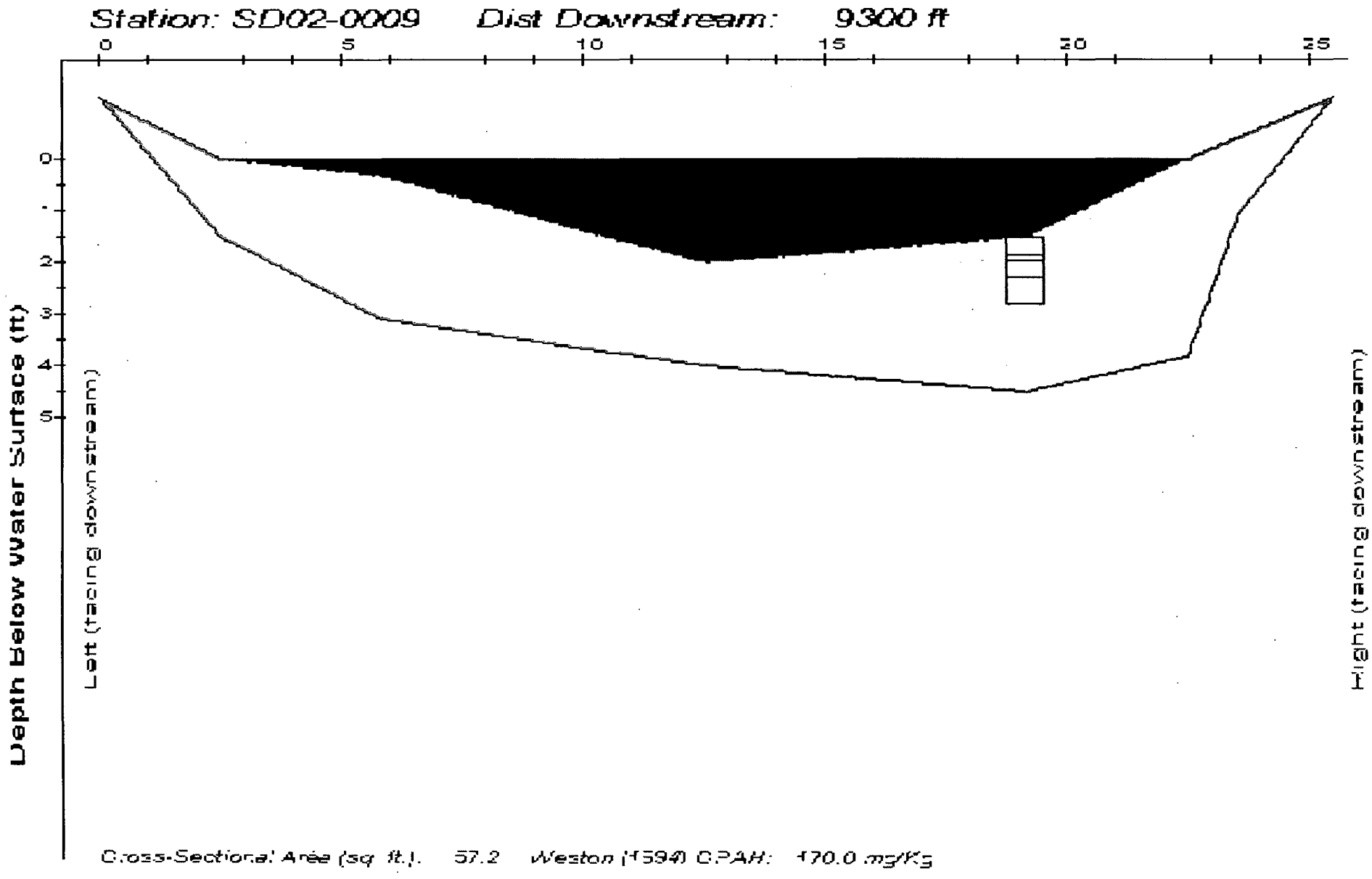
Sediment Depth (ft)

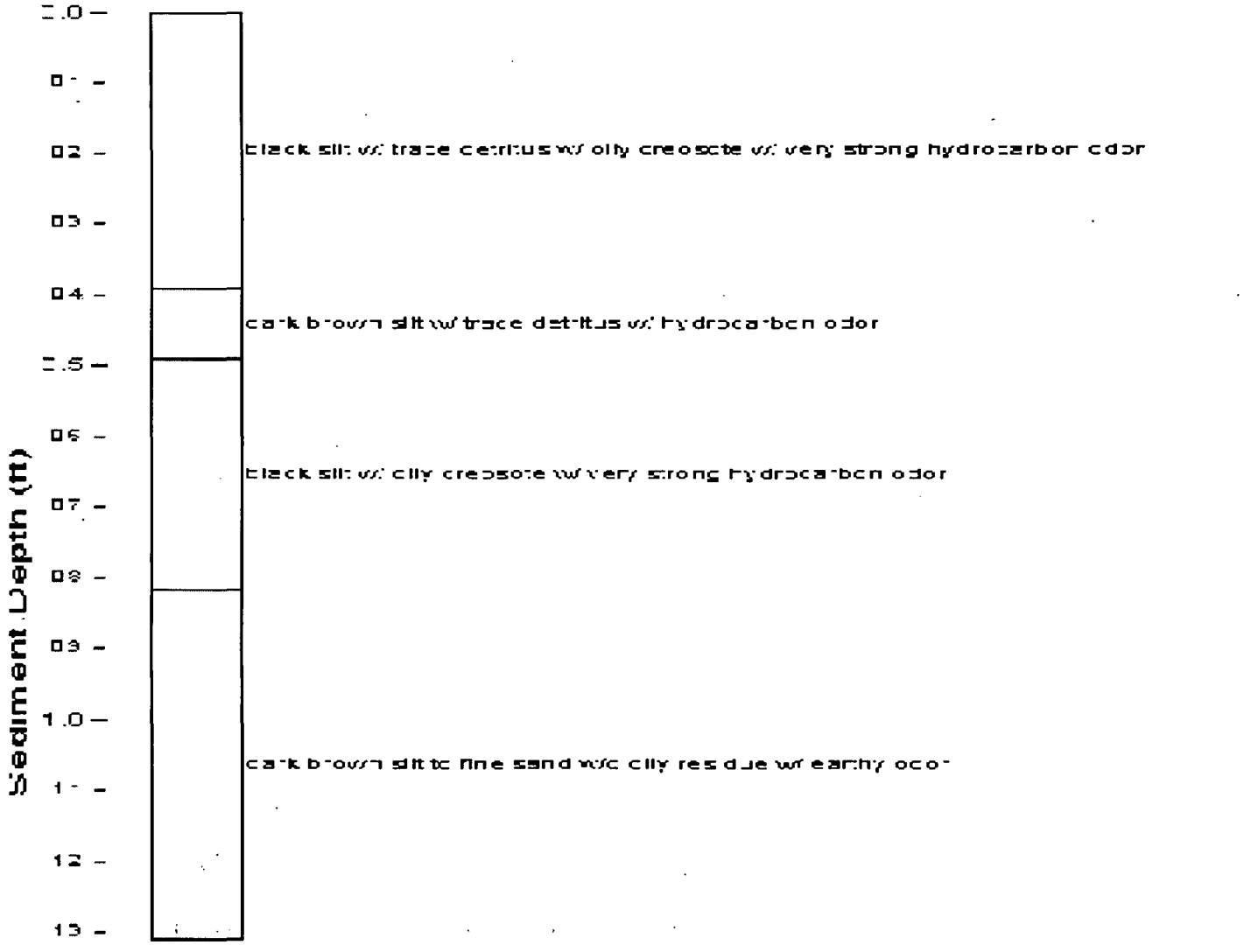
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
1.1

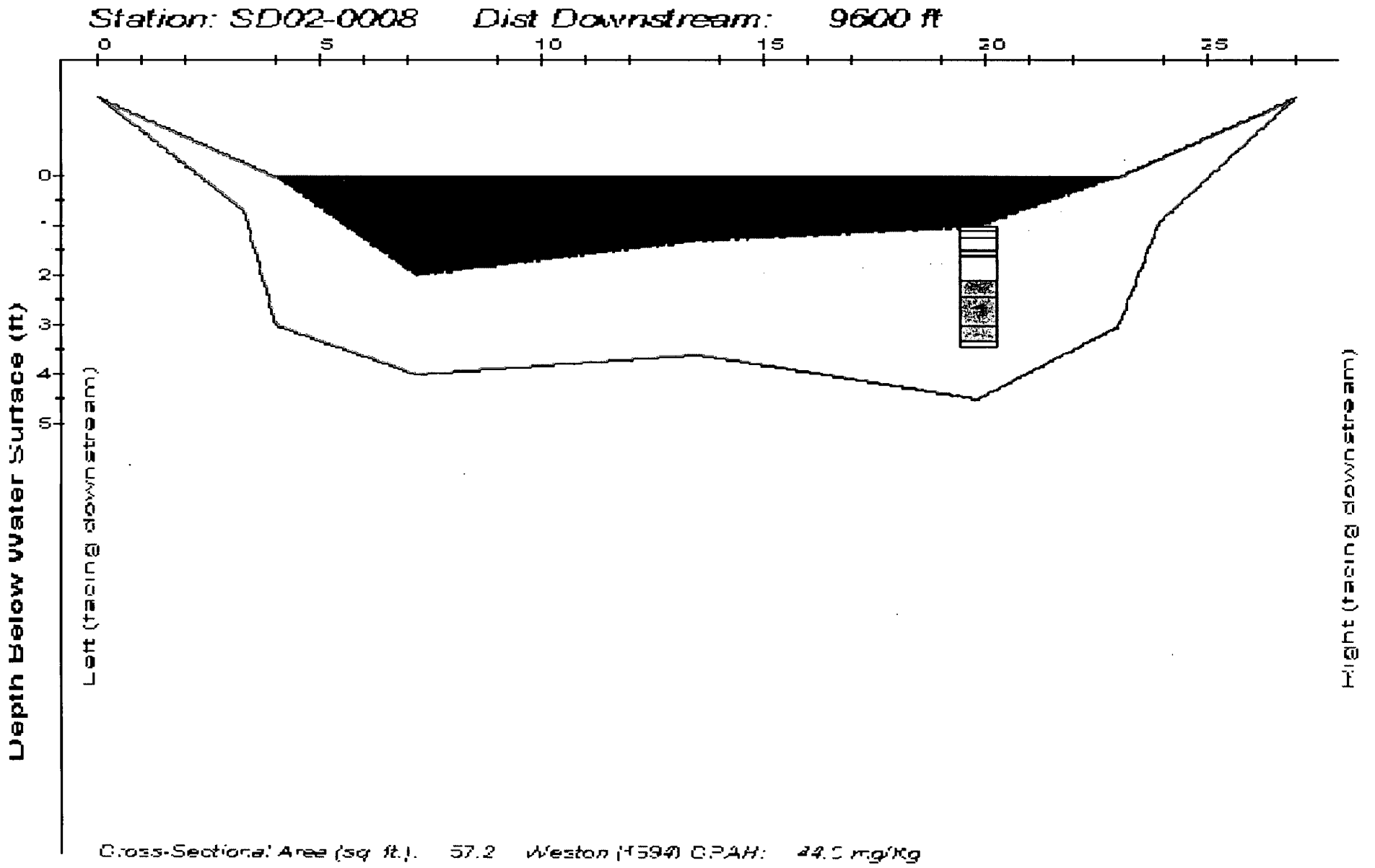
dark brown silt clay w/ gravel; black mottling w/ medium hydrocarbon odor

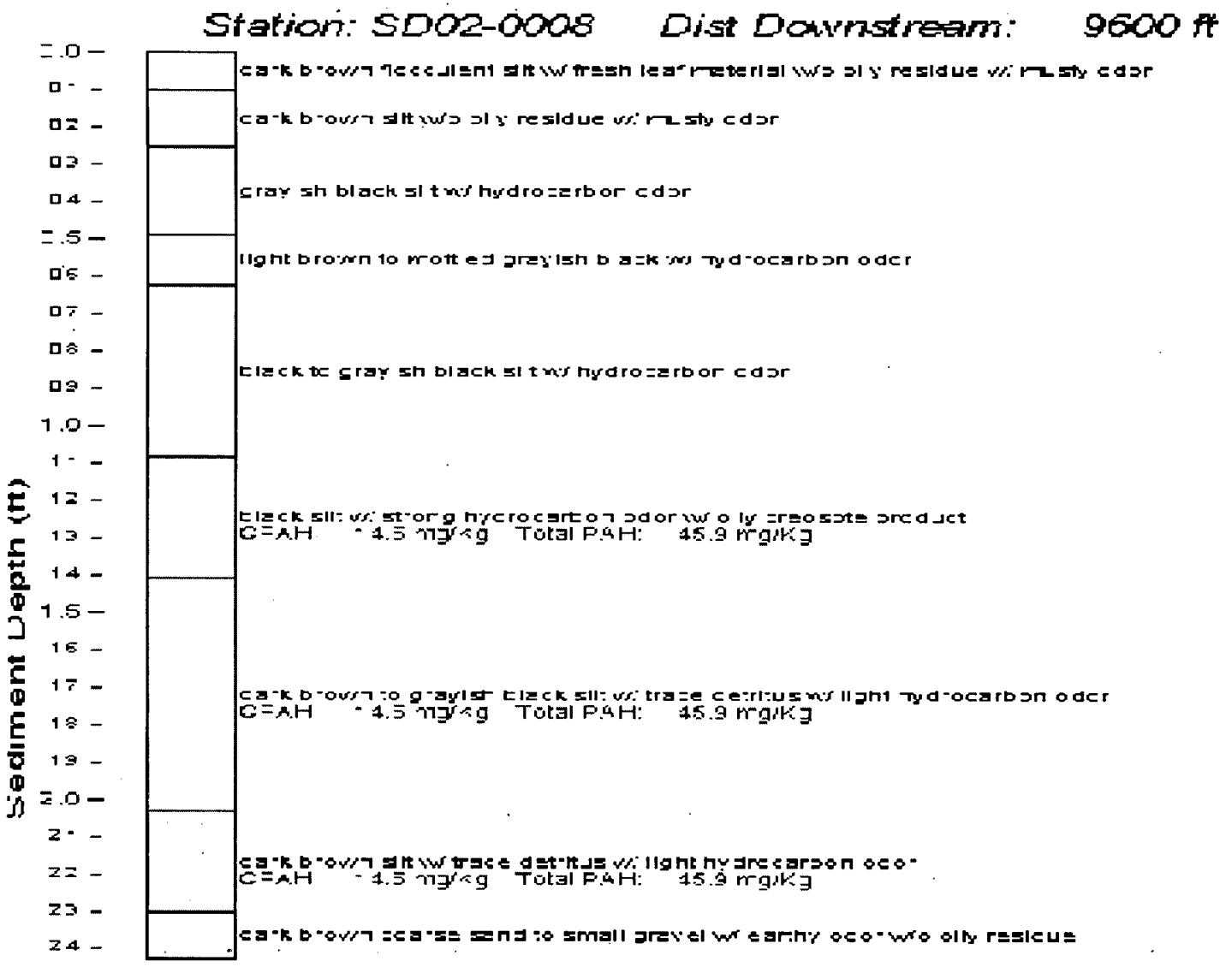
black silt two oily creosote strata w/ very strong hydrocarbon odor

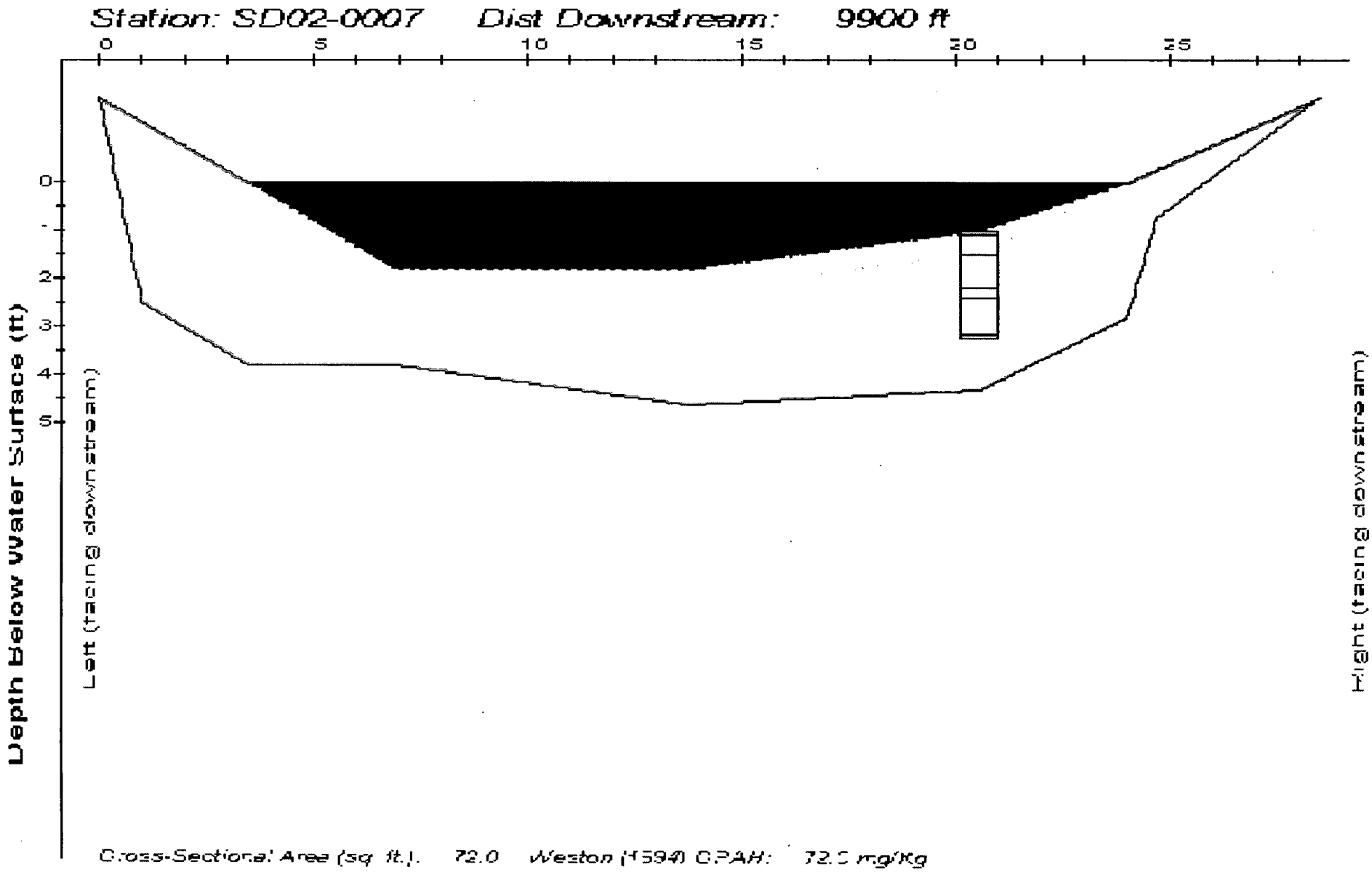
black silt clay w/ o ily residue w/ earthy odor


Station: SD02-0009
Dist Downstream: 9300 ft
0
5
10
15
20
25
0
2
3
4
5
Depth Below Water Surface (ft)
Left (facing downstream)
Right (facing downstream)
Cross-Sectional Area (sq. ft.): 57.2
Weston (1994) CPAH: 170.0 mg/Kg

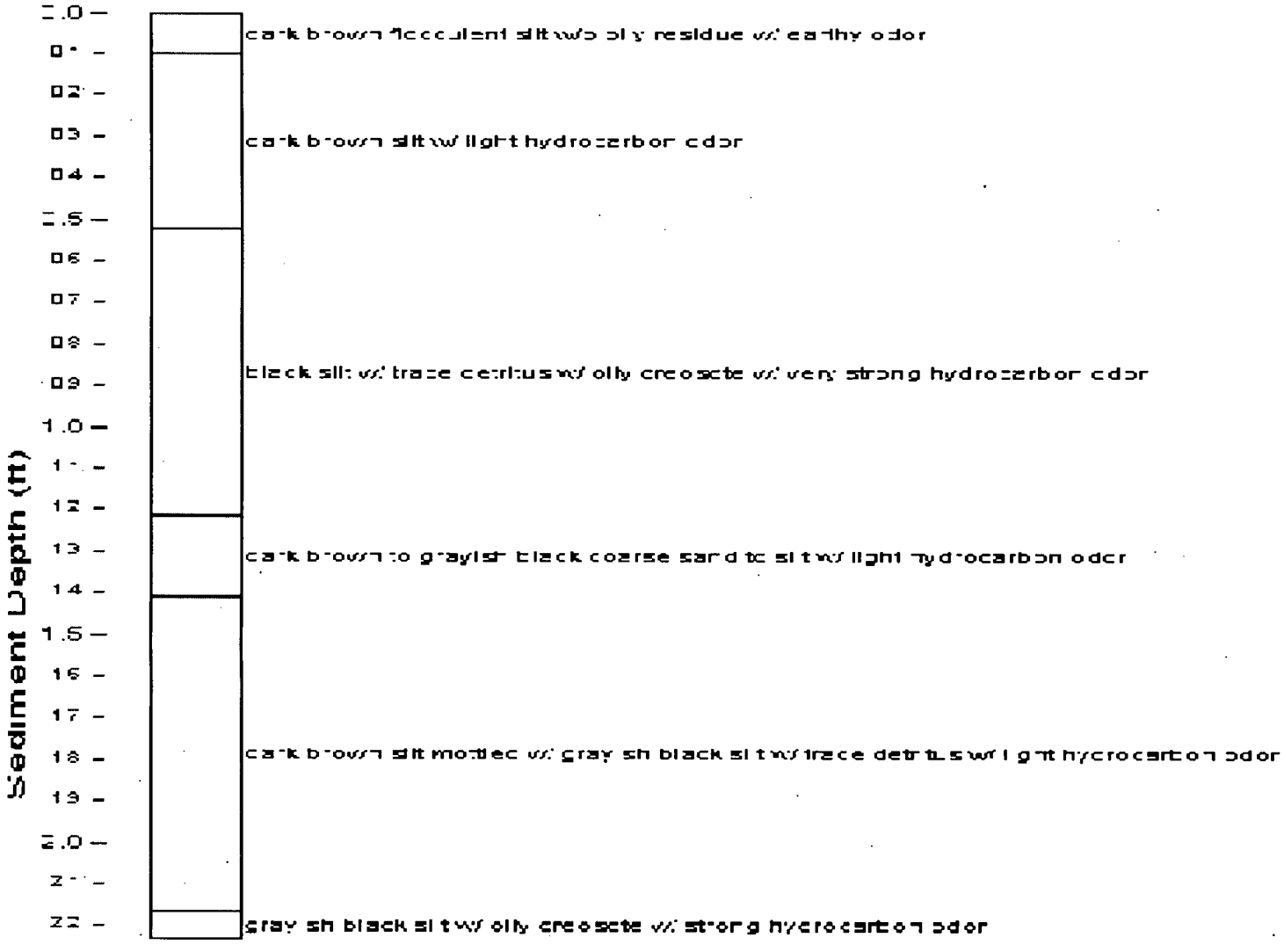

Station: SD02-0009
Dist Downstream:
9300 ft
Sediment Depth (ft)
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
1.1
1.2
1.3
black silt w/ trace detritus w/ oily creosote w/ very strong hydrocarbon odor
dark brown silt w/ trace detritus w/ hydrocarbon odor
black silt w/ oily creosote w/ very strong hydrocarbon odor
dark brown silt to fine sand w/c oily residue w/ earthy odor

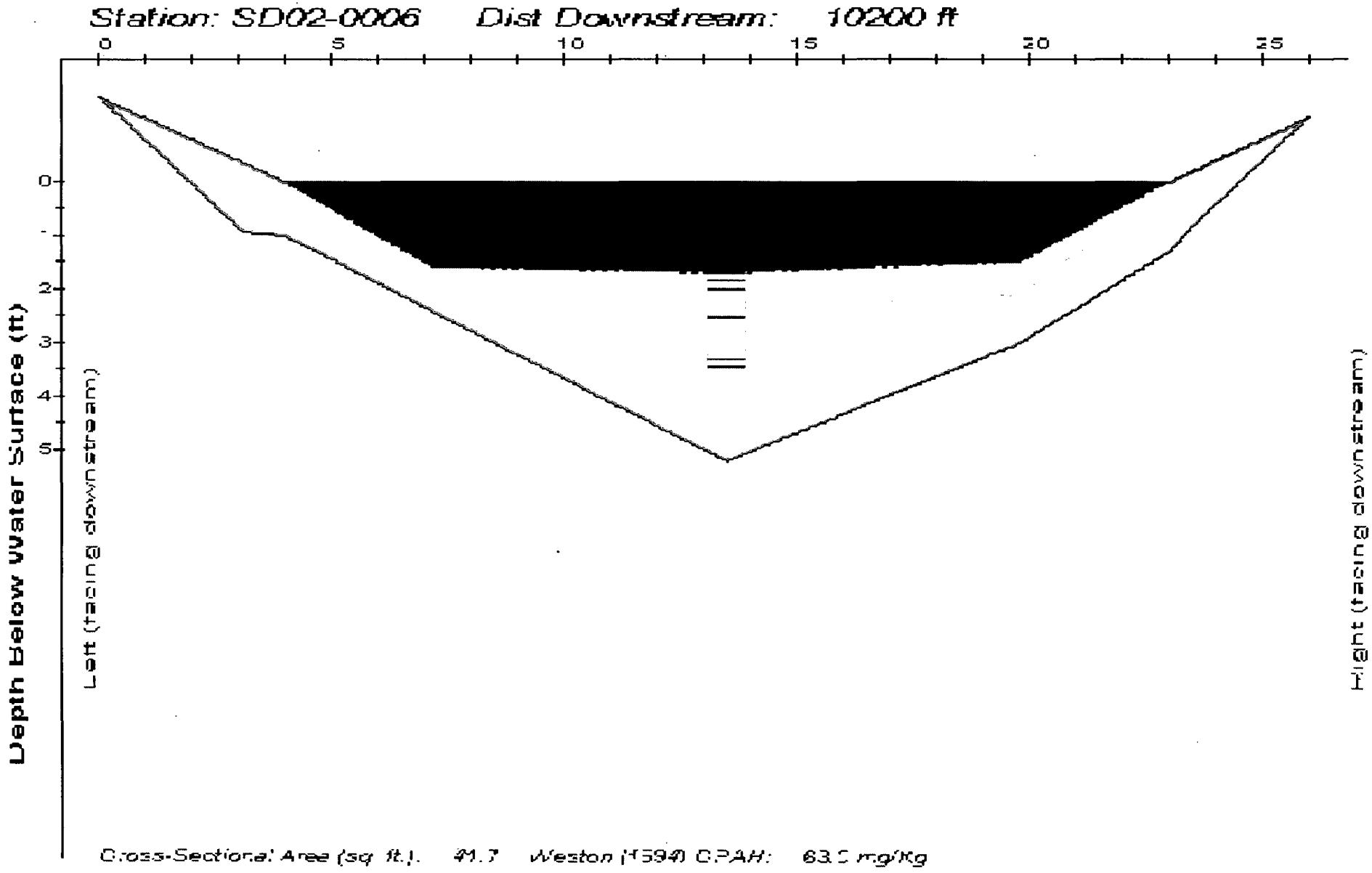

Station: SD02-0008
Dist Downstream: 9600 ft
0
5
10
15
20
25
0
2
3
4
5
Depth Below Water Surface (ft)
Left (facing downstream)
Right (facing downstream)
Cross-Sectional Area (sq. ft.): 57.2
Weston (1994) CPAH: 44.3 mg/kg


Station: SD02-0008 Dist Downstream: 9600 ft
Sediment Depth (ft)
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
1.1
1.2
1.3
1.4
1.5
1.6
1.7
1.8
1.9
2.0
2.1
2.2
2.3
2.4
dark brown flocculent silt w/ fresh leaf material w/o oily residue w/ musty odor
dark brown silt w/o oily residue w/ musty odor
gray sh black silt w/ hydrocarbon odor
light brown to mottled grayish black w/ hydrocarbon odor
black to gray sh black silt w/ hydrocarbon odor
black silt w/ strong hydrocarbon odor w/o oily creosote product
C=AH = 4.5 mg/kg Total PAH: 45.9 mg/Kg
dark brown to grayish black silt w/ trace detritus w/ light hydrocarbon odor
C=AH = 4.5 mg/kg Total PAH: 45.9 mg/Kg
dark brown silt w/ trace detritus w/ light hydrocarbon odor
C=AH = 4.5 mg/kg Total PAH: 45.9 mg/Kg
dark brown coarse sand to small gravel w/ earthy odor w/o oily residue

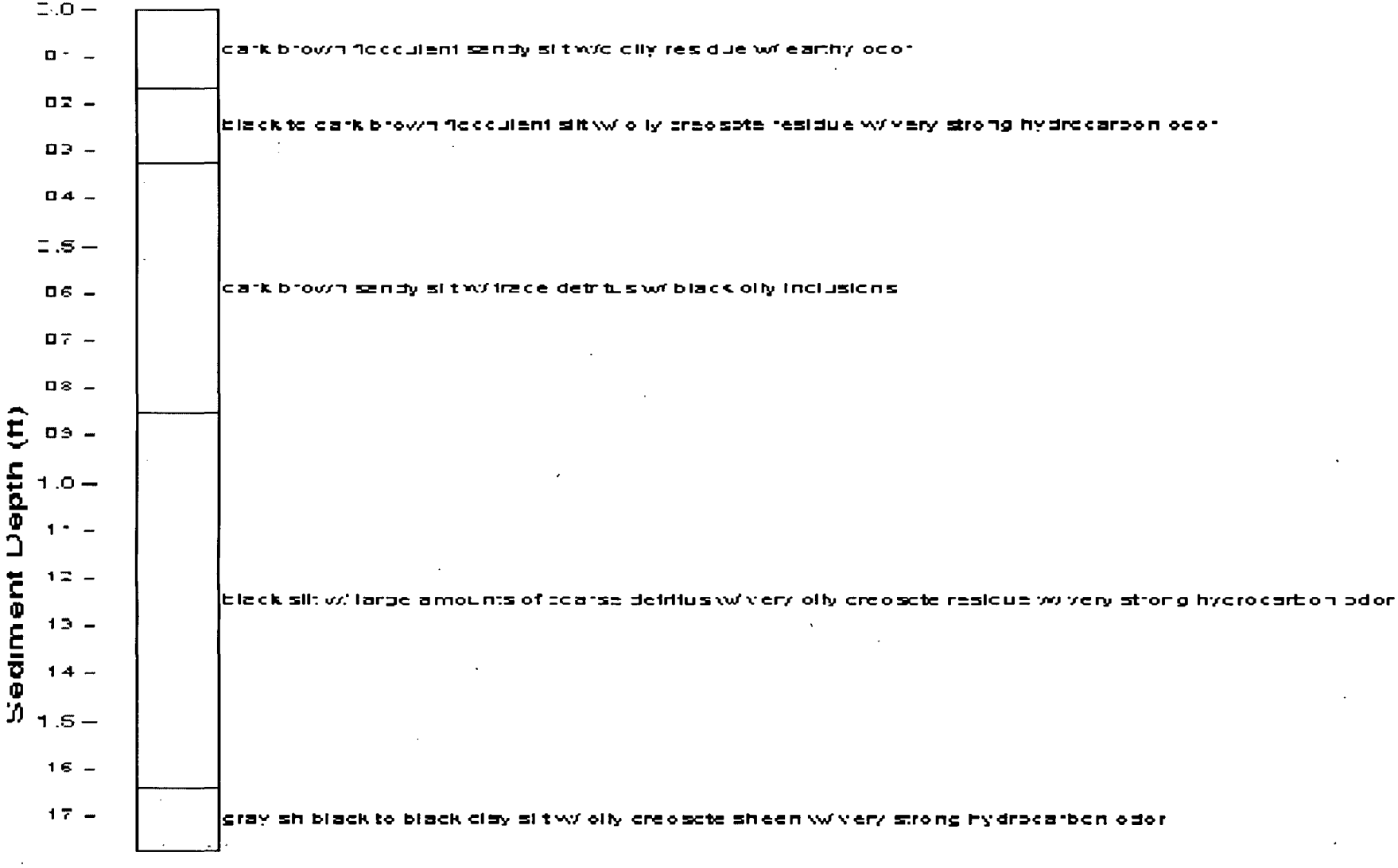

Station: SD02-0007
Dist Downstream: 9900 ft
0
5
10
15
20
25
0
2
3
4
5
Depth Below Water Surface (ft)
Left (facing downstream)
Right (facing downstream)
Cross-Sectional Area (sq. ft.): 72.0
Weston (1994) CPAH: 72.0 mg/kg

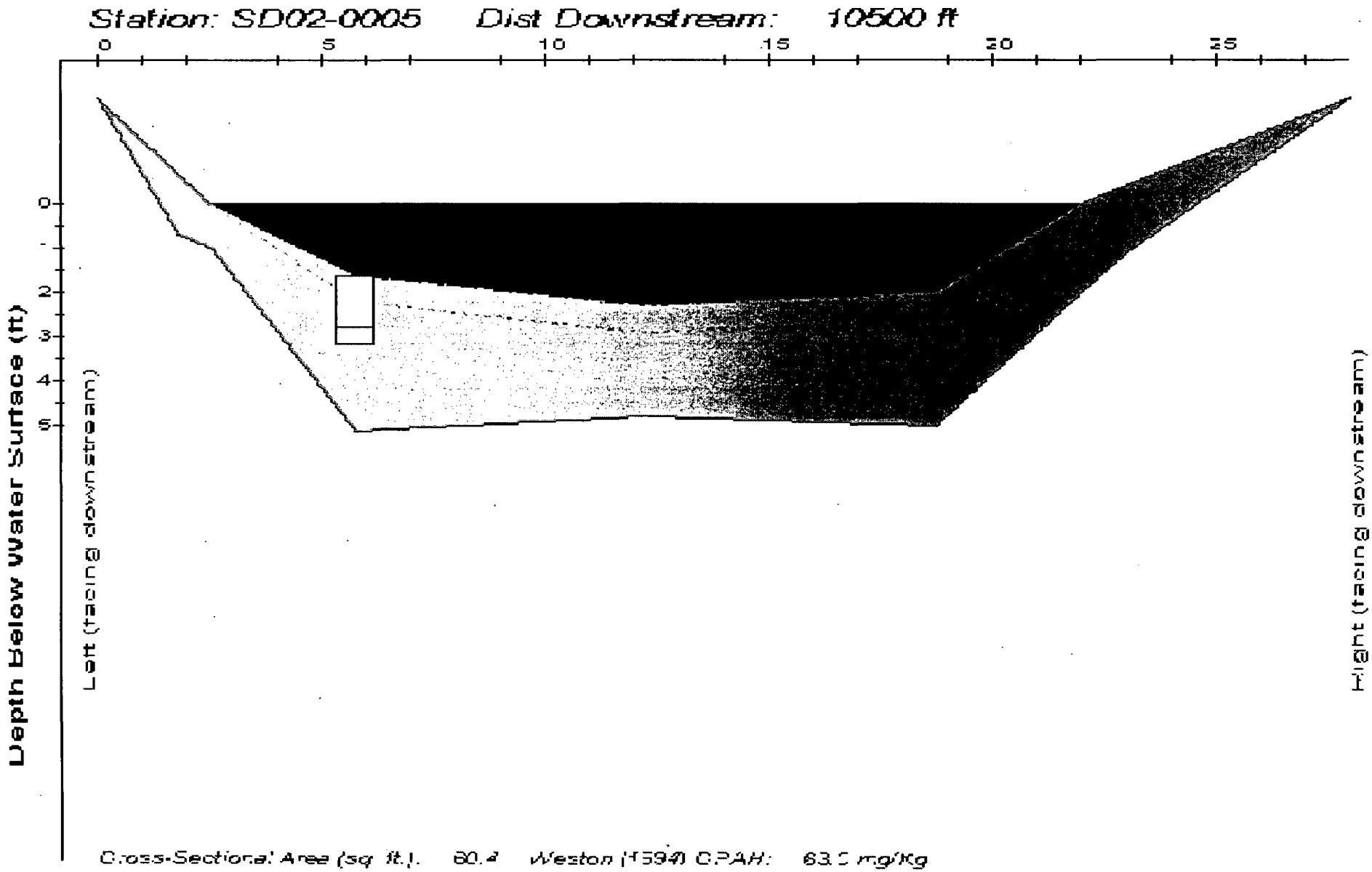
Station: SD02-0007 Dist Downstream: 9900 ft



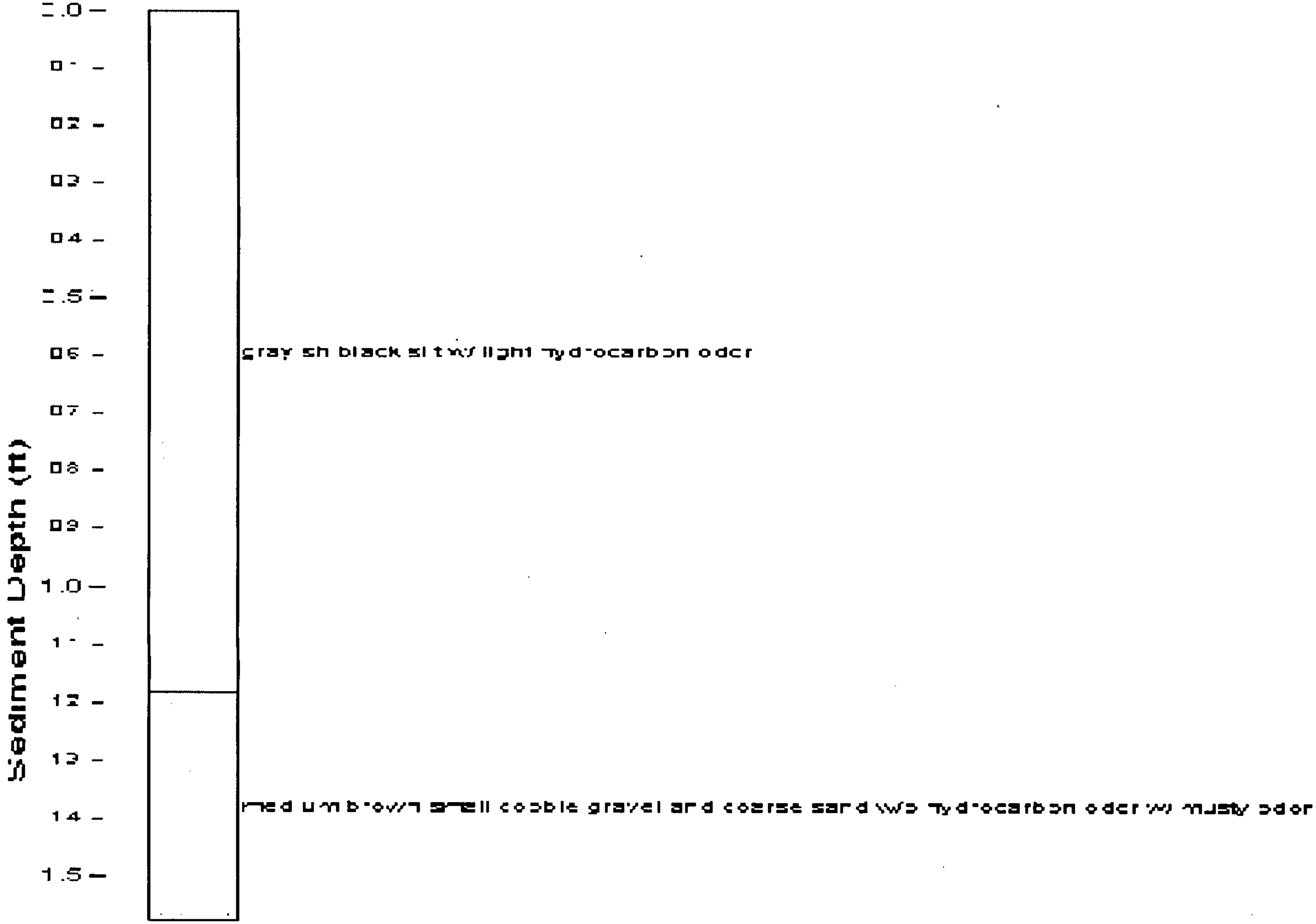

Station: SD02-0006 Dist Downstream: 10200 ft
0
5
10
15
20
25
0
2
3
4
5
Depth Below Water Surface (ft)
Left (facing downstream)
Right (facing downstream)
Cross-Sectional Area (sq. ft.): 41.7 Weston (1994) CPAH: 63.0 mg/Kg

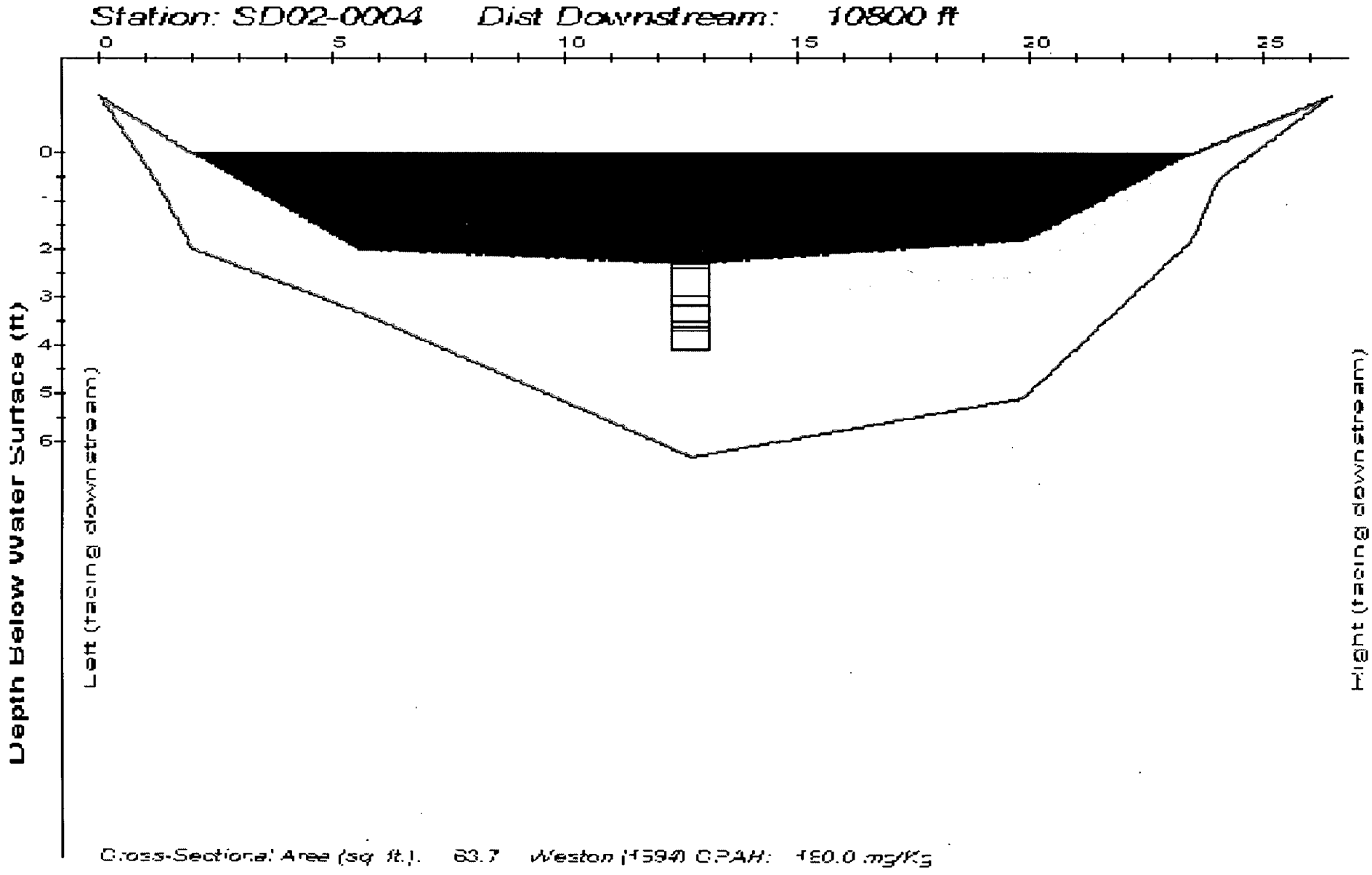
Station: SD02-0006 Dist Downstream: 10200 ft



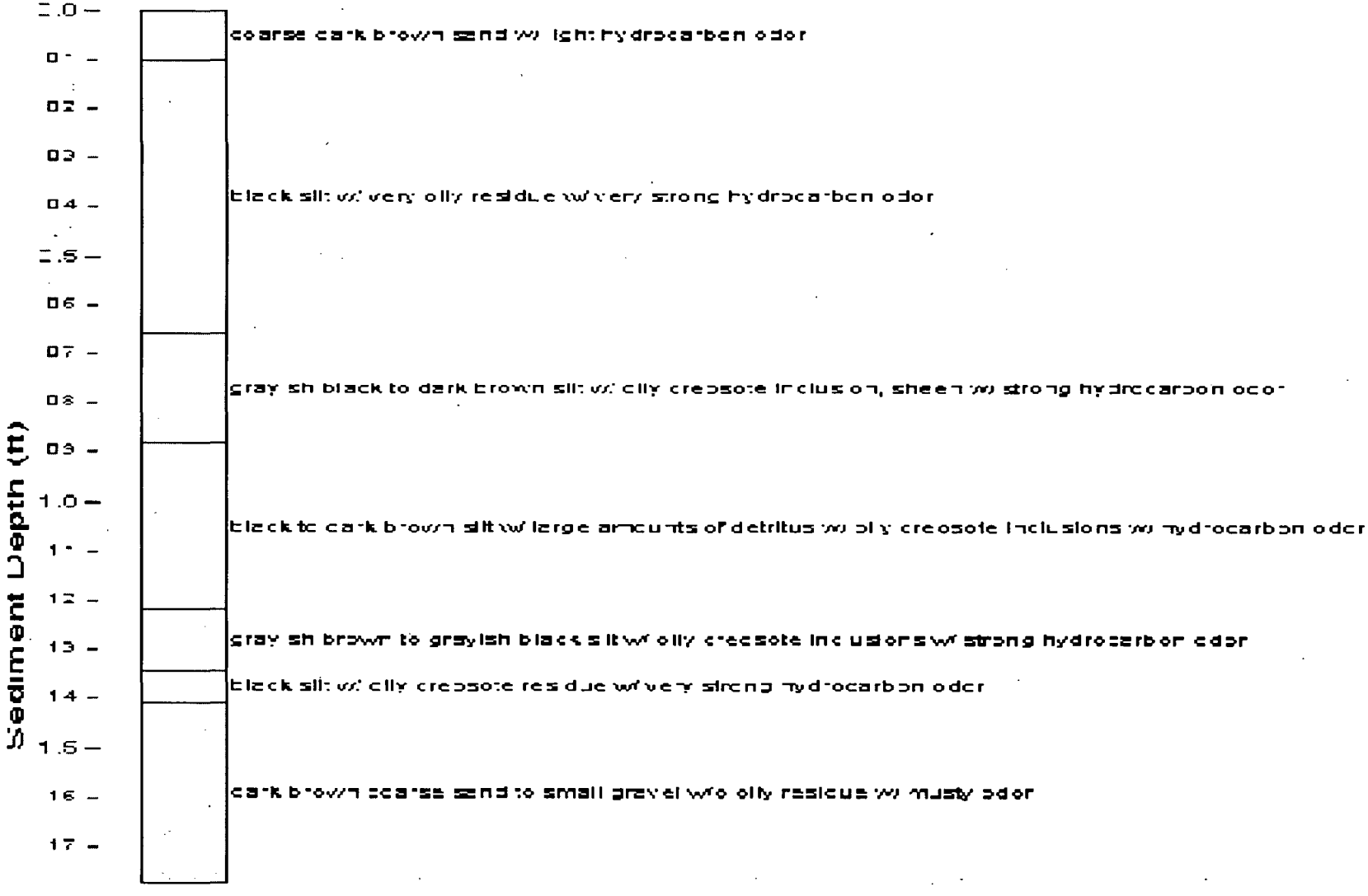

Station: SD02-0005 Dist Downstream: 10500 ft
0
5
10
15
20
25
0
2
3
4
5
Depth Below Water Surface (ft)
Left (facing downstream)
Right (facing downstream)
Cross-Sectional Area (sq. ft.): 80.4 Weston (1994) CPAH: 63.0 mg/Kg

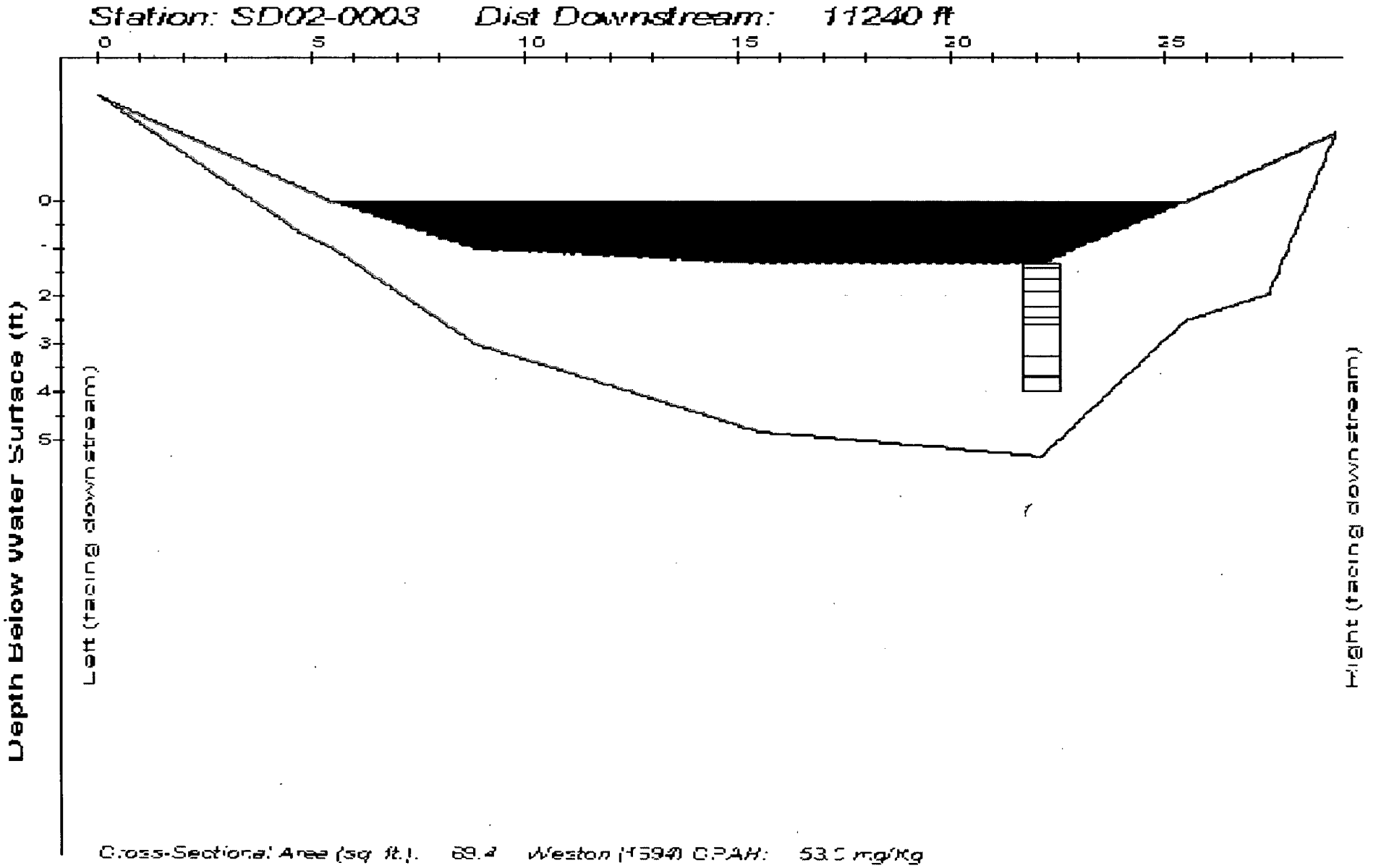
Station: SD02-0005 Dist Downstream: 10500 ft



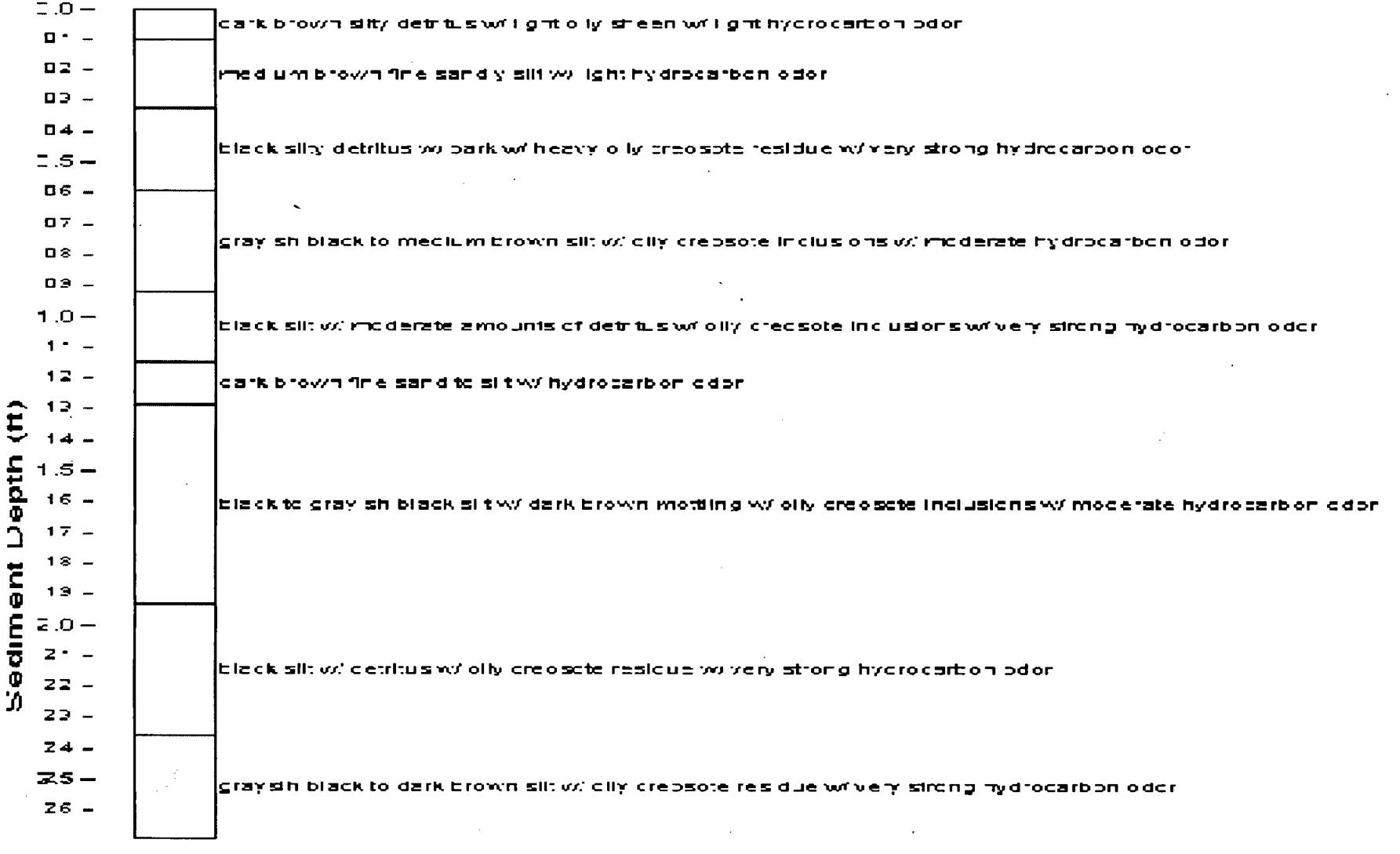

Station: SD02-0004 Dist Downstream: 10800 ft
0
5
10
15
20
25
0
2
3
4
5
6
Depth Below Water Surface (ft)
Left (facing downstream)
Right (facing downstream)
Cross-Sectional Area (sq. ft.): 83.7 Weston (1994) CPAH: 150.0 mg/Kg

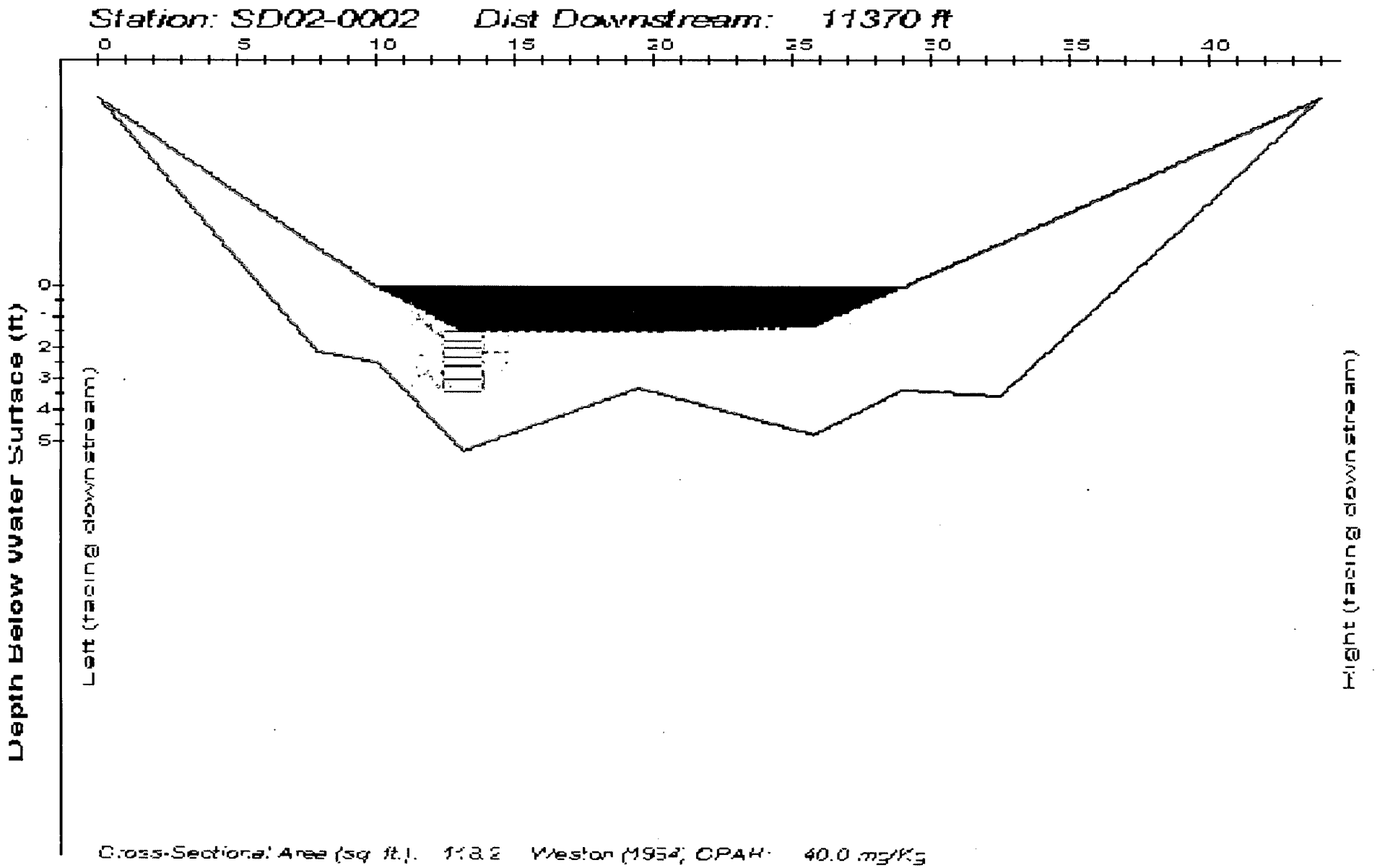
Station: SD02-0004 Dist Downstream: 10300 ft



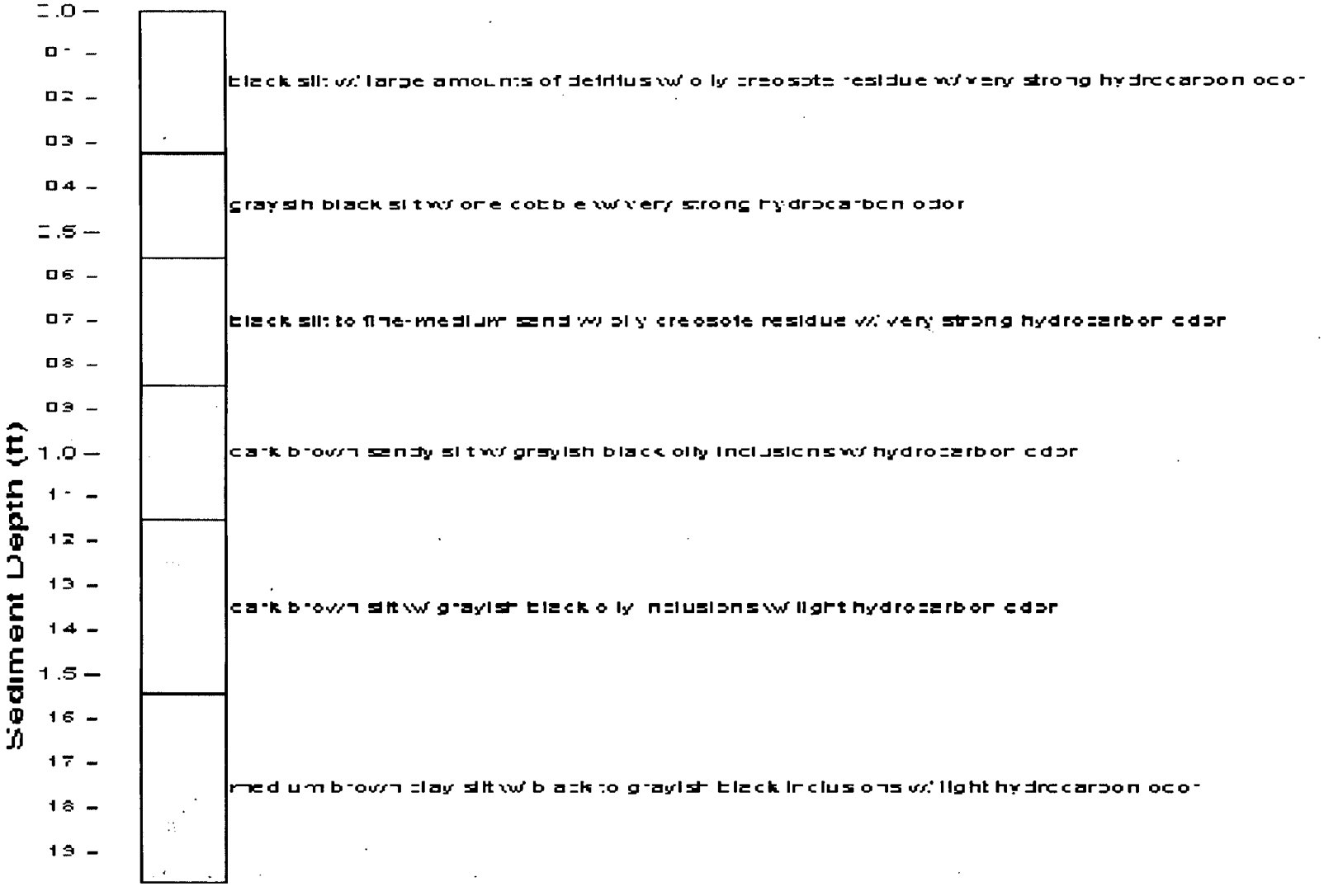

Station: SD02-0003 Dist Downstream: 11240 ft
0
5
10
15
20
25
0
1
2
3
4
5
Depth Below Water Surface (ft)
Left (facing downstream)
Right (facing downstream)
Cross-Sectional Area (sq. ft.): 69.4 Weston (1994) CPAH: 53.0 mg/Kg

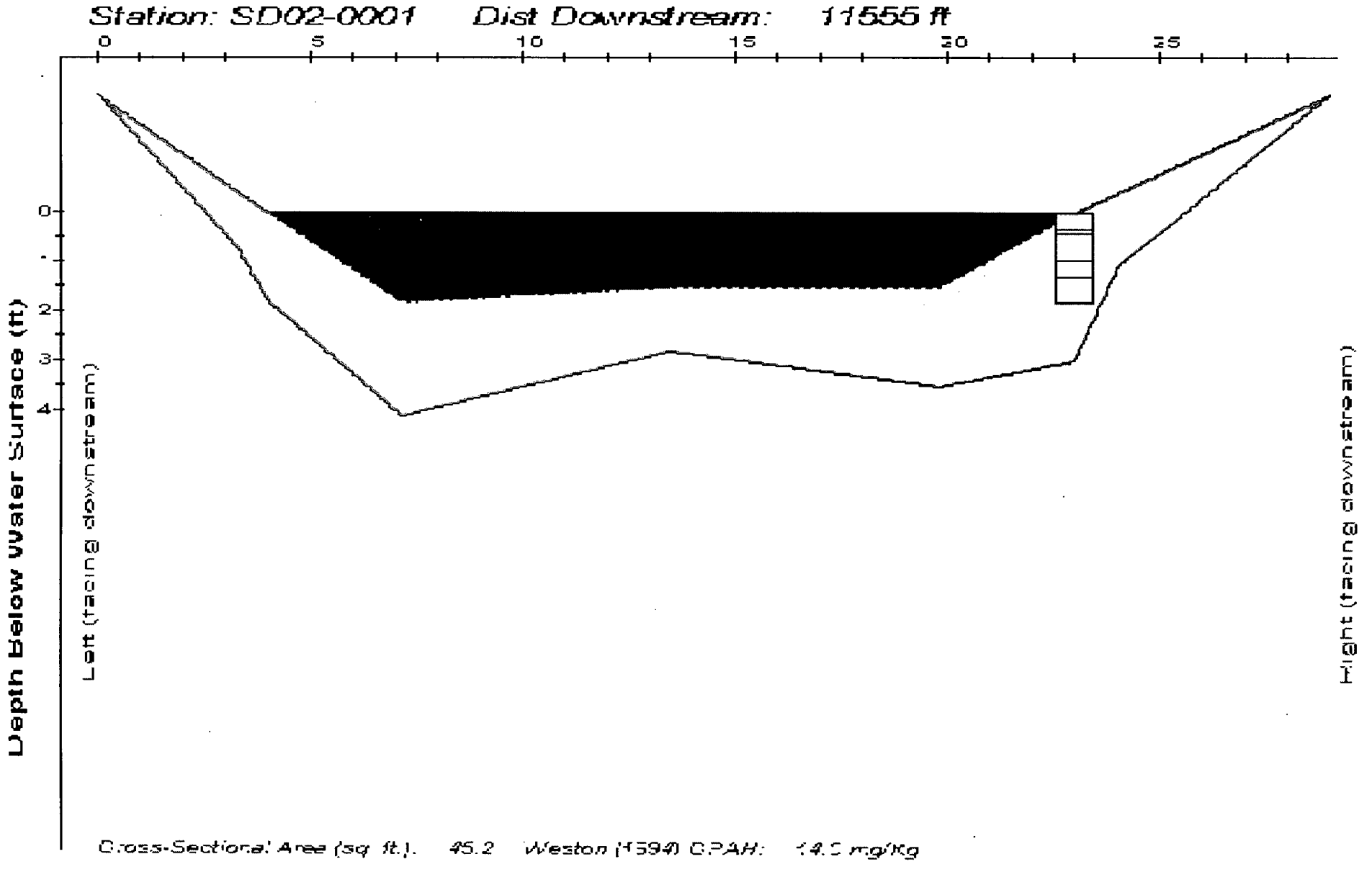
Station: SD02-0003 Dist Downstream: 11240 ft



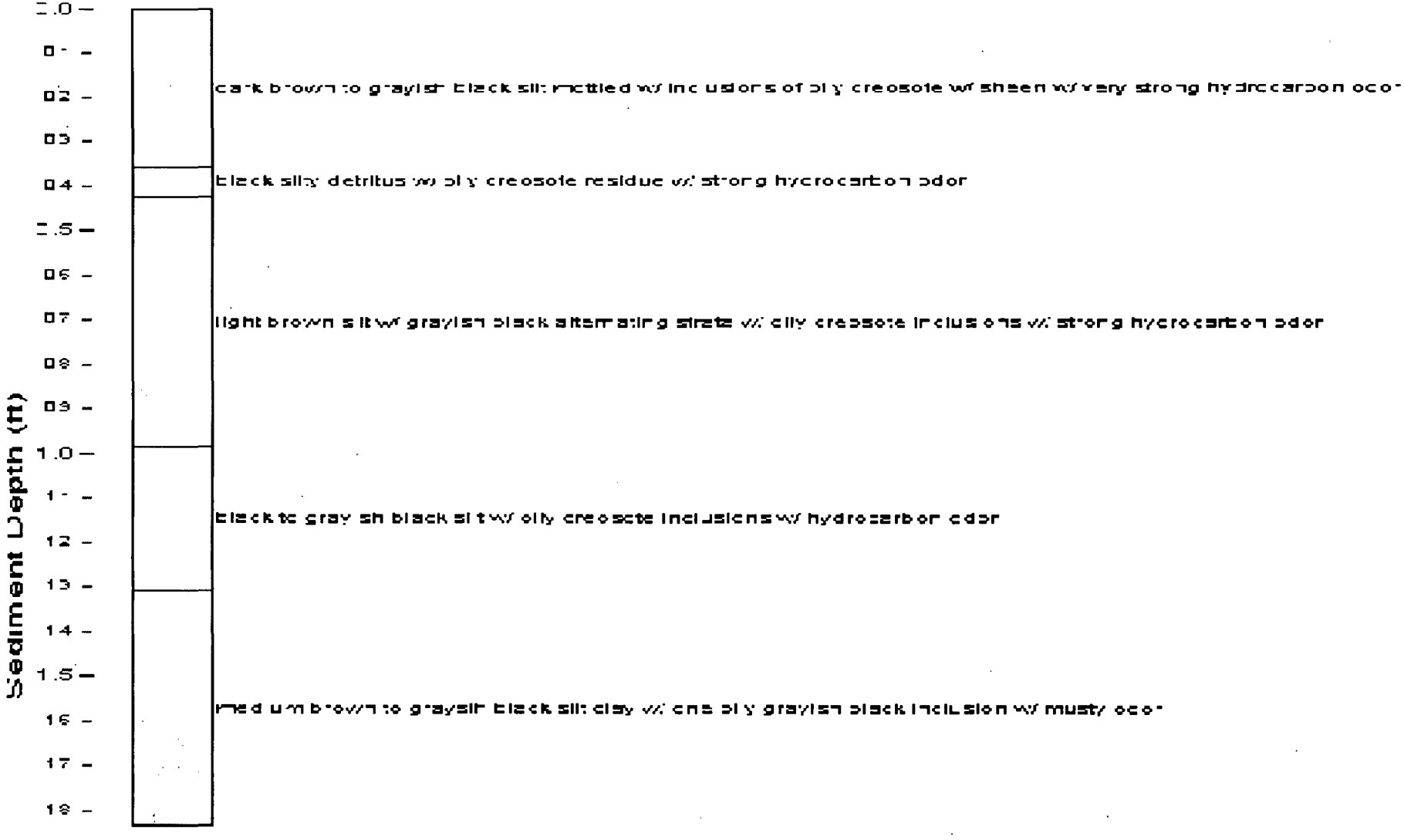

Station: SD02-0002 Dist Downstream: 11370 ft
0
5
10
15
20
25
30
35
40
Depth Below Water Surface (ft)
0
2
3
4
5
Left (facing downstream)
Right (facing downstream)
Cross-Sectional Area (sq. ft.): 113.2 Weston (1954), CPAH: 40.0 mg/Kg

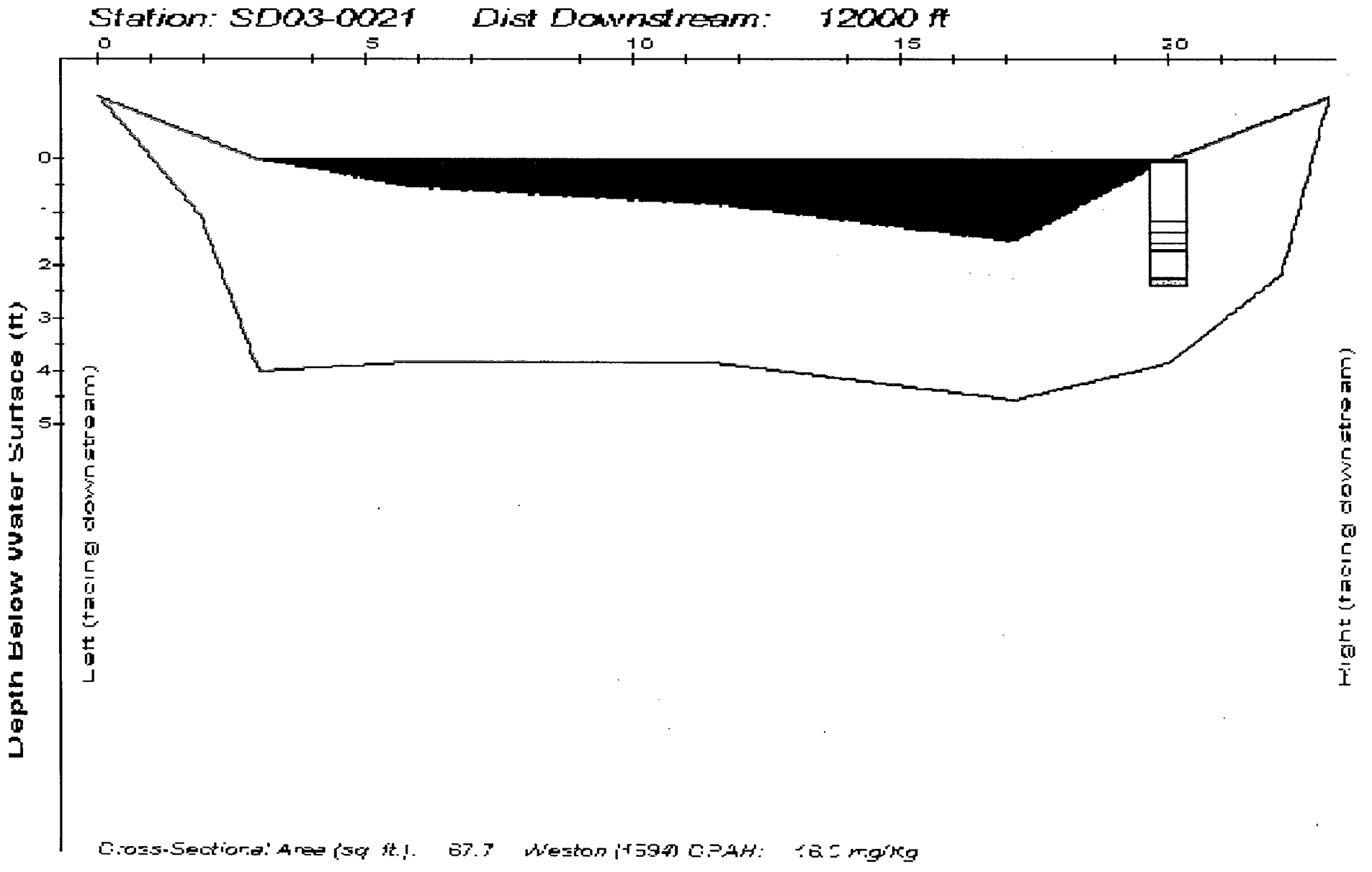
Station: SD02-0002 Dist Downstream: 11370 ft



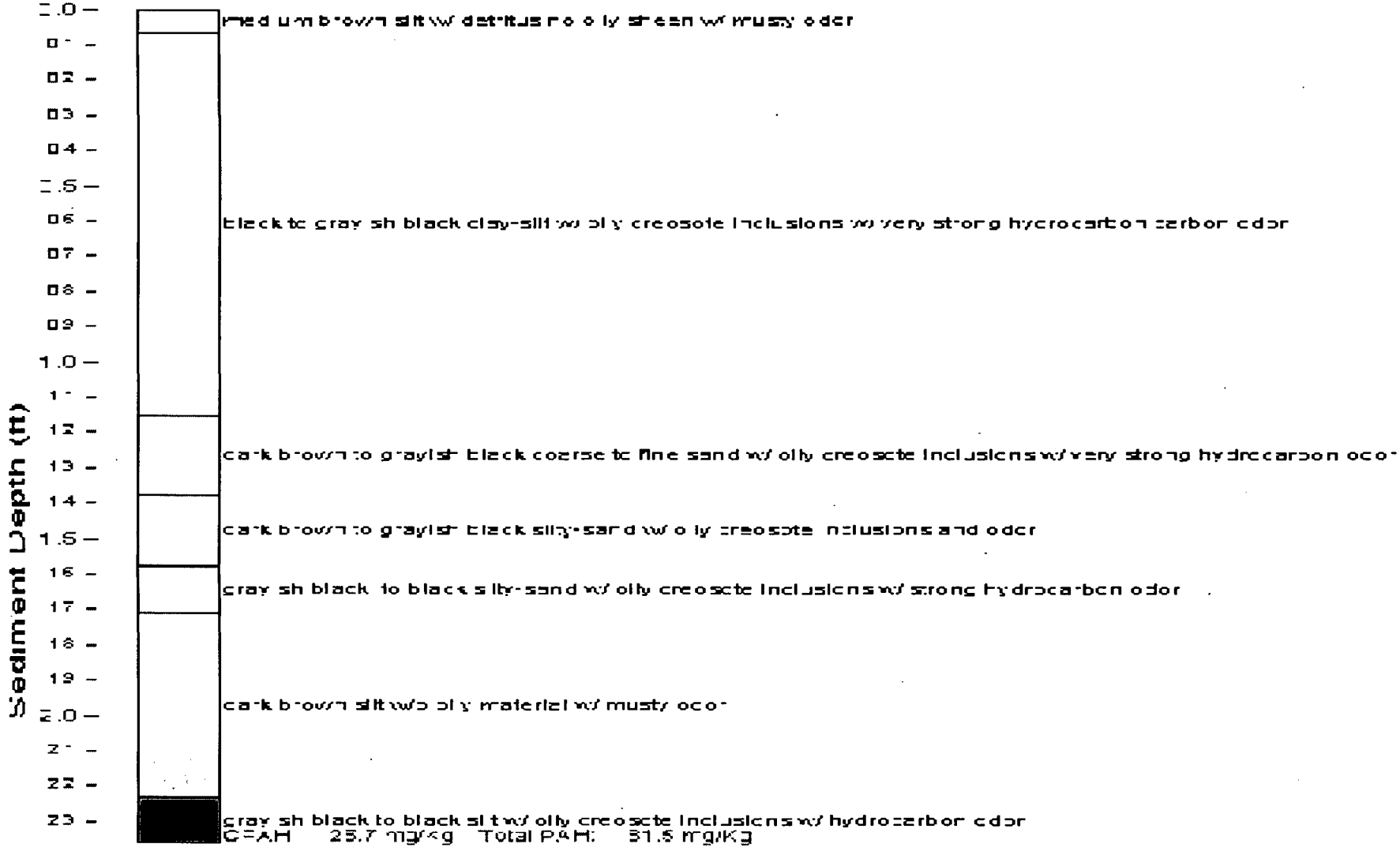

Station: SD02-0001 Dist Downstream: 11555 ft
0
5
10
15
20
25
0
2
3
4
Depth Below Water Surface (ft)
Left (facing downstream)
Right (facing downstream)
Cross-Sectional Area (sq. ft.): 45.2 Weston (1994) CPAH: 14.5 mg/Kg

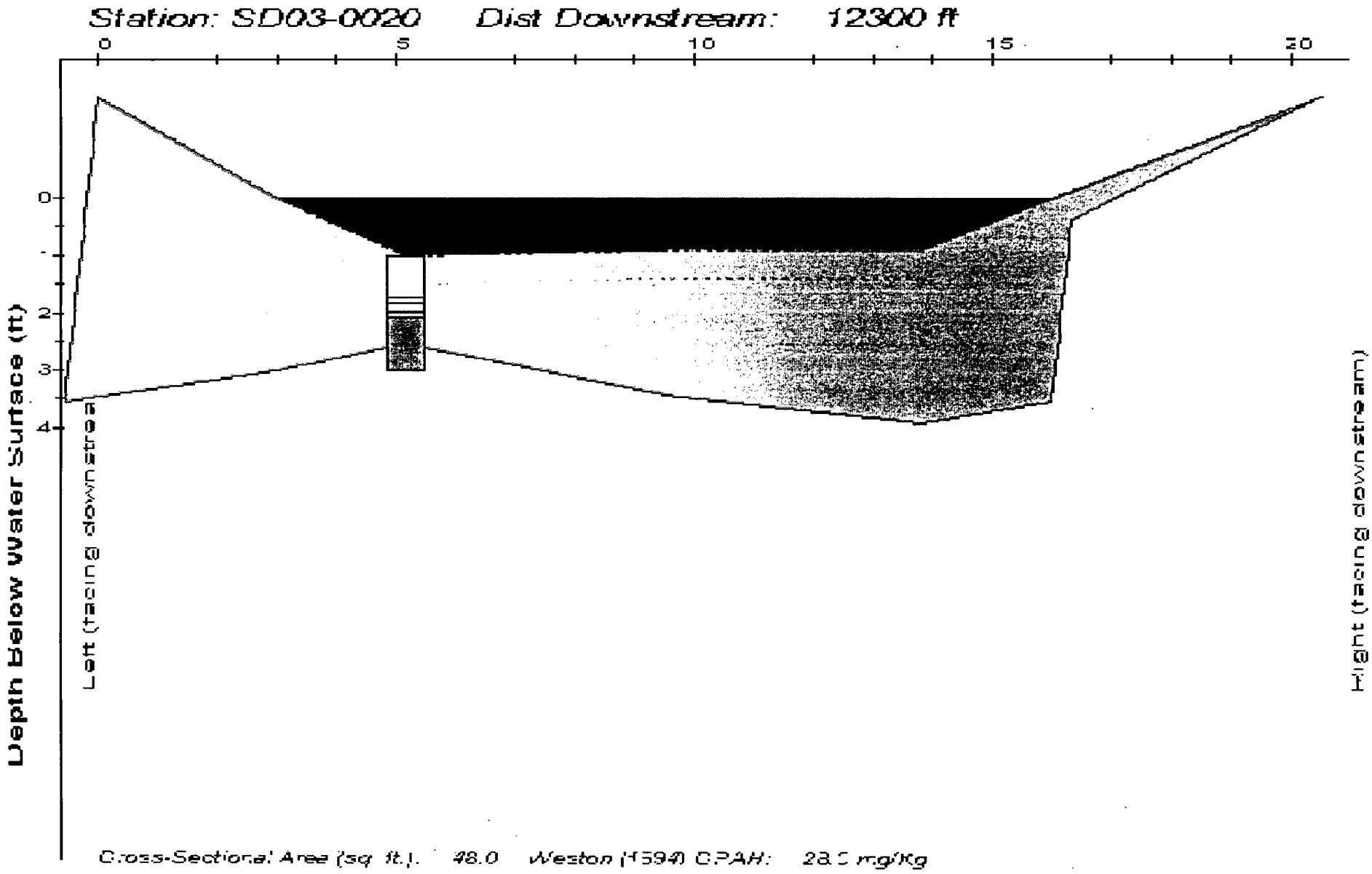
Station: SD02-0001 Dist Downstream: 11555 ft

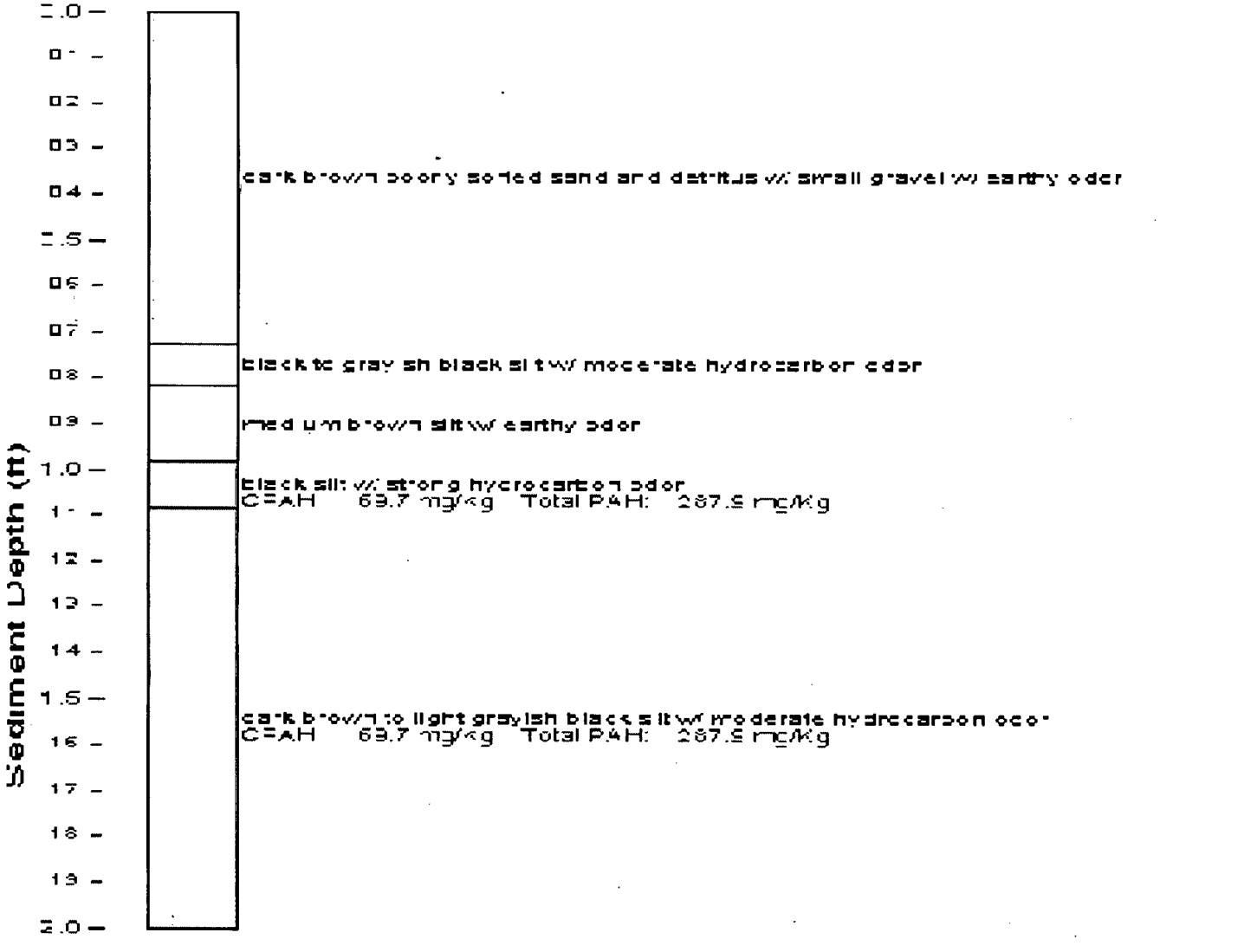



Station: SD03-0021
Dist Downstream: 12000 ft
0
5
10
15
20
0
2
3
4
5
Depth Below Water Surface (ft)
Left (facing downstream)
Right (facing downstream)
Cross-Sectional Area (sq. ft.): 67.7
Weston (1994) CPAH: 18.0 mg/Kg

Station: SD03-0021 Dist Downstream: 12000 ft




Station: SD03-0020 Dist Downstream: 12300 ft
0
5
10
15
20
0
2
3
4
Depth Below Water Surface (ft)
Left (facing downstream)
Right (facing downstream)
Cross-Sectional Area (sq. ft.): 48.0 Weston (1994) CPAH: 28.0 mg/Kg

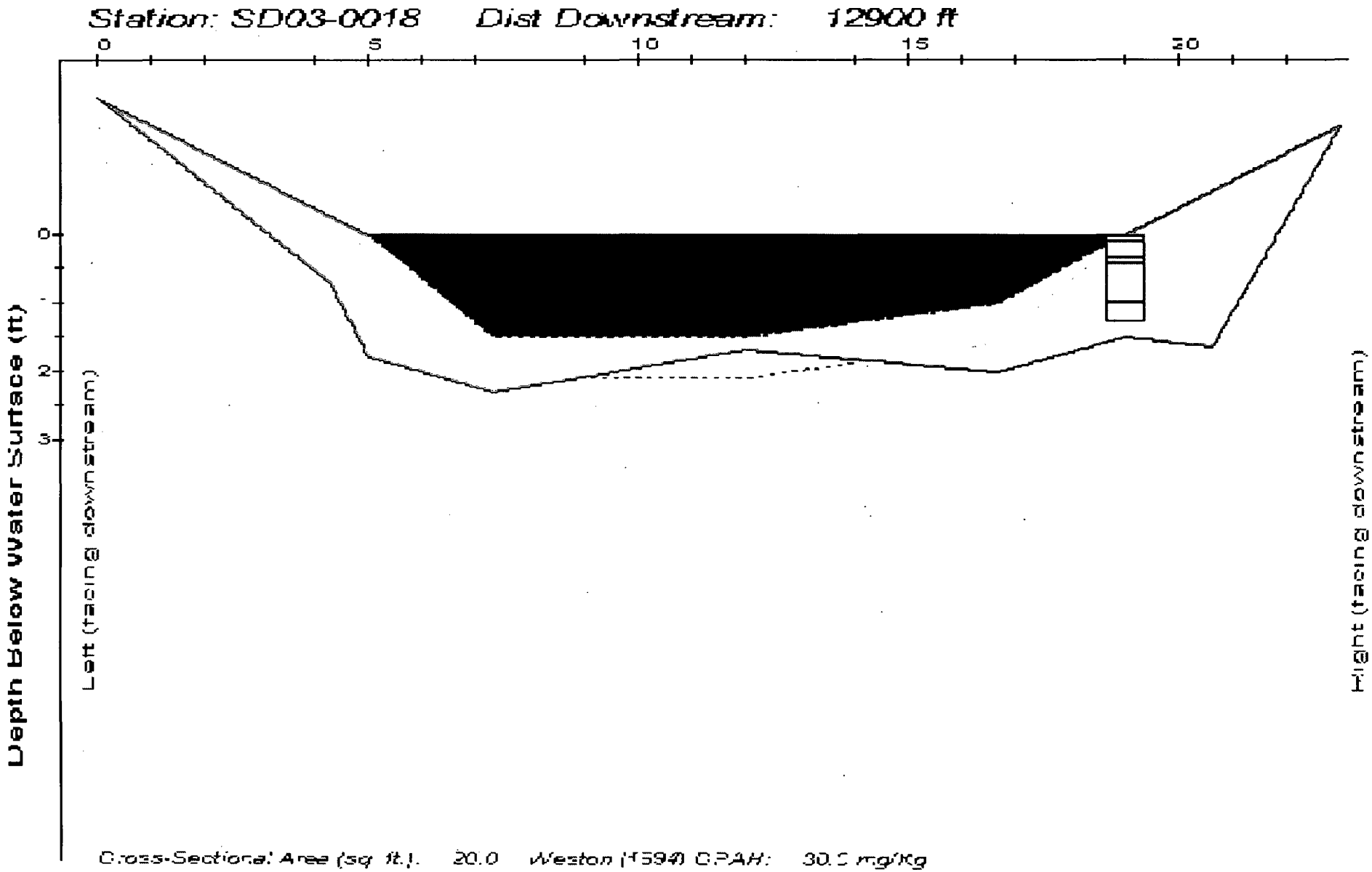

Station: SD03-0020 Dist Downstream: 12300 ft
Sediment Depth (ft)
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
1.1
1.2
1.3
1.4
1.5
1.6
1.7
1.8
1.9
2.0
dark brown poorly sorted sand and detritus w/ small gravel w/ earthy odor
black to grayish black silt w/ moderate hydrocarbon odor
med-dk brown silt w/ earthy odor
black silt w/ strong hydrocarbon odor
C=AH 69.7 mg/kg Total PAH: 287.5 mg/kg
dark brown to light grayish black silt w/ moderate hydrocarbon odor
C=AH 69.7 mg/kg Total PAH: 287.5 mg/kg

Station: SD03-0019
Dist Downstream: 12600 ft
0
5
10
15
20
0
2
3
4
Depth Below Water Surface (ft)
Left (facing downstream)
Right (facing downstream)
Cross-Sectional Area (sq. ft.): 67.8
Weston (1994) CPAH: 19.0 mg/Kg

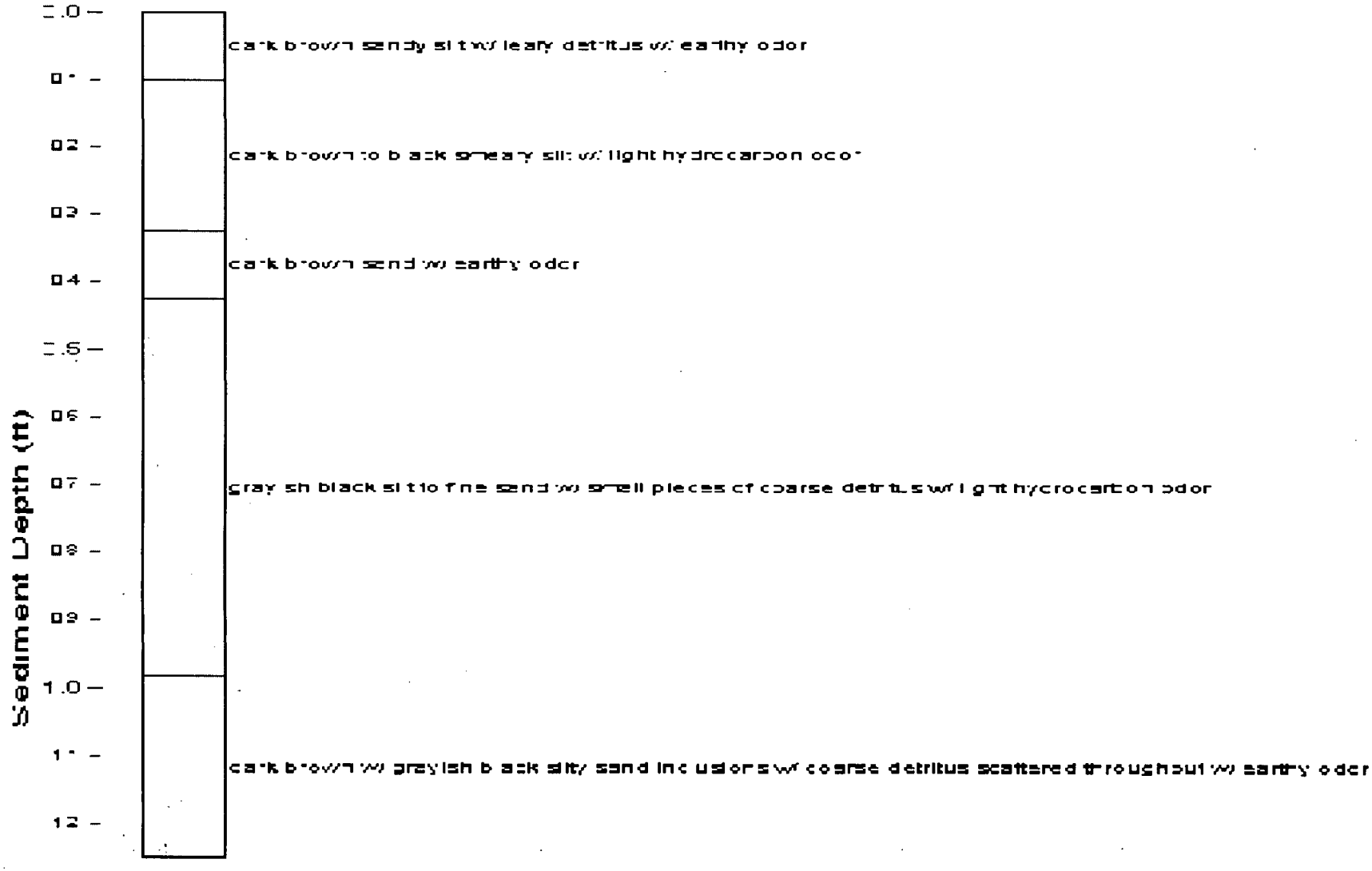
Station: SD03-0019 Dist Downstream: 12600 ft

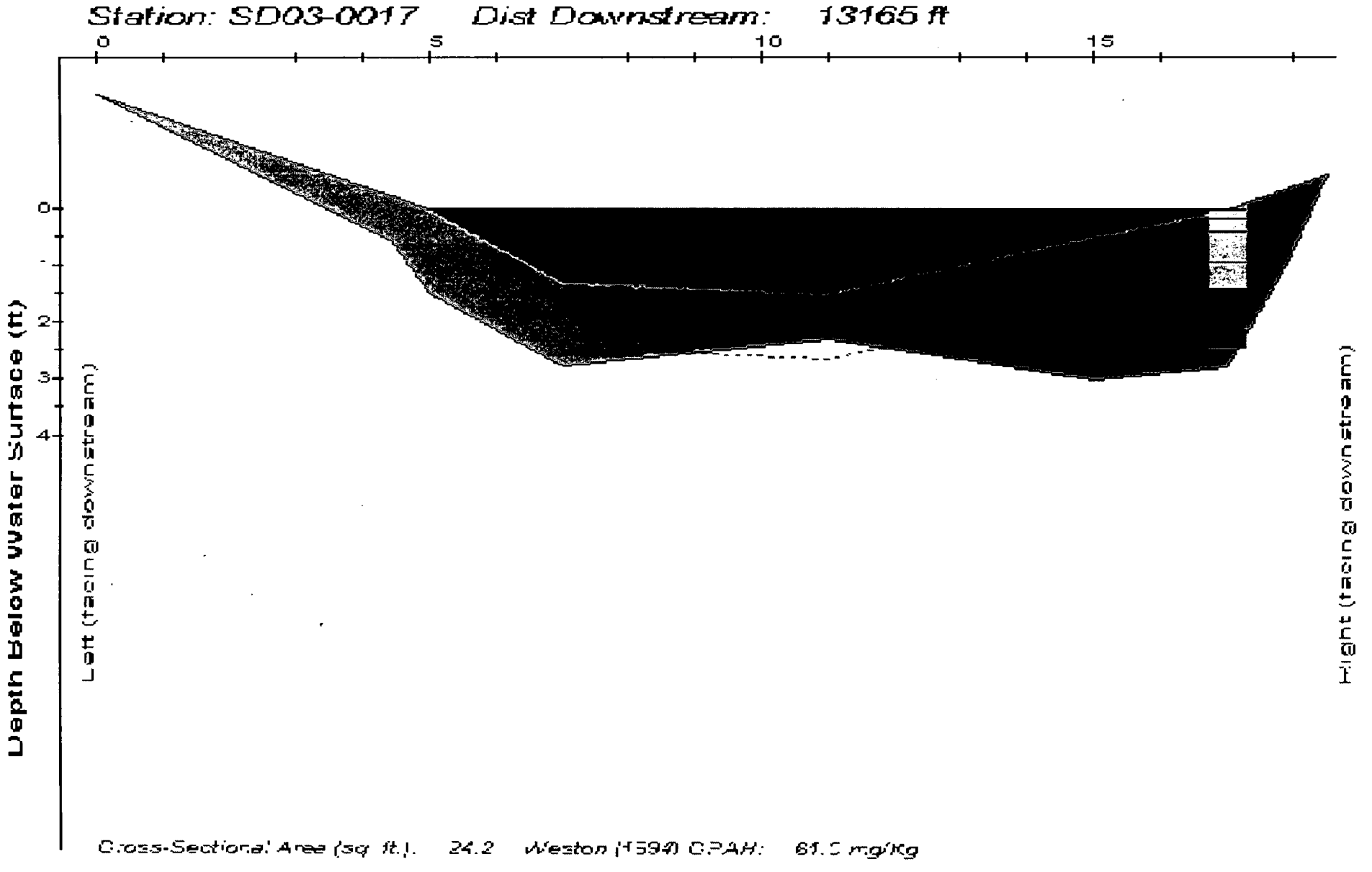
1.0 –

Sediment Depth (ft)

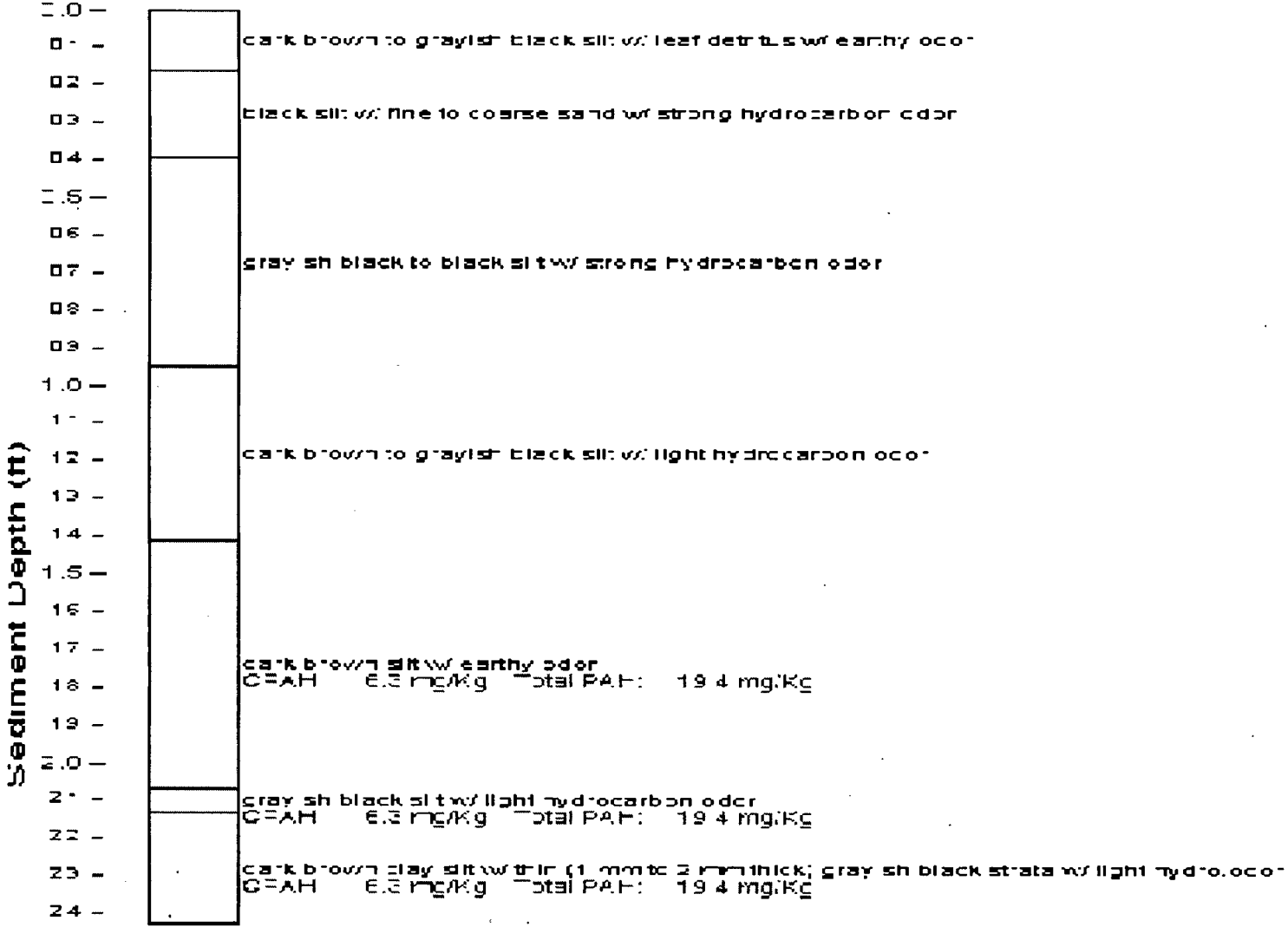

Station: SD03-0018
Dist Downstream: 12900 ft
0
5
10
15
20
0
2
3
Depth Below Water Surface (ft)
Left (facing downstream)
Right (facing downstream)
Cross-Sectional Area (sq. ft.): 20.0
Weston (1994) CPAH: 30.0 mg/Kg

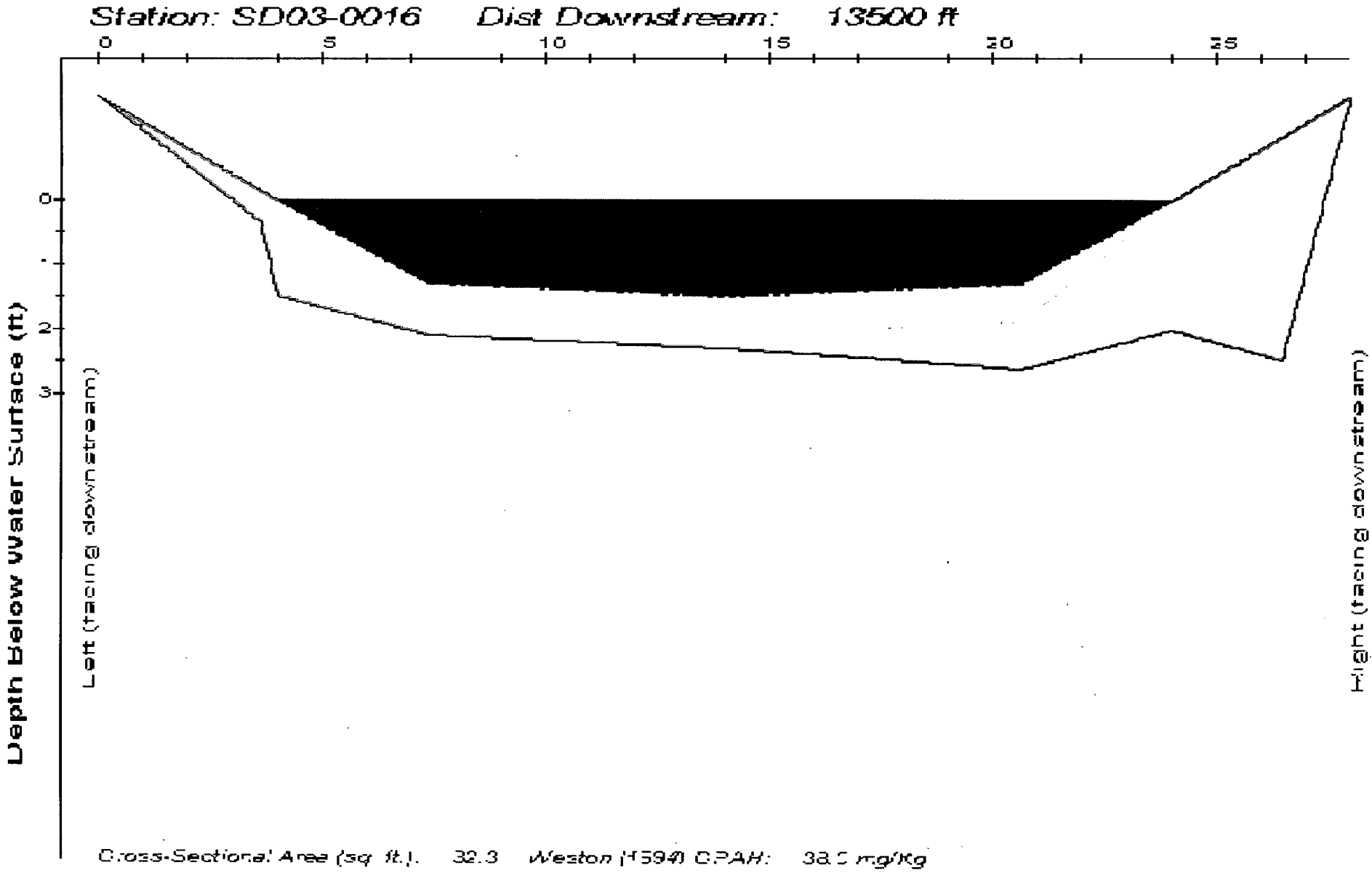
Station: SD03-0018 Dist Downstream: 12900 ft




Station: SD03-0017 Dist Downstream: 13165 ft
0
5
10
15
0
2
3
4
Depth Below Water Surface (ft)
Left (facing downstream)
Right (facing downstream)
Cross-Sectional Area (sq. ft.): 24.2 Weston (1994) CPAH: 61.3 mg/Kg

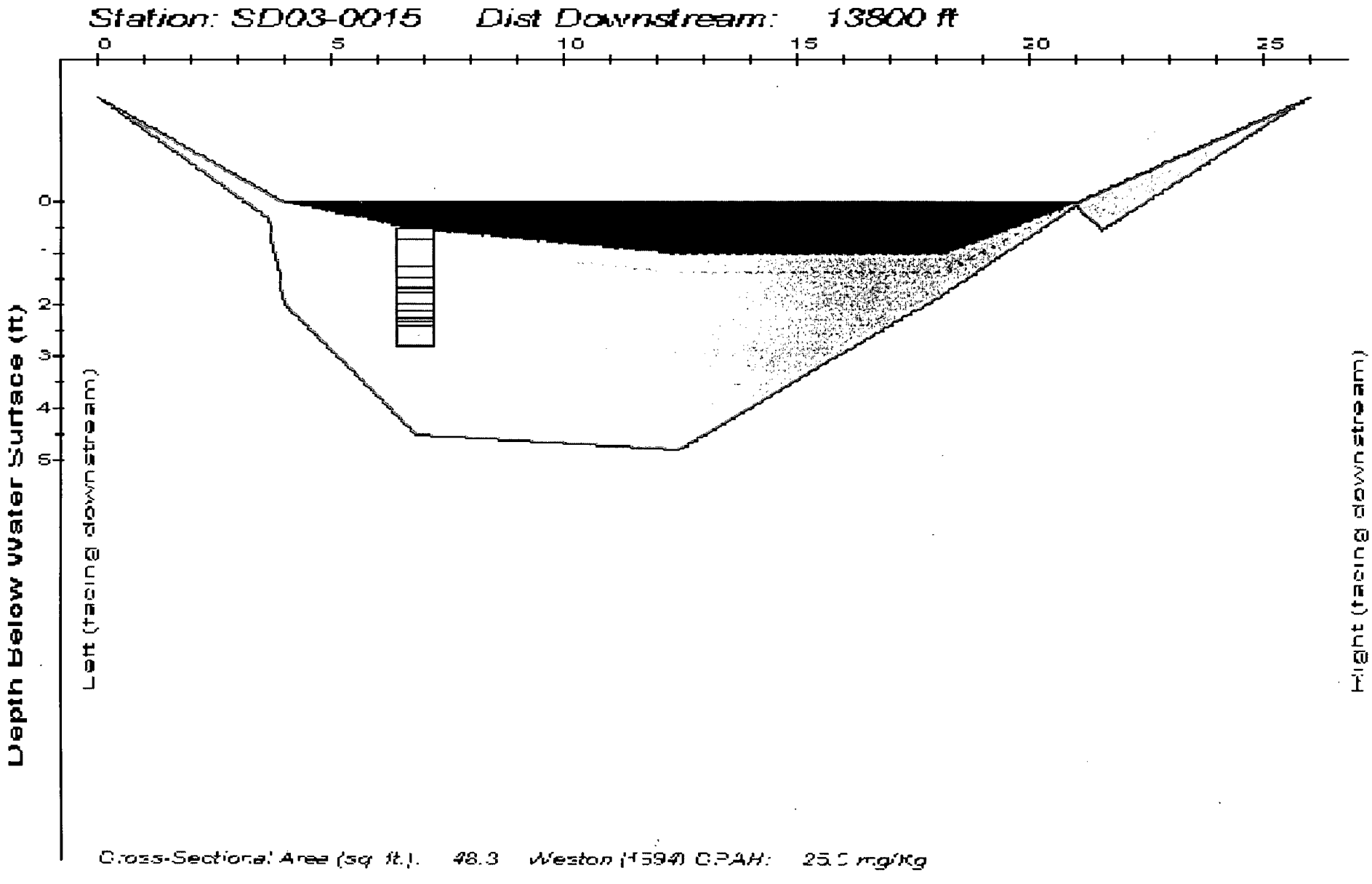
Station: SD03-0017 Dist Downstream: 13165 ft



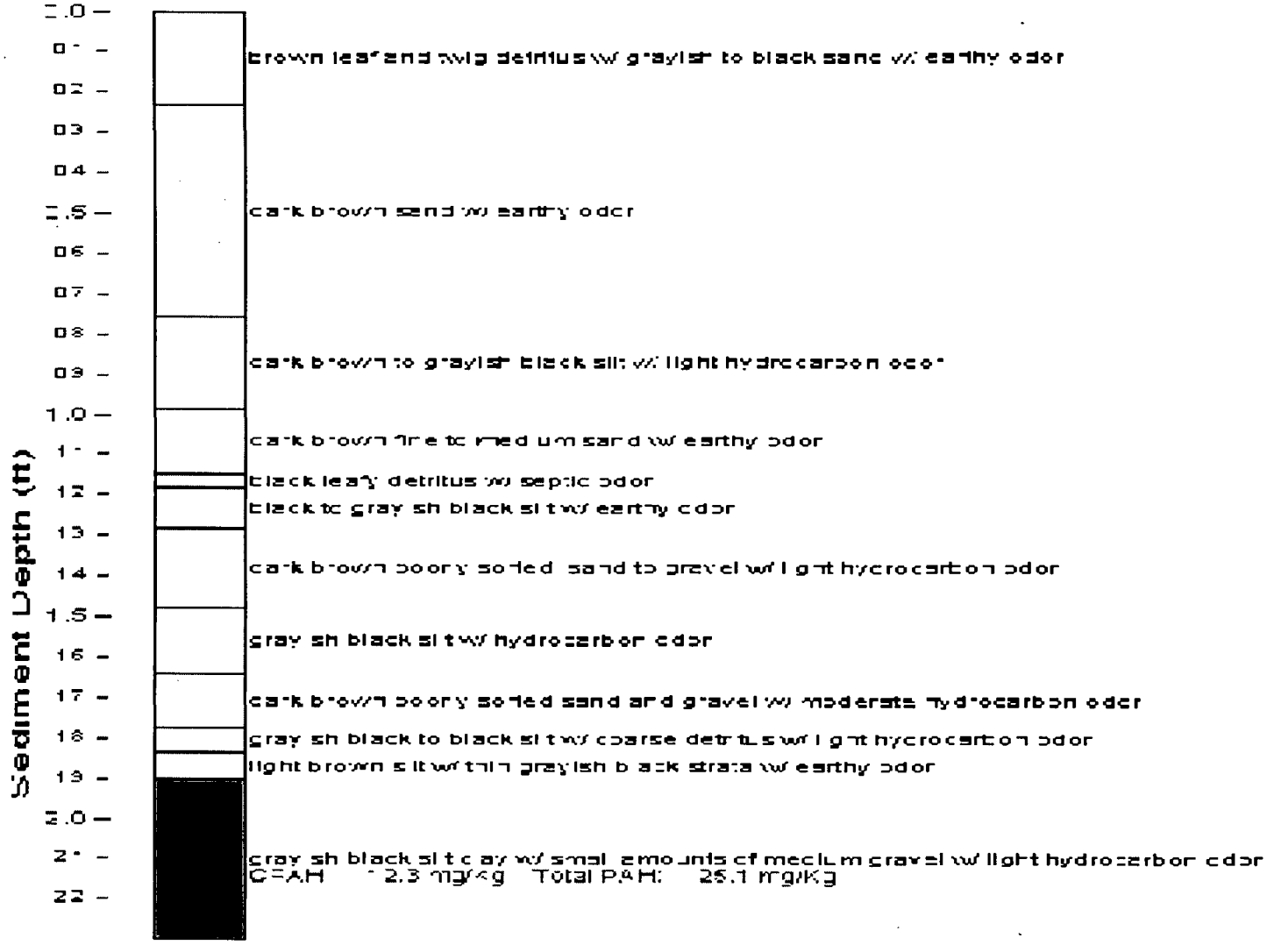

Station: SD03-0016
Dist Downstream: 13500 ft
0
5
10
15
20
25
0
2
3
Depth Below Water Surface (ft)
Left (facing downstream)
Right (facing downstream)
Cross-Sectional Area (sq. ft.): 32.3
Weston (1994) CPAH: 38.0 mg/Kg

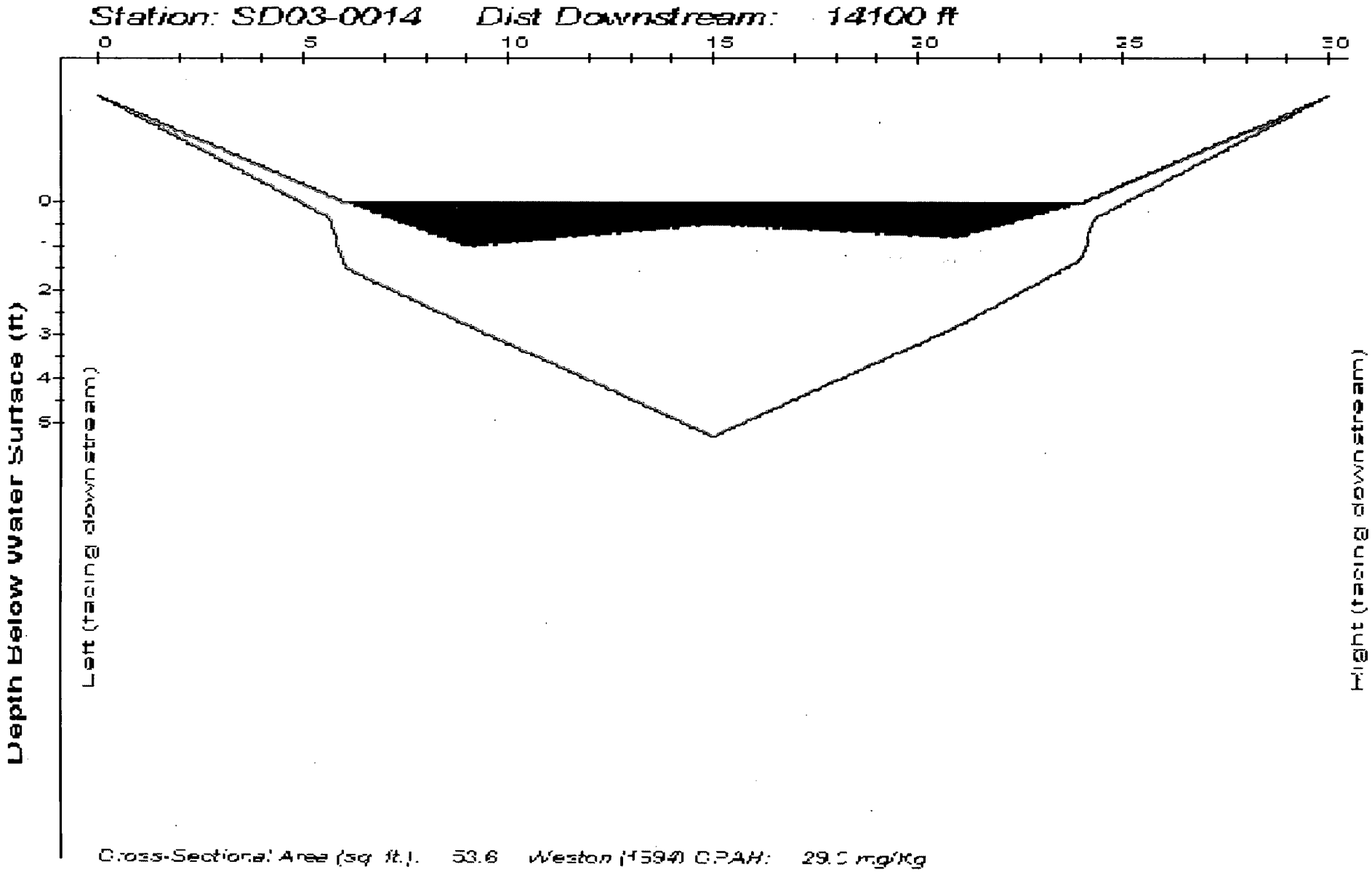
Station: SD03-0016 Dist Downstream: 13500 ft

Sediment Depth (ft)


Station: SD03-0015 Dist Downstream: 13800 ft
0
5
10
15
20
25
0
2
3
4
5
Depth Below Water Surface (ft)
Left (facing downstream)
Right (facing downstream)
Cross-Sectional Area (sq. ft.). 48.3 Weston (1994) CPAH: 25.0 mg/Kg

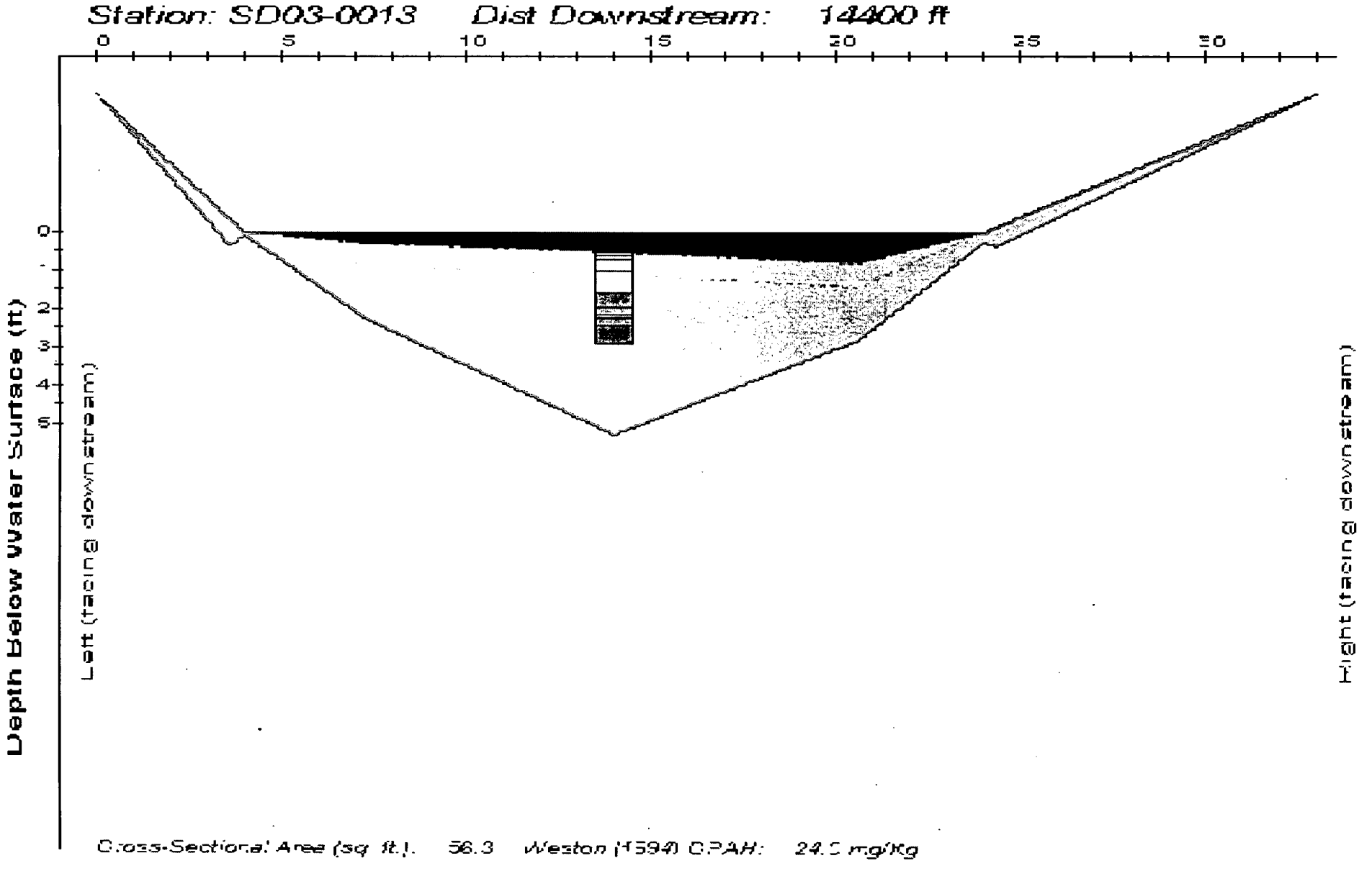
Station: SD03-0015 Dist Downstream: 13800 ft



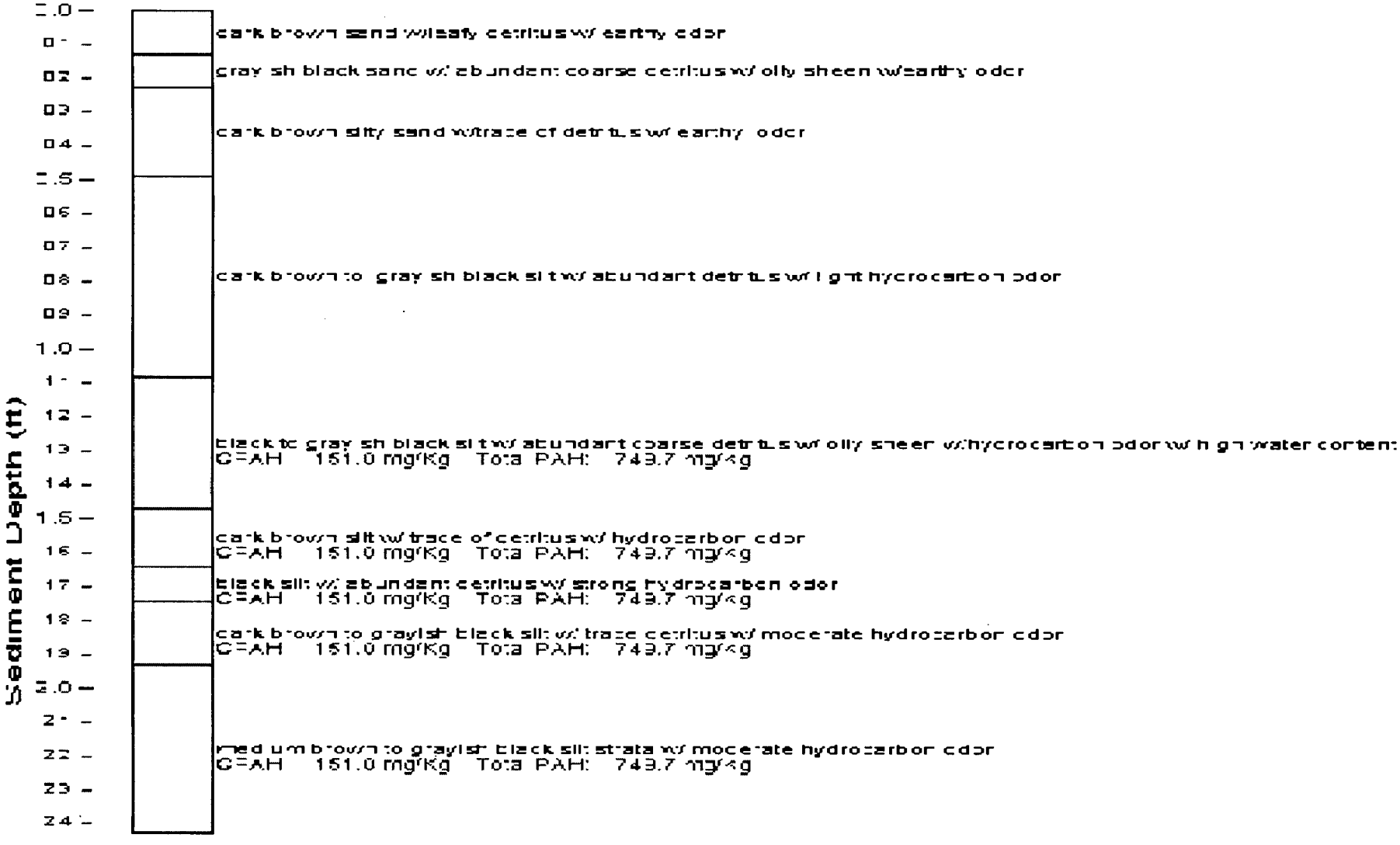

Station: SD03-0014
Dist Downstream: 14100 ft
0
5
10
15
20
25
30
0
2
3
4
5
Depth Below Water Surface (ft)
Left (facing downstream)
Right (facing downstream)
Cross-Sectional Area (sq. ft.): 53.6
Weston (1994) CPAH: 29.0 mg/Kg

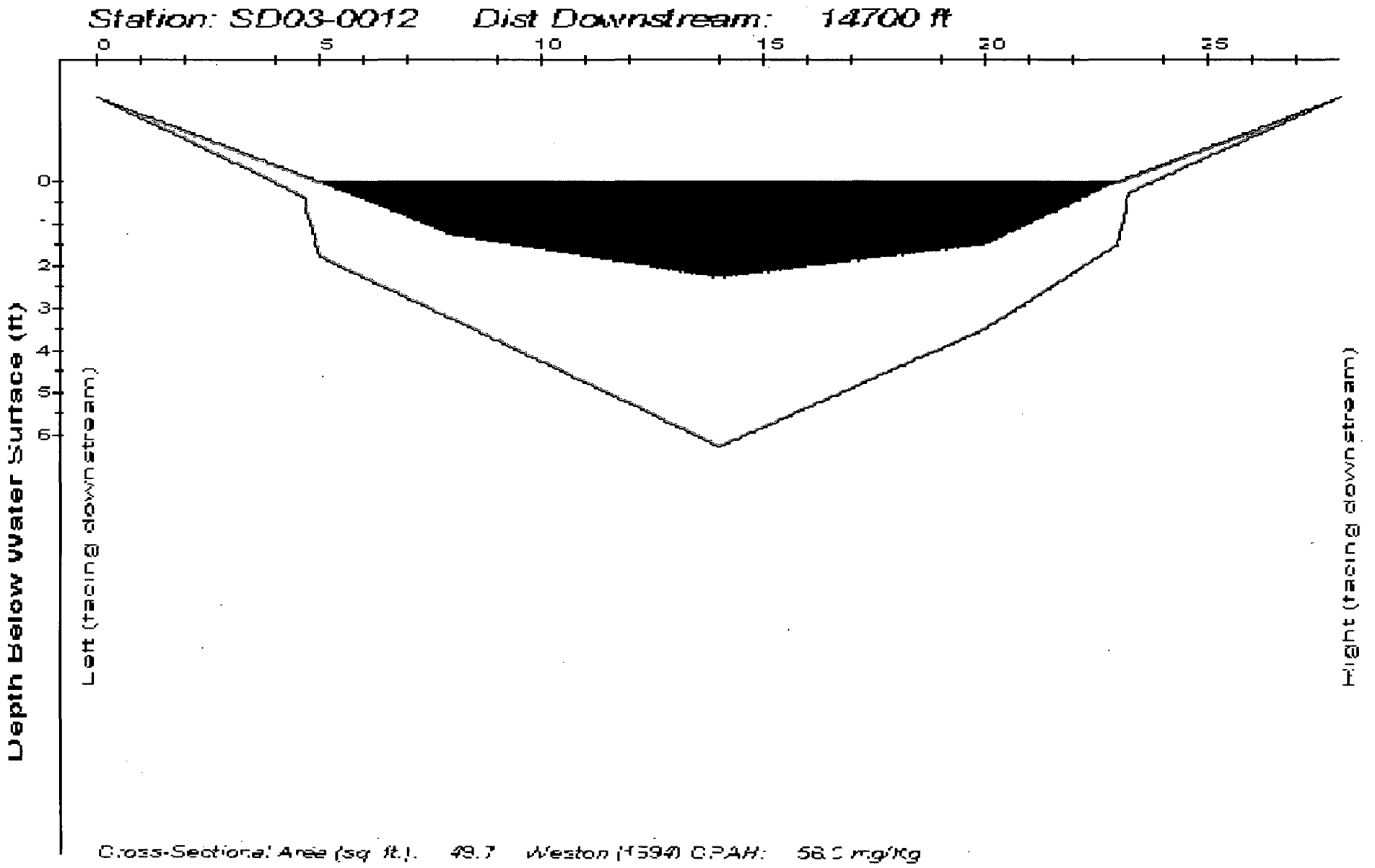
Station: SD03-0014 Dist Downstream: 14100 ft

Sediment Depth (ft)

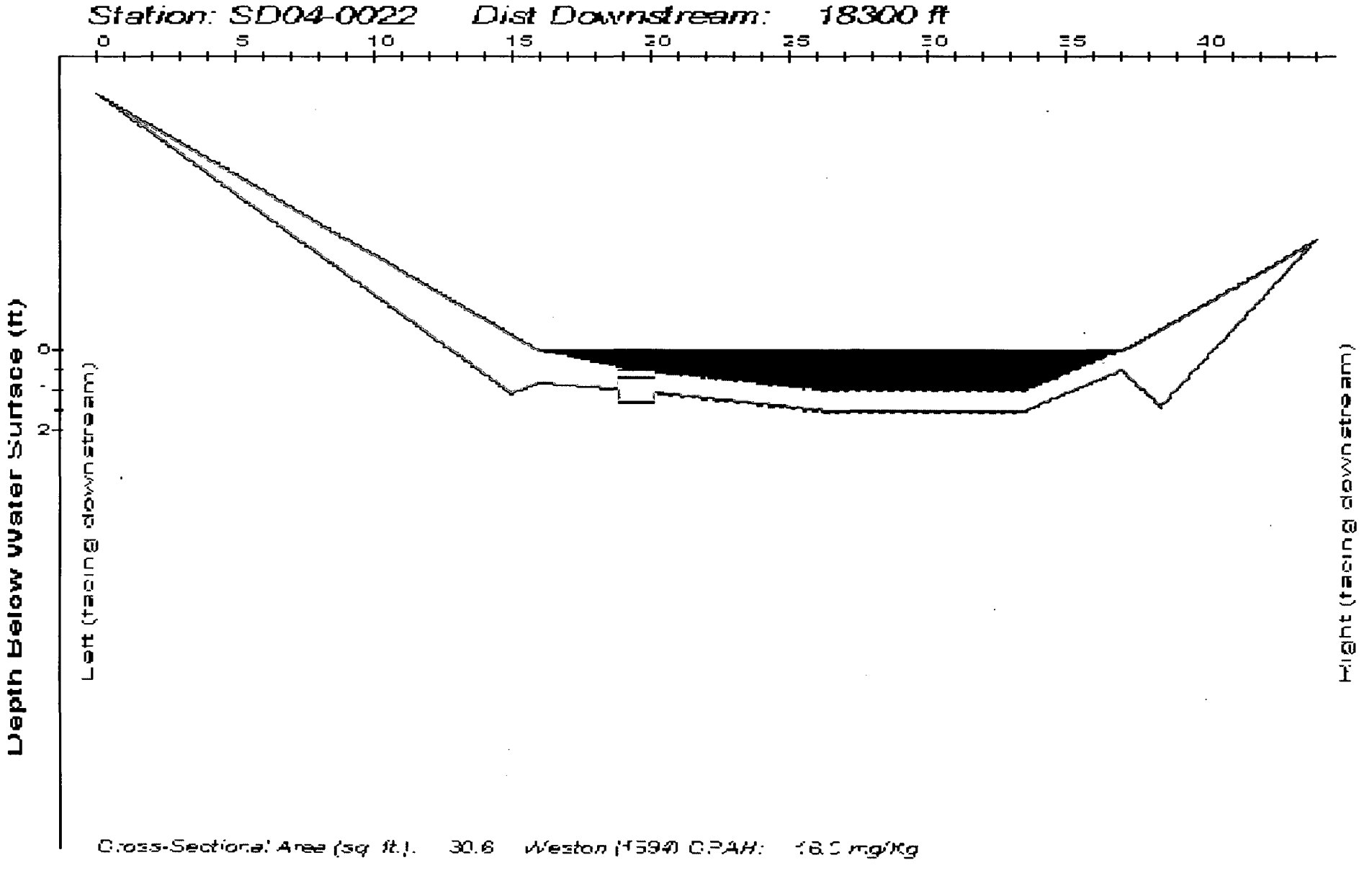

Station: SD03-0013 Dist Downstream: 14400 ft
0
5
10
15
20
25
30
0
2
3
4
5
Depth Below Water Surface (ft)
Left (facing downstream)
Right (facing downstream)
Cross-Sectional Area (sq. ft.): 56.3 Weston (1994) CPAH: 24.5 mg/kg

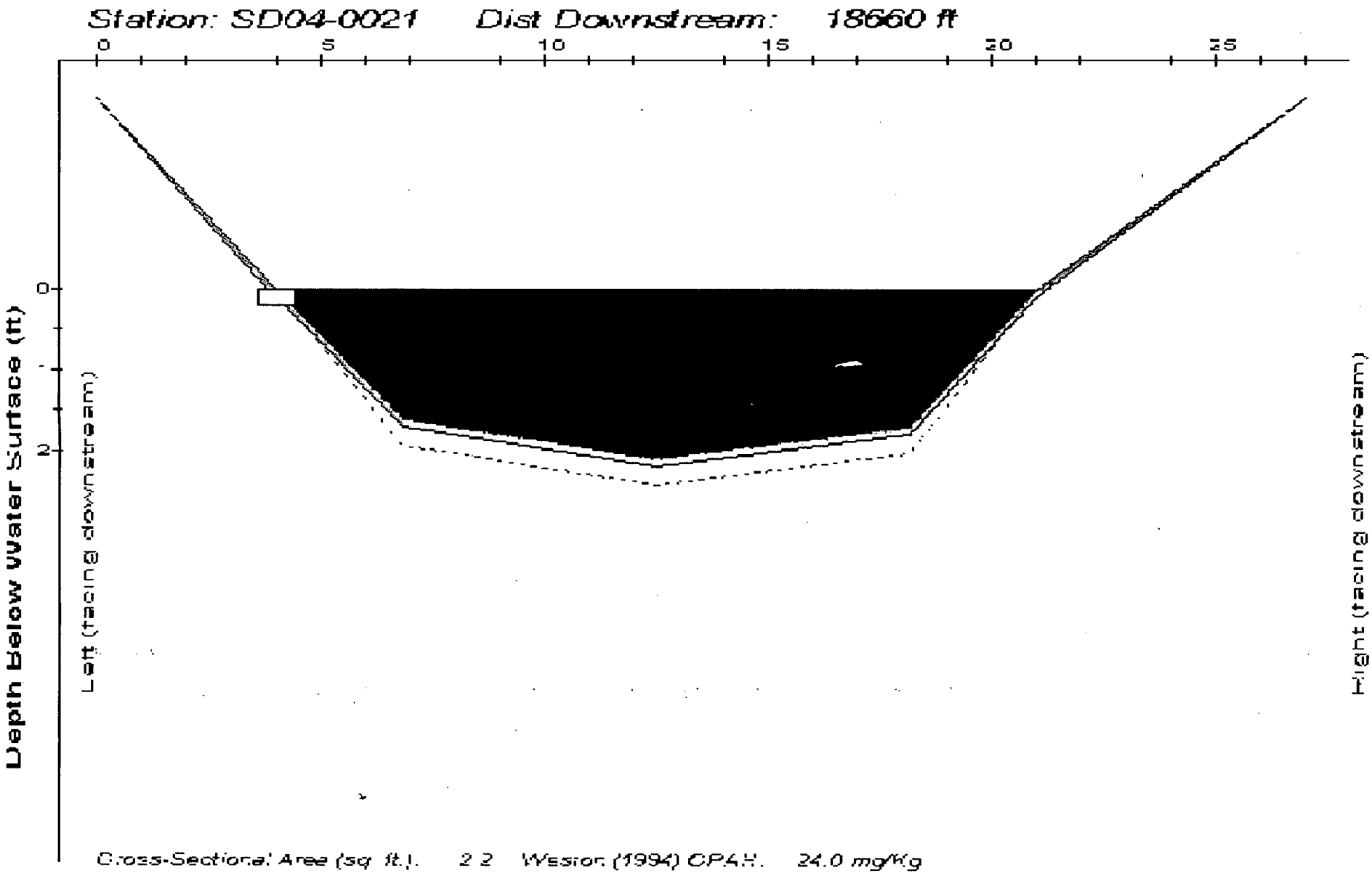
Station: SD03-0013 Dist Downstream: 14400 ft

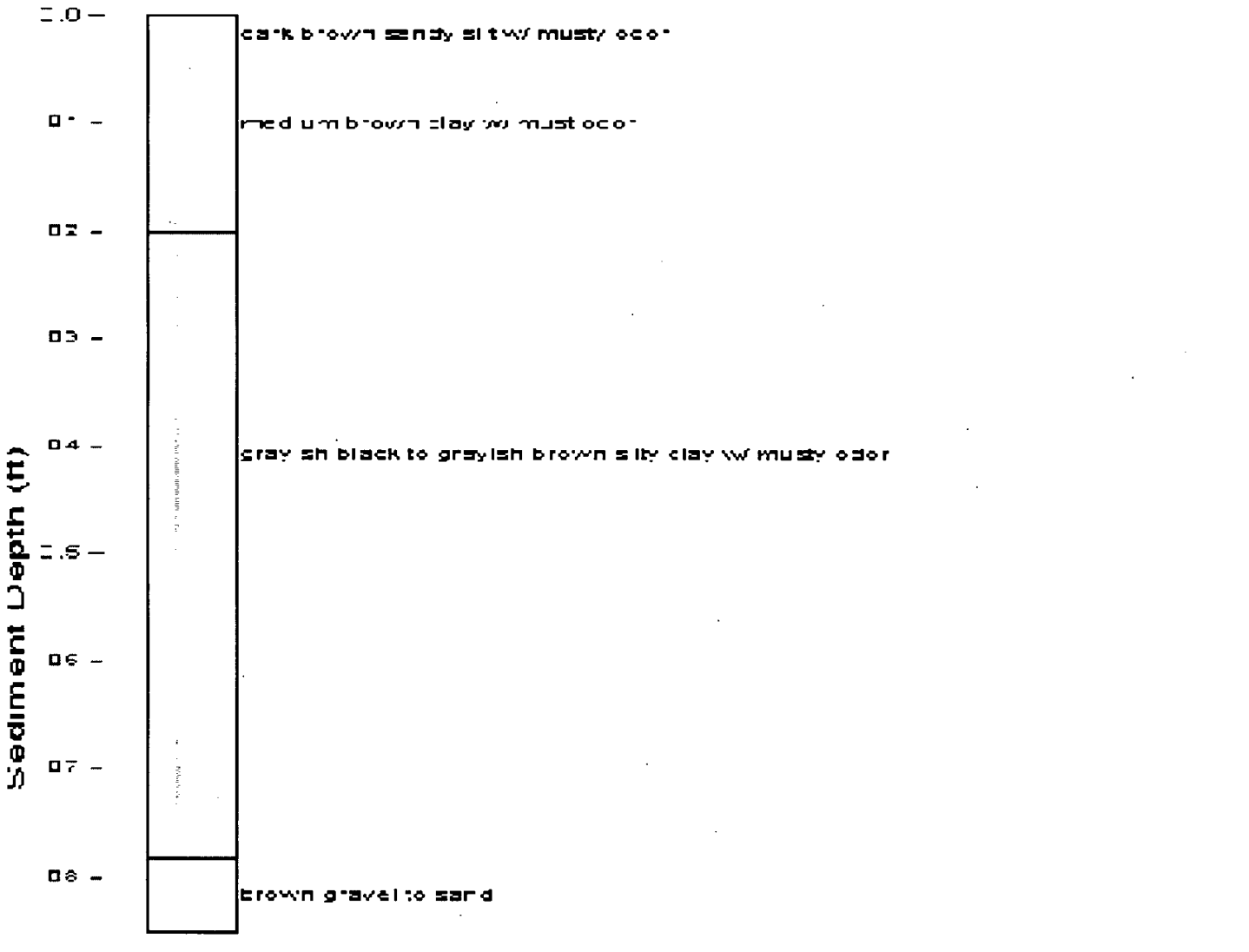


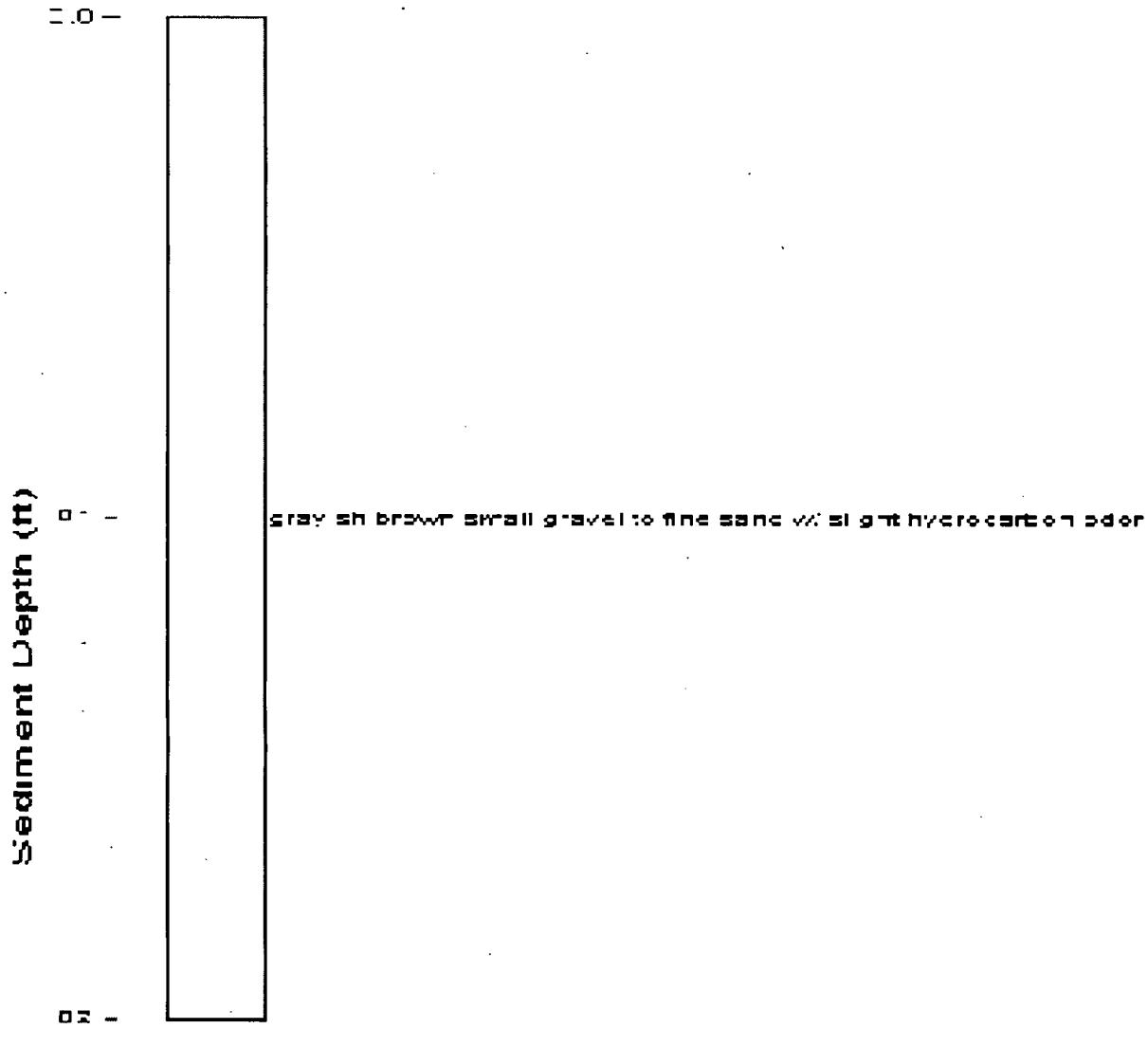

Station: SD03-0012
Dist Downstream: 14700 ft
0
5
10
15
20
25
0
2
3
4
5
6
Depth Below Water Surface (ft)
Left (facing downstream)
Right (facing downstream)
Cross-Sectional Area (sq. ft.): 49.7
Weston (1994) CPAH: 58.0 mg/Kg

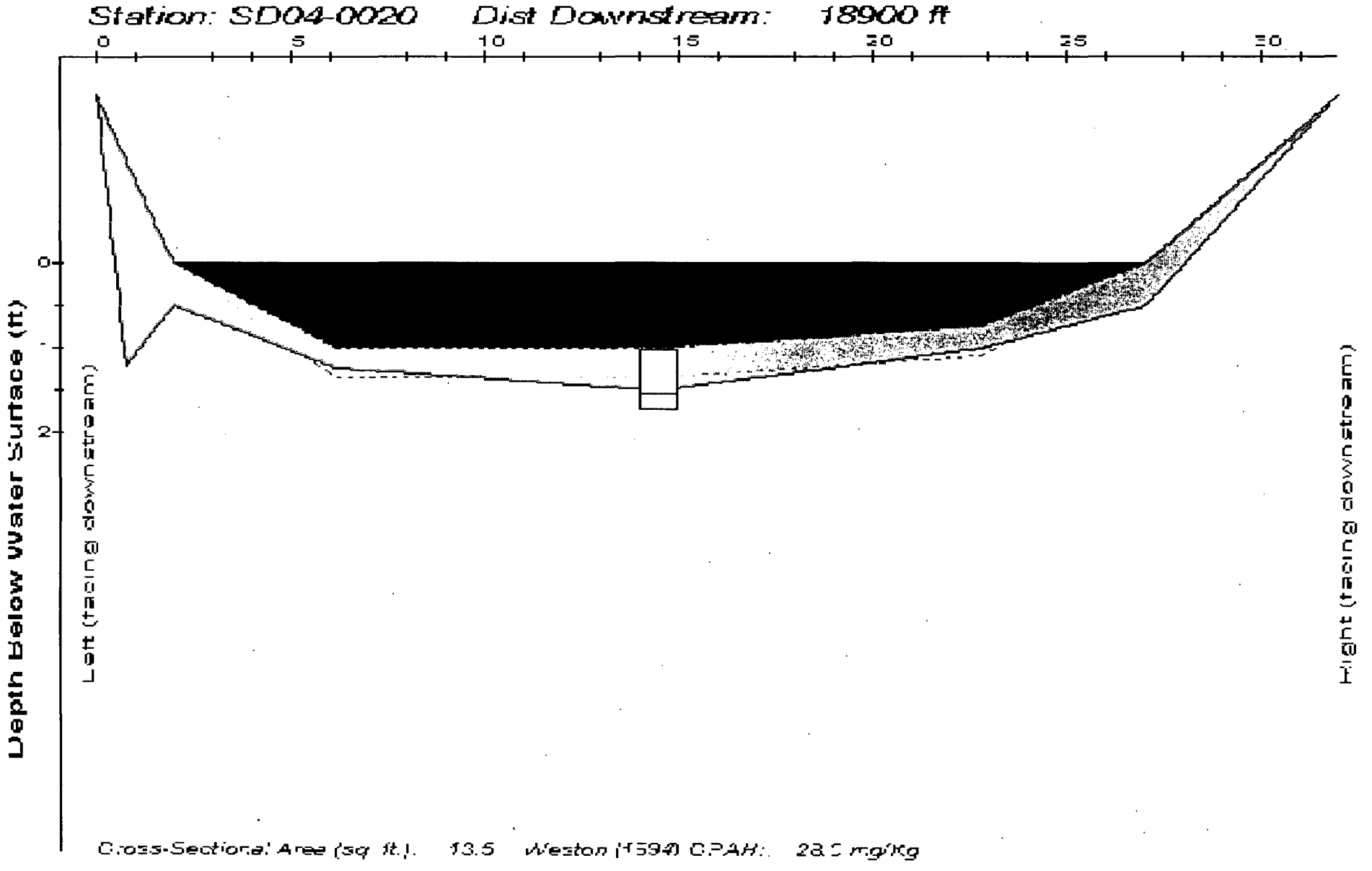
Station: SD03-0012 Dist Downstream: 14700 ft

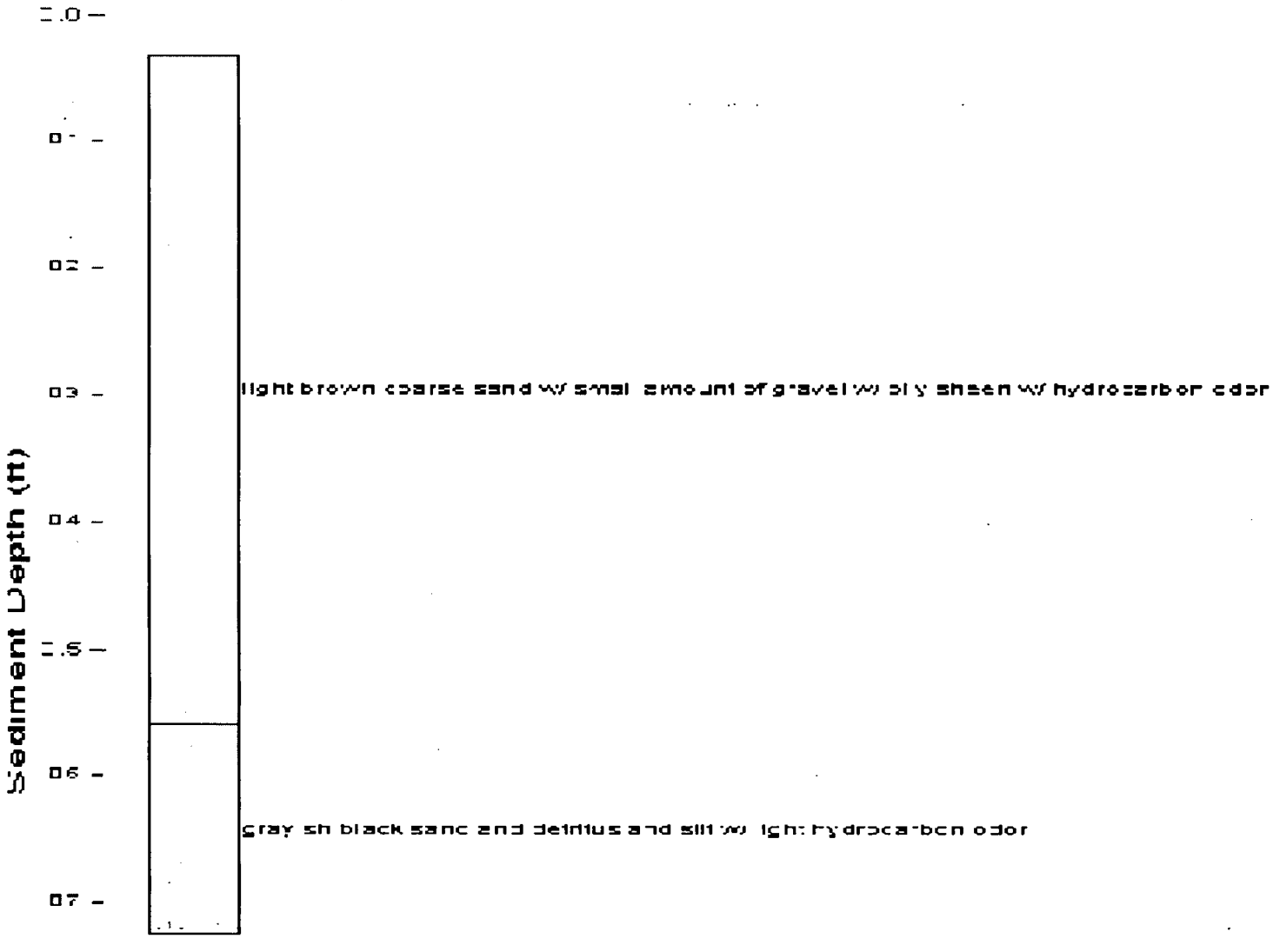

Station: SD04-0022 Dist Downstream: 18300 ft
0
5
10
15
20
25
30
35
40
Depth Below Water Surface (ft)
0
2
Left (facing downstream)
Right (facing downstream)
Cross-Sectional Area (sq. ft.): 30.6 Weston (1994) CPAH: 16.0 mg/Kg

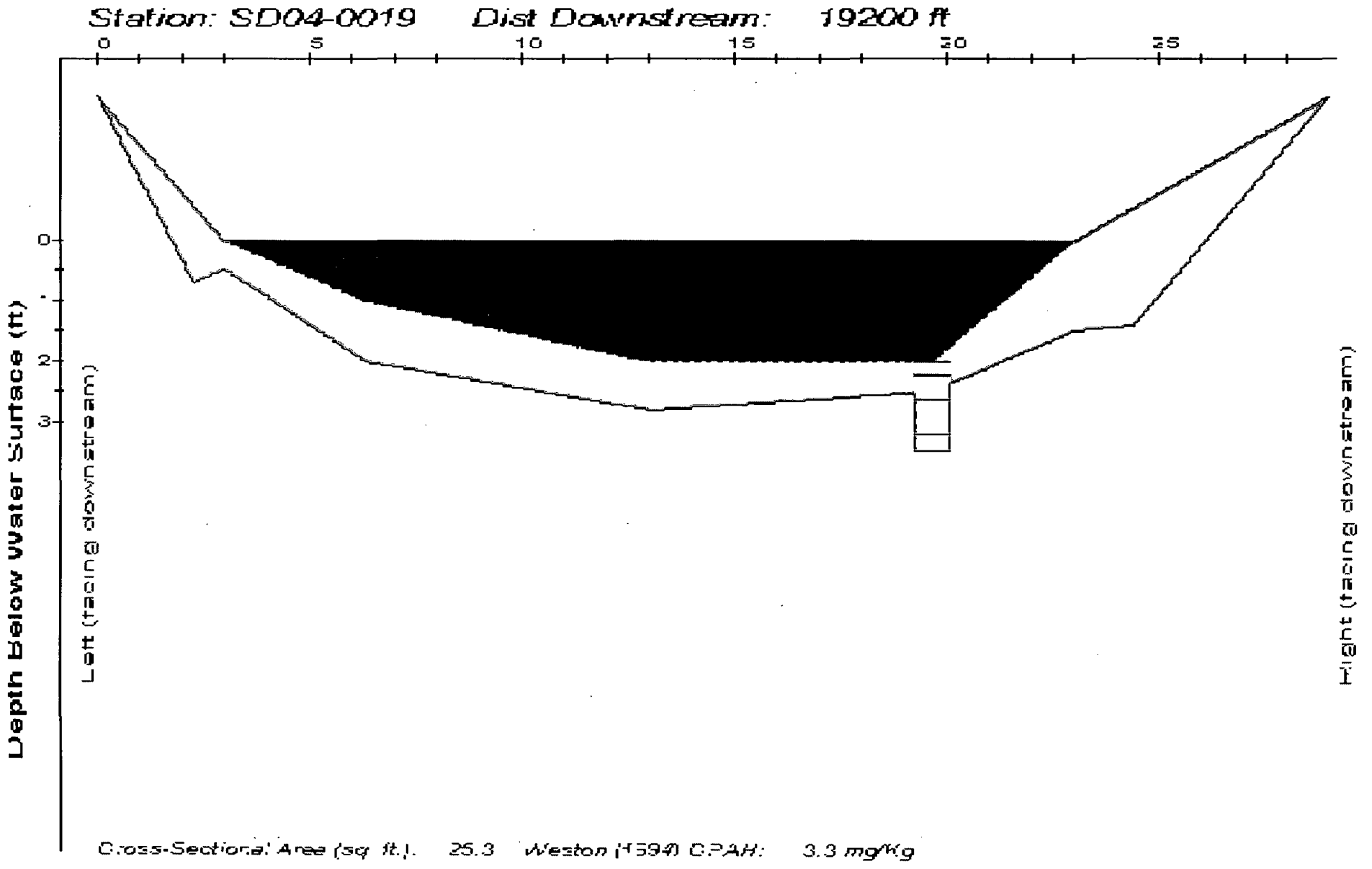

Station: SD04-0021
Dist Downstream: 18660 ft
0
5
10
15
20
25
0
2
Depth Below Water Surface (ft)
Left (facing downstream)
Right (facing downstream)
Cross-Sectional Area (sq. ft.): 2.2
Version (1994) CP4.H.
24.0 mg/Kg

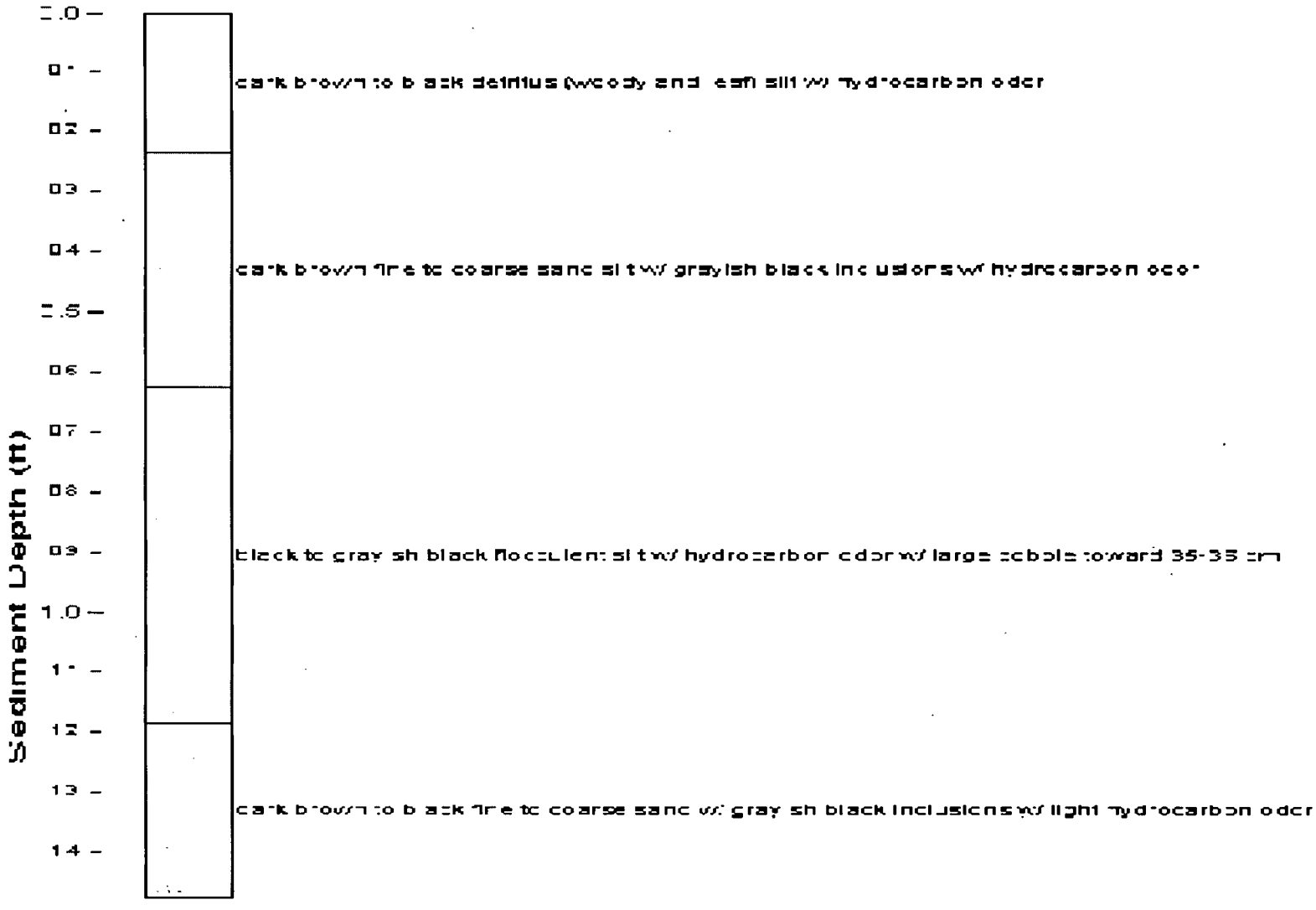

Station: SD04-0022
Dist Downstream: 18300 ft
Sediment Depth (ft)
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
dark brown sandy silt w/ musty odor
medium brown clay w/ musty odor
gray sh black to grayish brown silty clay w/ musty odor
brown gravel to sand

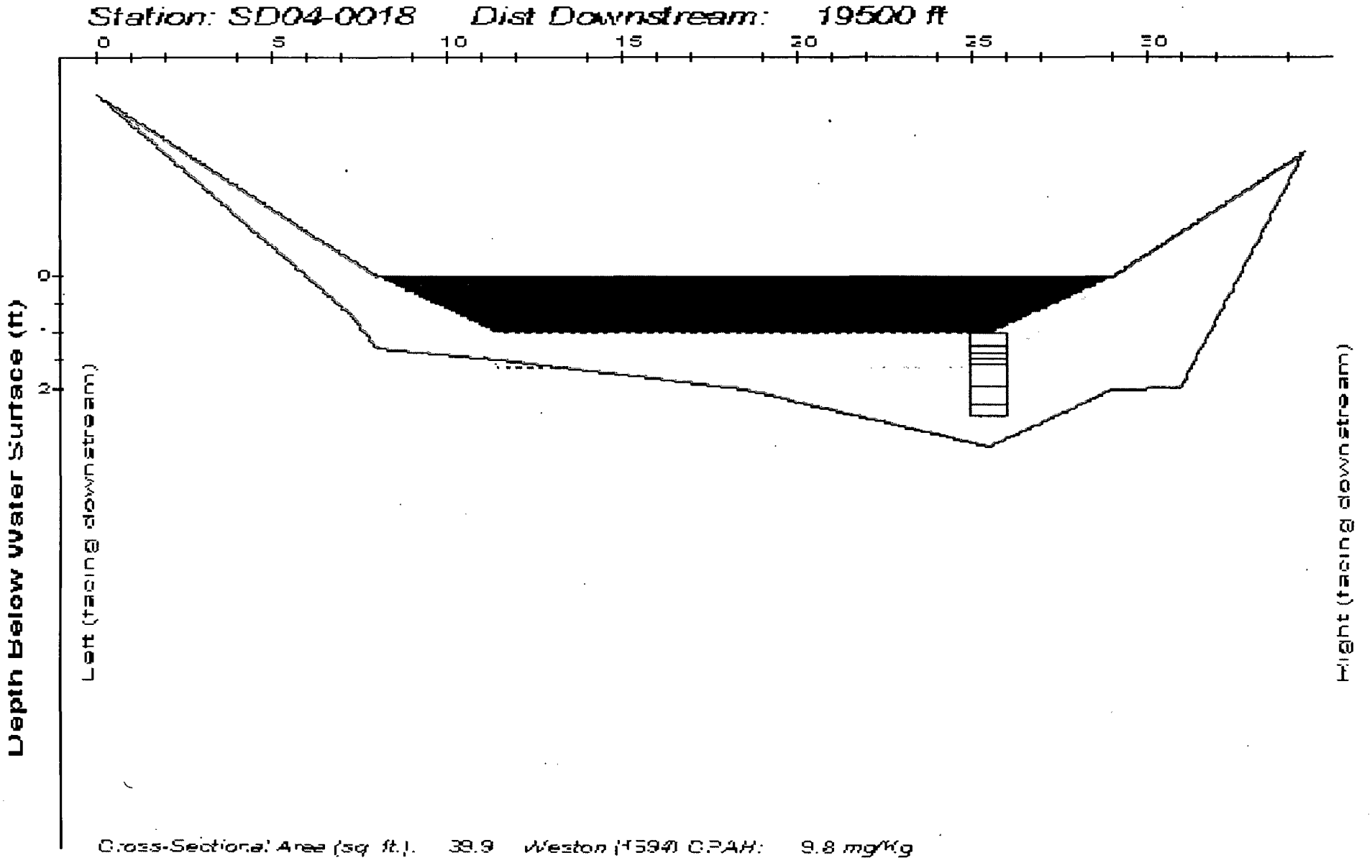

Station: SD04-0021
Dist Downstream: 18660 ft
Sediment Depth (ft)
0
gray sh brown small gravel to fine sand w/ sl grit hydrocarbon odor

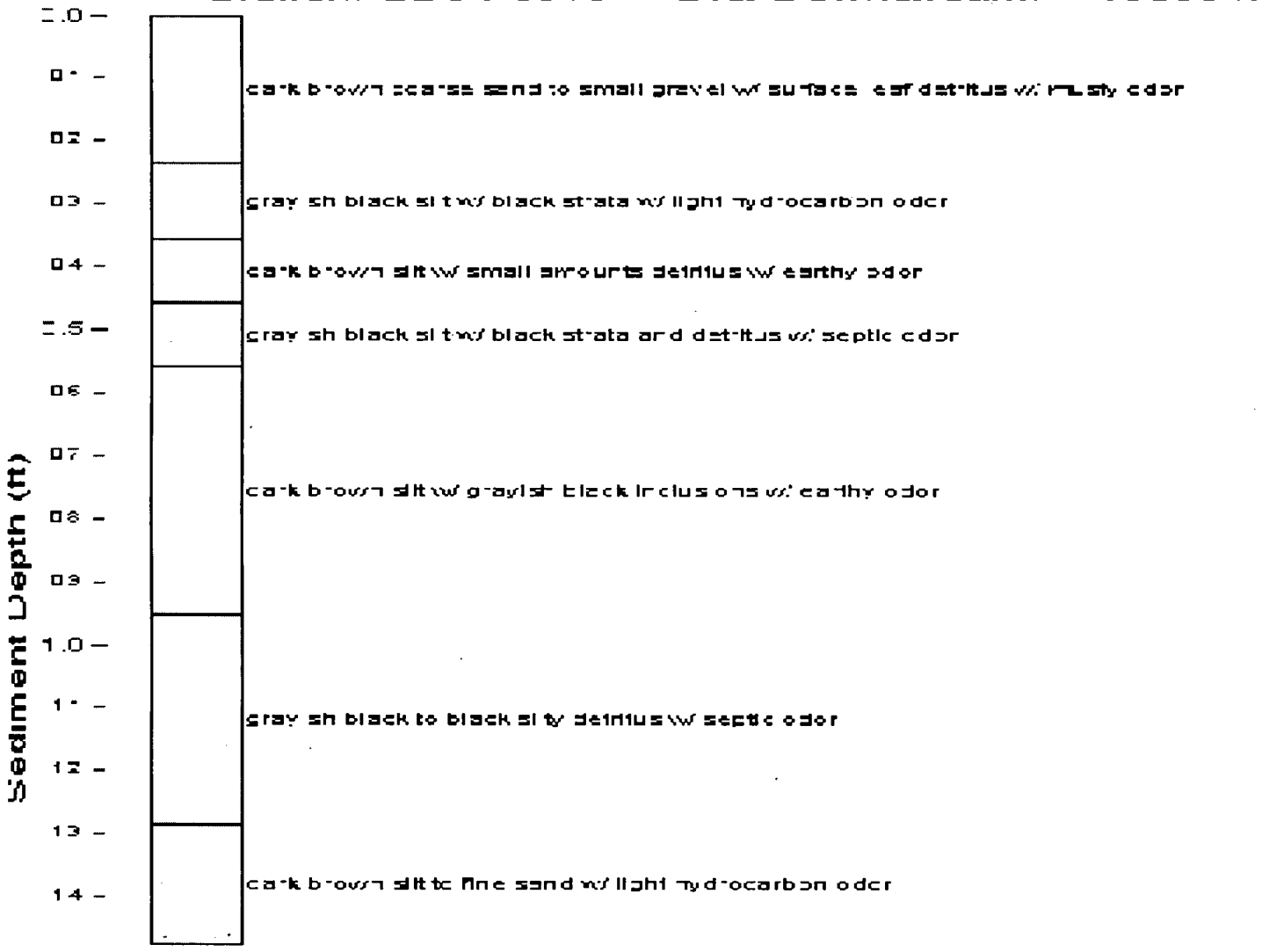

Station: SD04-0020
Dist Downstream: 18900 ft
0
5
10
15
20
25
30
Depth Below Water Surface (ft)
0
2
Left (facing downstream)
Right (facing downstream)
Cross-Sectional Area (sq. ft.): 13.5
Weston (1994) CPAH: 28.0 mg/Kg

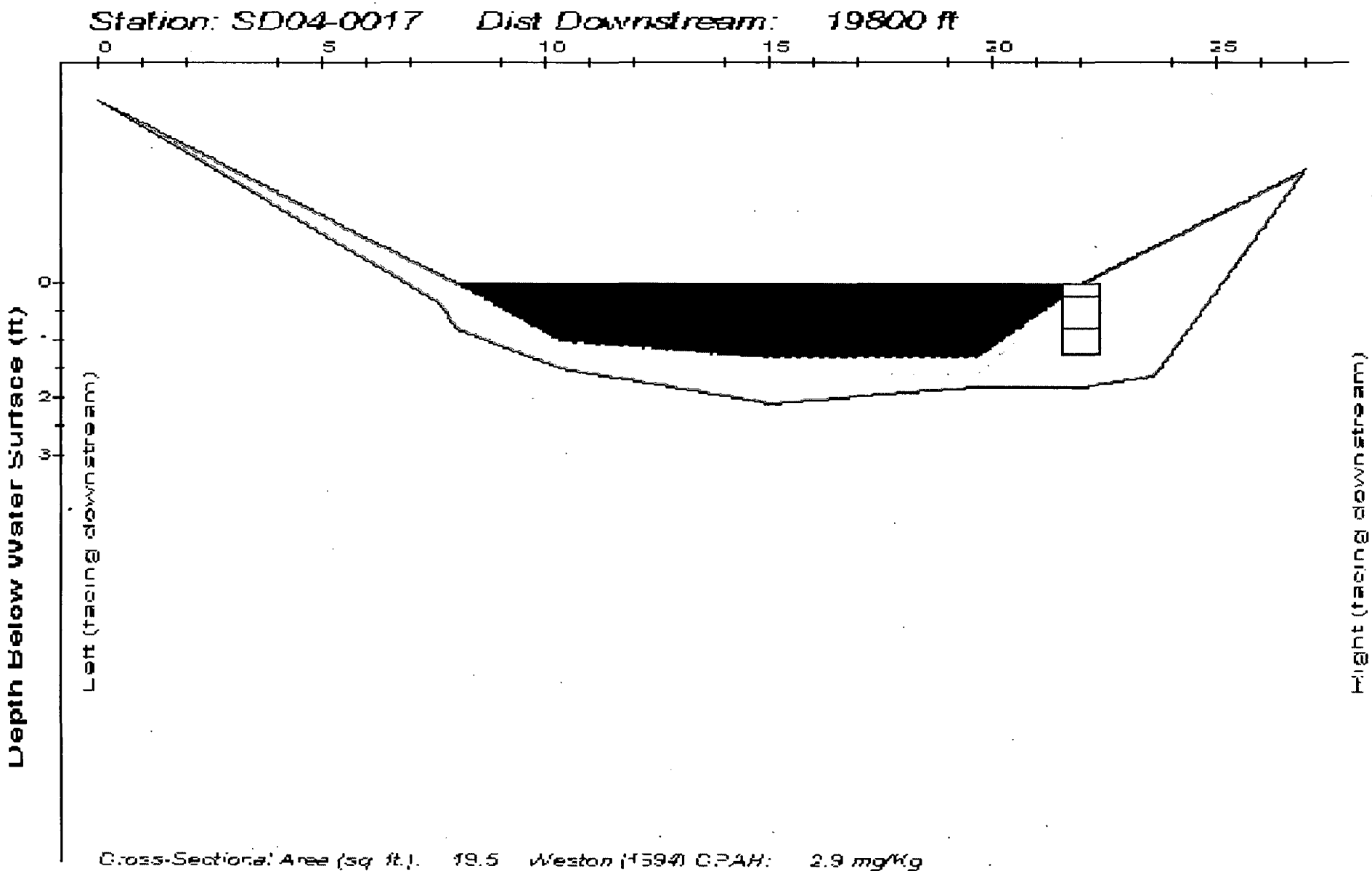

Station: SD04-0020 Dist Downstream: 18900 ft
Sediment Depth (ft)
light brown coarse sand w/ small amount of gravel w/ oily sheen w/ hydrocarbon odor
gray sh black sand and detritus and silt w/ light hydrocarbon odor

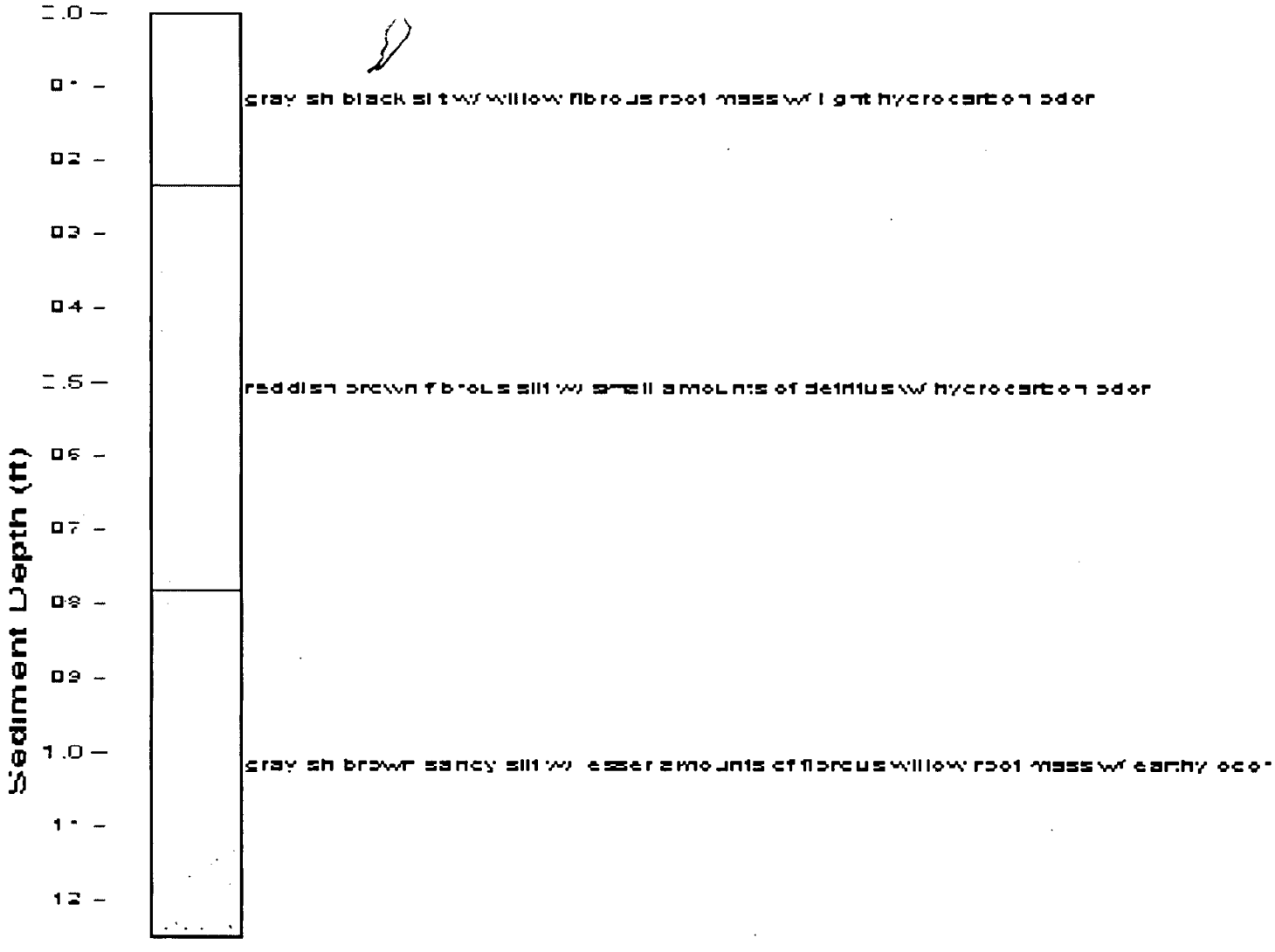

Station: SD04-0019
Dist Downstream: 19200 ft
0
5
10
15
20
25
0
2
3
Depth Below Water Surface (ft)
Left (facing downstream)
Right (facing downstream)
Cross-Sectional Area (sq. ft.): 25.3
Weston (1994) CPAH: 3.3 mg/Kg

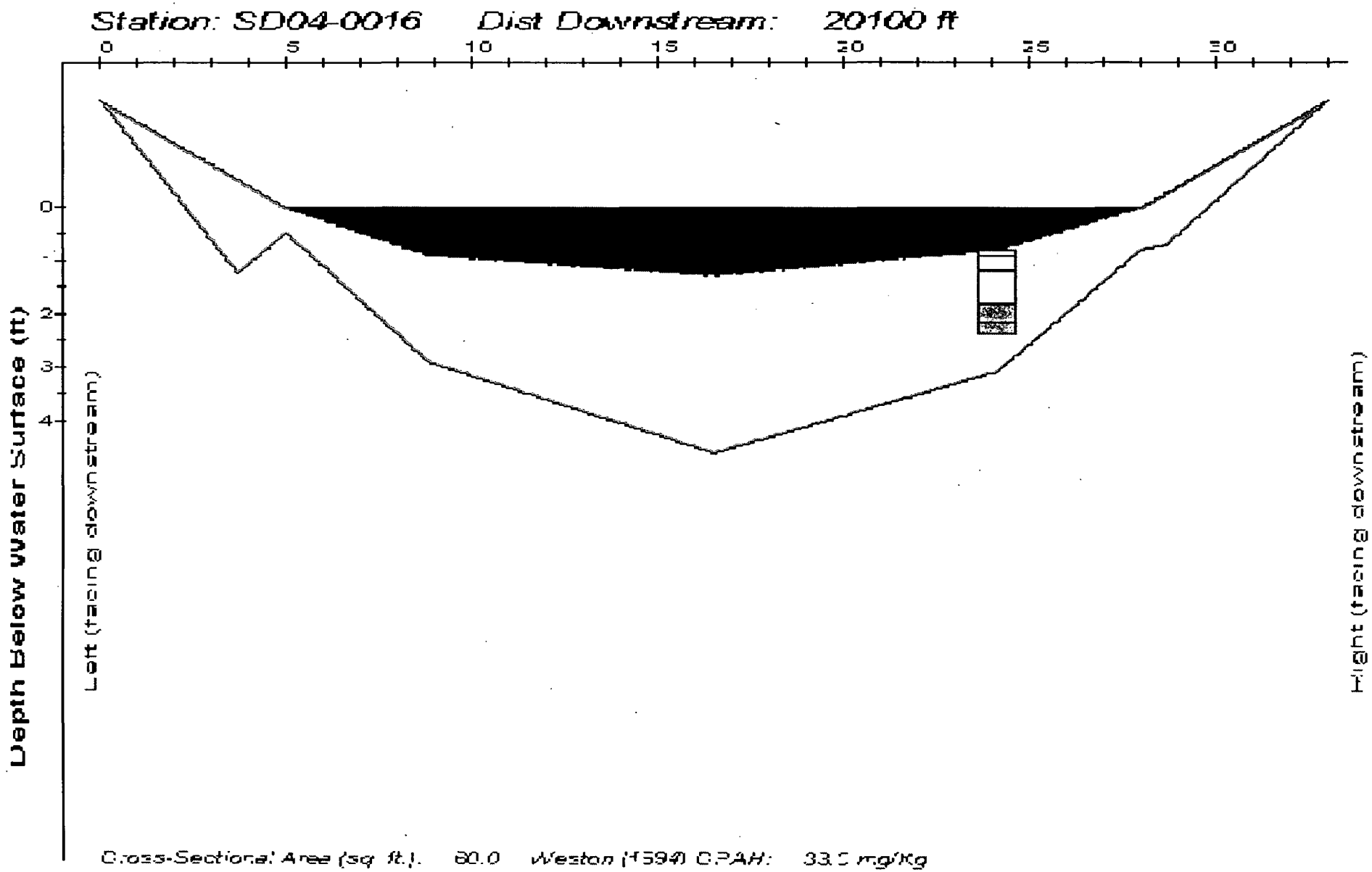

Station: SD04-0019
Dist Downstream: 19200 ft
Sediment Depth (ft)
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
1.1
1.2
1.3
1.4
dark brown to black detritus (woody and peat) silt w/ hydrocarbon odor
dark brown fine to coarse sand silt w/ grayish black inclusions w/ hydrocarbon odor
black to gray sh black flocculent silt w/ hydrocarbon odor w/ large cobble toward 35-35 cm
dark brown to black fine to coarse sand w/ gray sh black inclusions w/ light hydrocarbon odor


Station: SD04-0018 Dist Downstream: 19500 ft
0
5
10
15
20
25
30
0
2
Depth Below Water Surface (ft)
Left (facing downstream)
Right (facing downstream)
Cross-Sectional Area (sq. ft.): 38.9 Weston (1994) CPAH: 9.8 mg/Kg

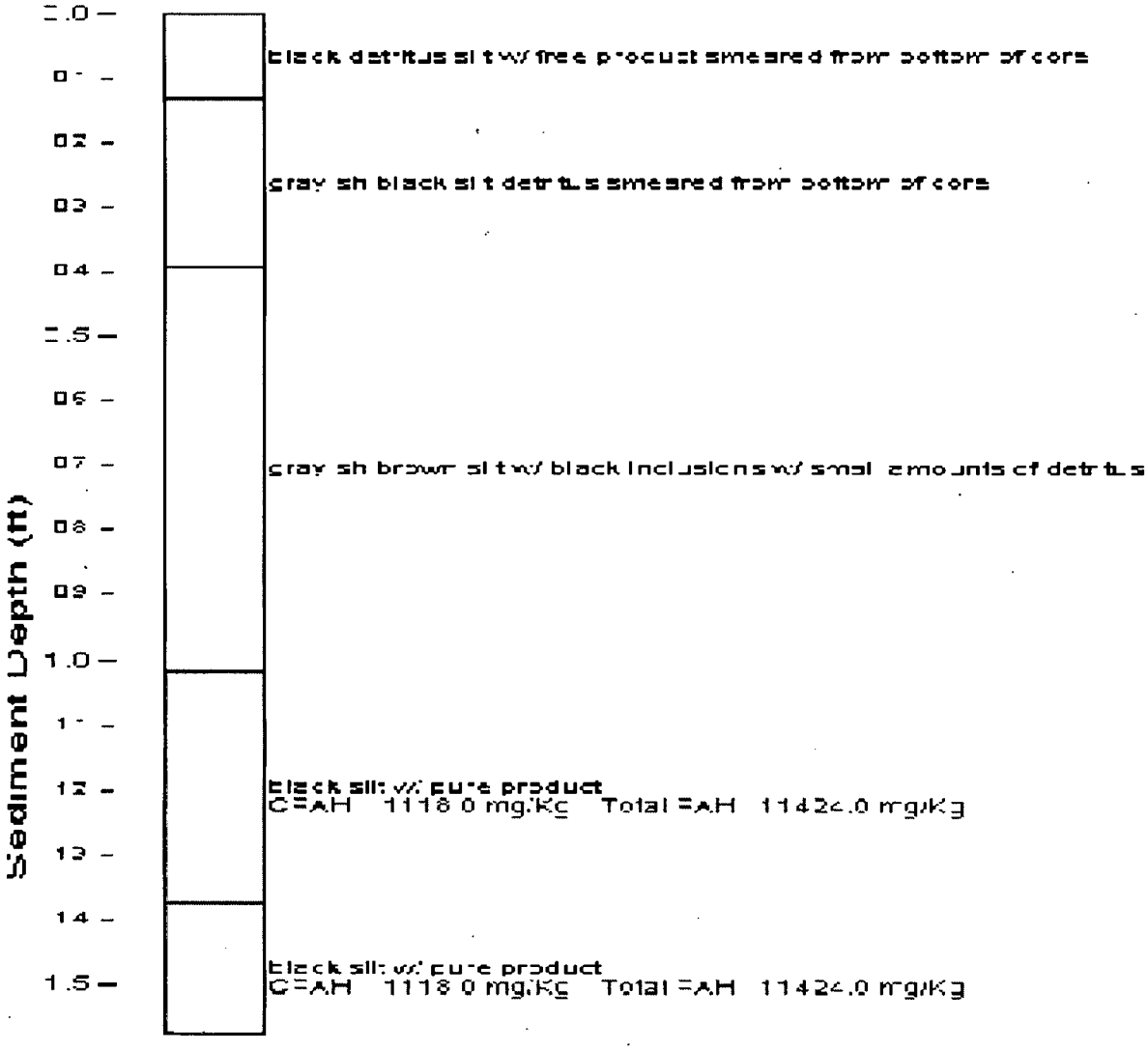

Station: SD04-0018
Dist Downstream: 19500 ft
Sediment Depth (ft)
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
1.1
1.2
1.3
1.4
dark brown coarse sand to small gravel w/ surface leaf detritus w/ musty odor
gray sh black silt w/ black strata w/ light hydrocarbon odor
dark brown silt w/ small amounts detritus w/ earthy odor
gray sh black silt w/ black strata and detritus w/ septic odor
dark brown silt w/ grayish black inclusions w/ earthy odor
gray sh black to black silty detritus w/ septic odor
dark brown silt to fine sand w/ light hydrocarbon odor


Station: SD04-0017 Dist Downstream: 19800 ft
0
5
10
15
20
25
0
2
3
Depth Below Water Surface (ft)
Left (facing downstream)
Right (facing downstream)
Cross-Sectional Area (sq. ft.): 19.5 Weston (1994) CPAH: 2.9 mg/kg

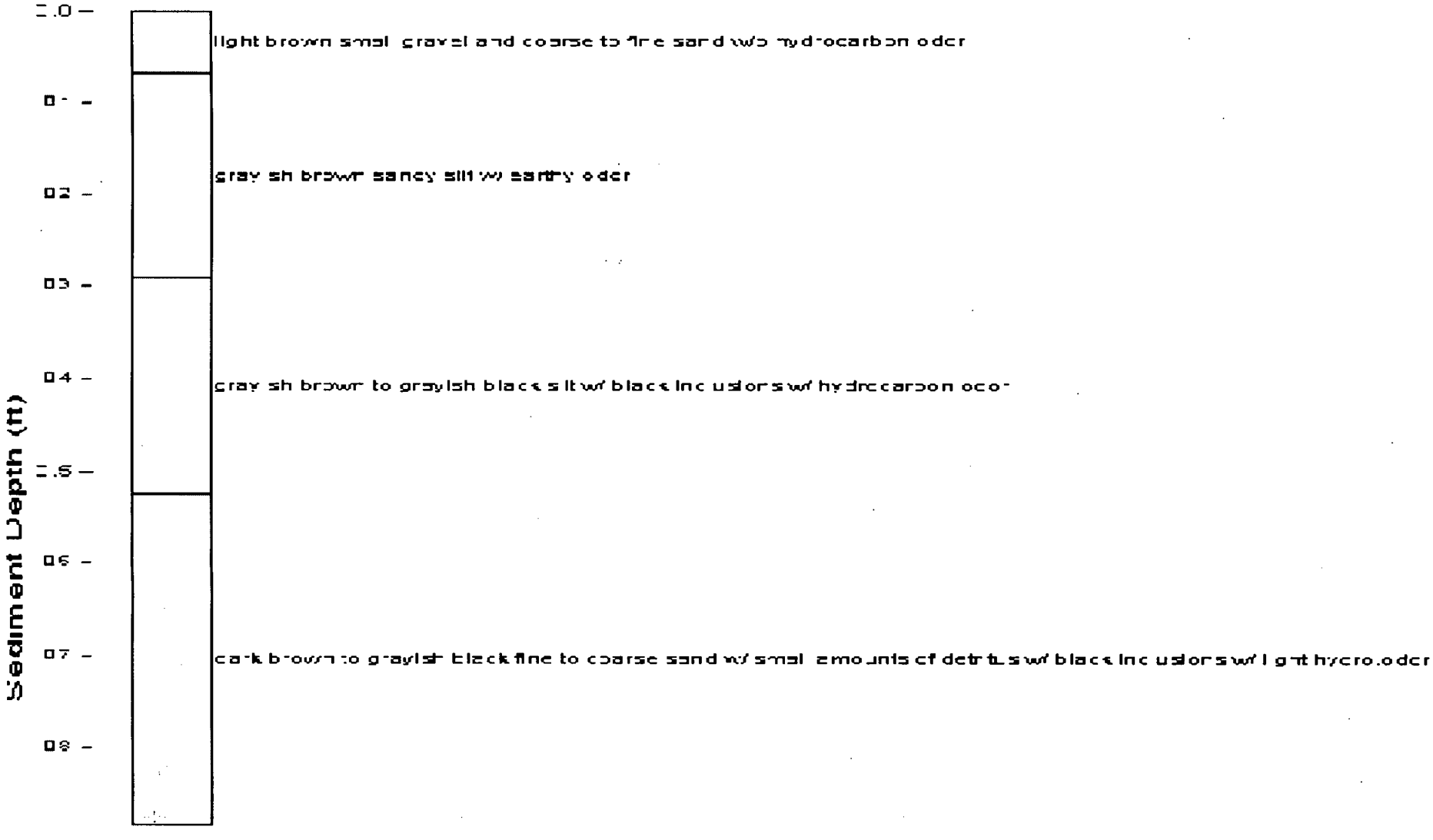

Station: SD04-0017
Dist Downstream: 19800 ft
Sediment Depth (ft)
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
1.1
1.2
gray sh black silt w/ willow fibrous root mass w/ light hydrocarbon odor
reddish brown fibrous silt w/ small amounts of detritus w/ hydrocarbon odor
gray sh brown sandy silt w/ lesser amounts of fibrous willow root mass w/ earthy odor

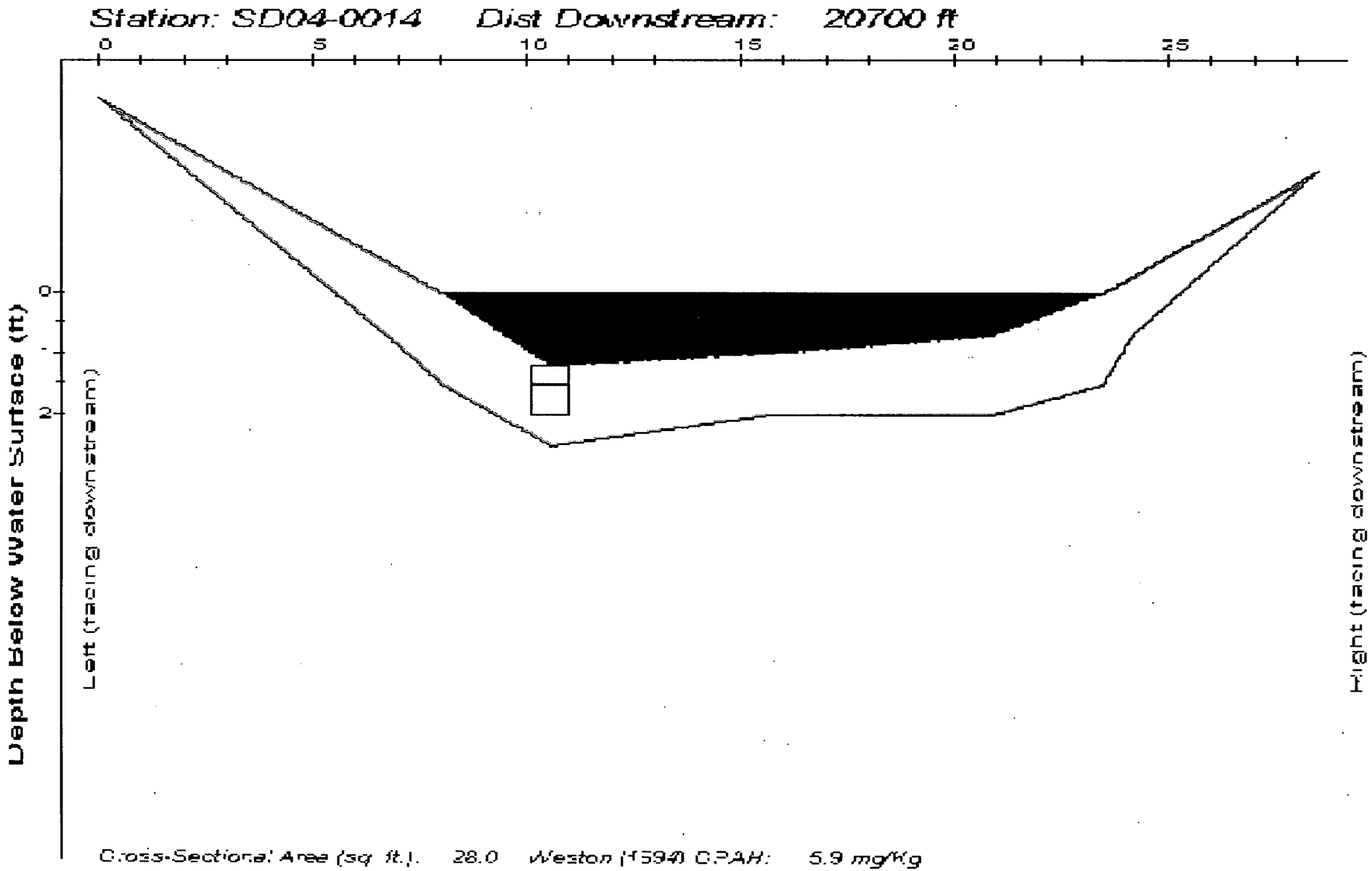

Station: SD04-0016 Dist Downstream: 20100 ft
0
5
10
15
20
25
30
0
2
3
4
Depth Below Water Surface (ft)
Left (facing downstream)
Right (facing downstream)
Cross-Sectional Area (sq. ft.): 80.0 Weston (1994) CPAH: 33.0 mg/Kg

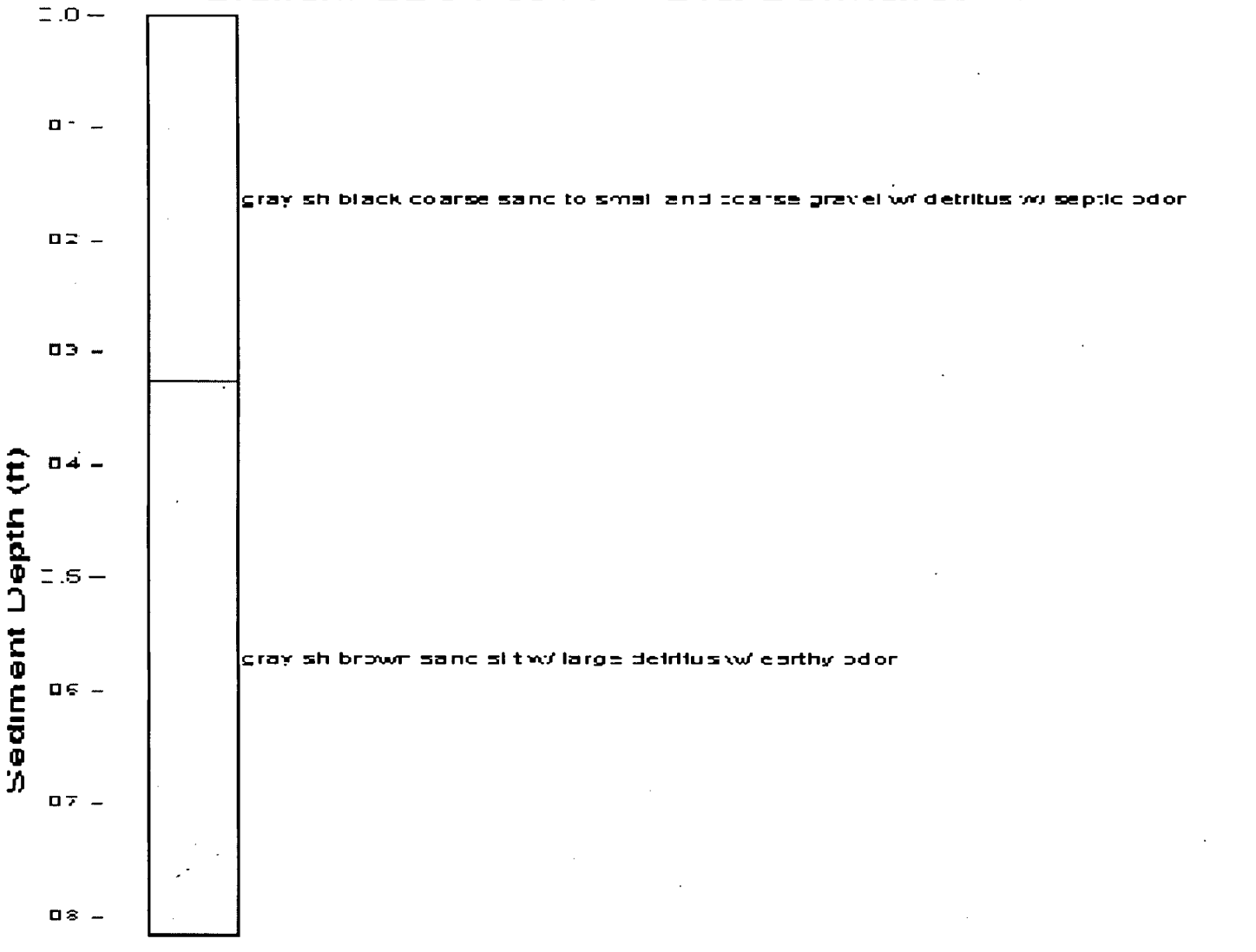
Station: SD04-0016 Dist Downstream: 20100 ft

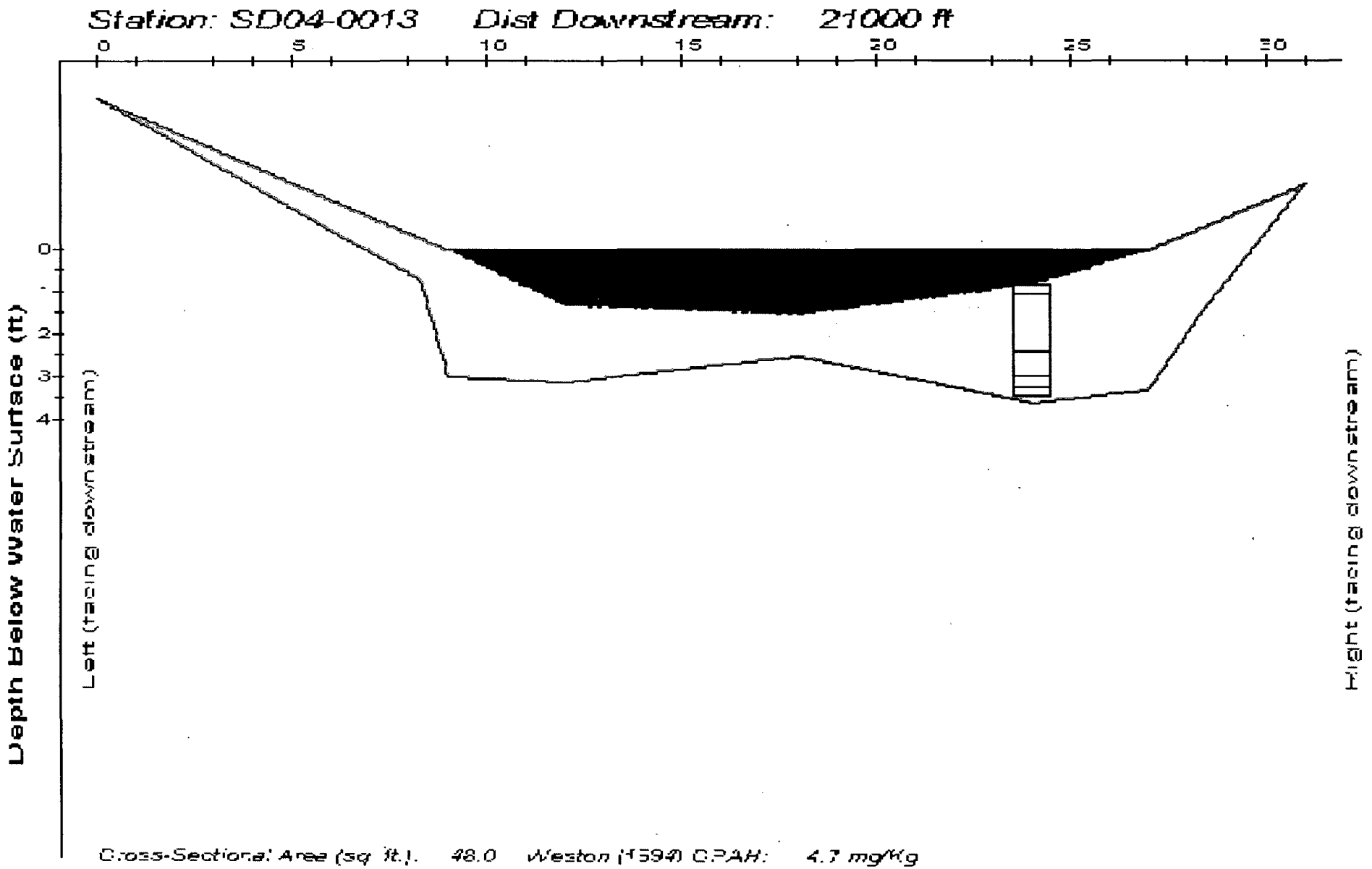


Station: SD04-0015 Dist Downstream: 20400 ft
0
5
10
15
20
25
Depth Below Water Surface (ft)
0
2
Left (facing downstream)
Right (facing downstream)
Cross-Sectional Area (sq. ft.): 21.9 Weston (1994) CPAH: 6.2 mg/Kg

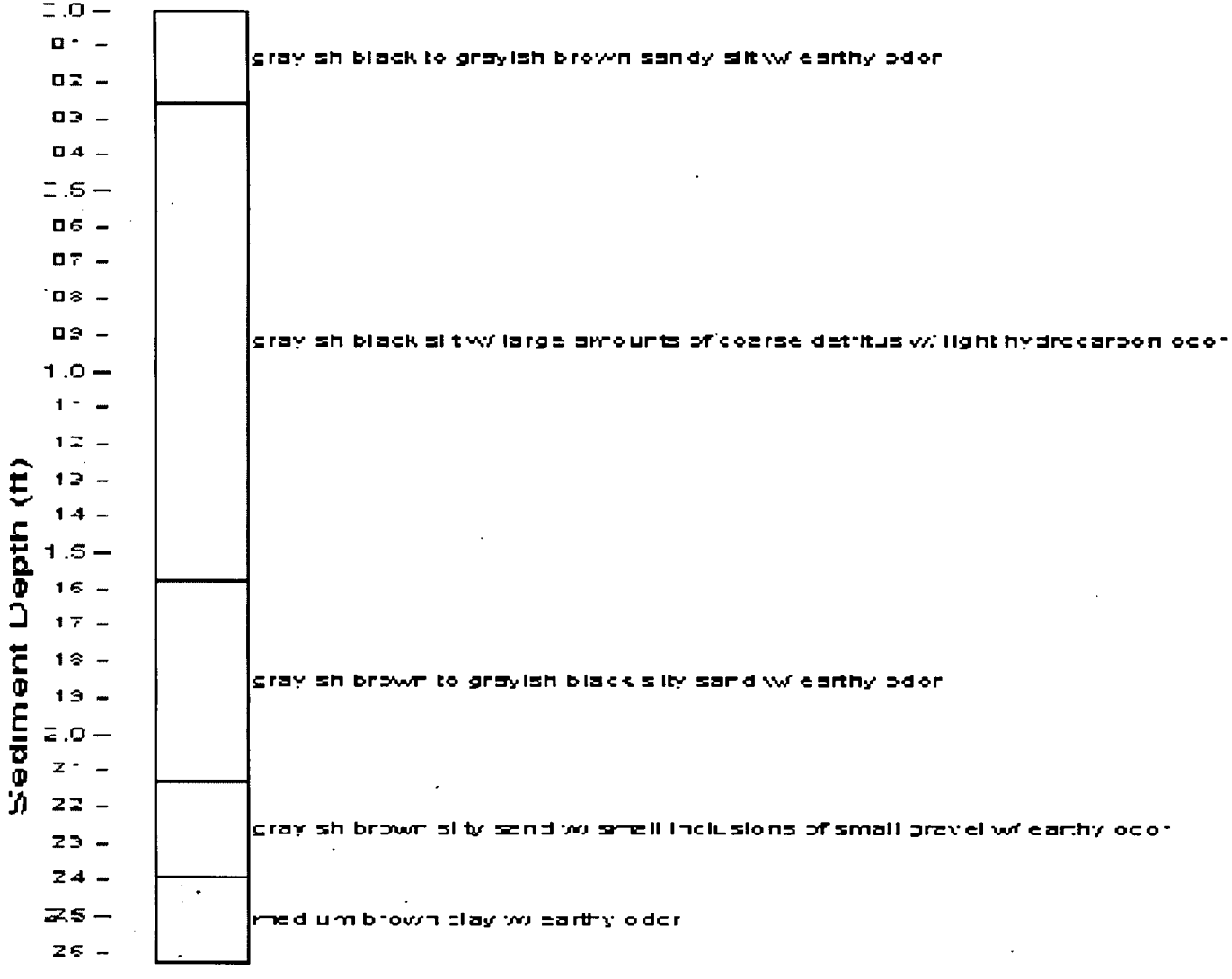

Station: SD04-0015 Dist Downstream: 20400 ft
Sediment Depth (ft)
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
light brown small gravel and coarse to fine sand w/o hydrocarbon oder
gray sh brown sandy silt w/ earthy oder
gray sh brown to grayish black silt w/ black inclusions w/ hydrocarbon odor
dark brown to grayish black fine to coarse sand w/ small amounts of debris w/ black inclusions w/ light hydro.oder

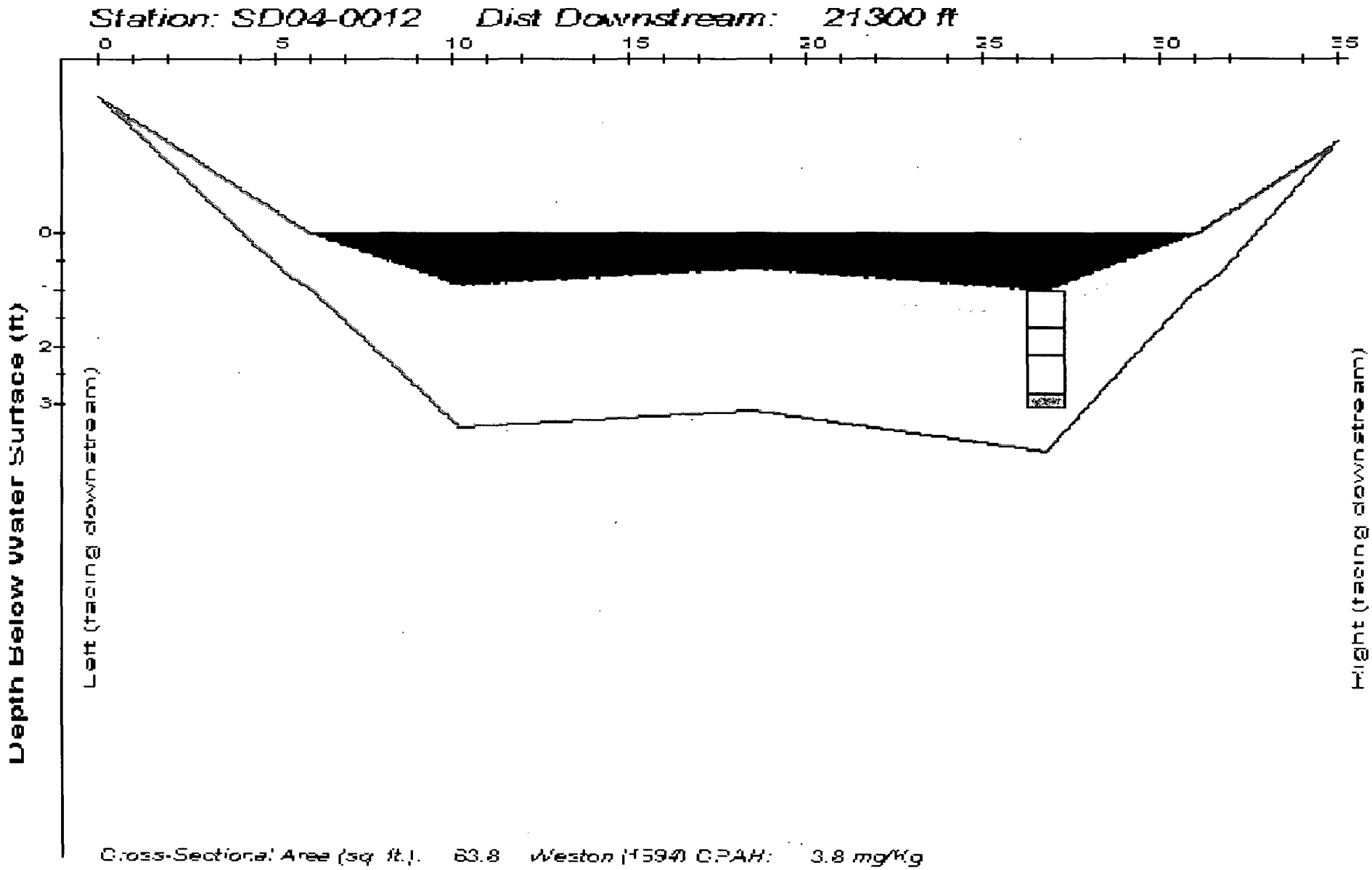

Station: SD04-0014
Dist Downstream: 20700 ft
0
5
10
15
20
25
0
2
Depth Below Water Surface (ft)
Left (facing downstream)
Right (facing downstream)
Cross-Sectional Area (sq. ft.): 28.0
Weston (1994) CPAH: 5.9 mg/Kg

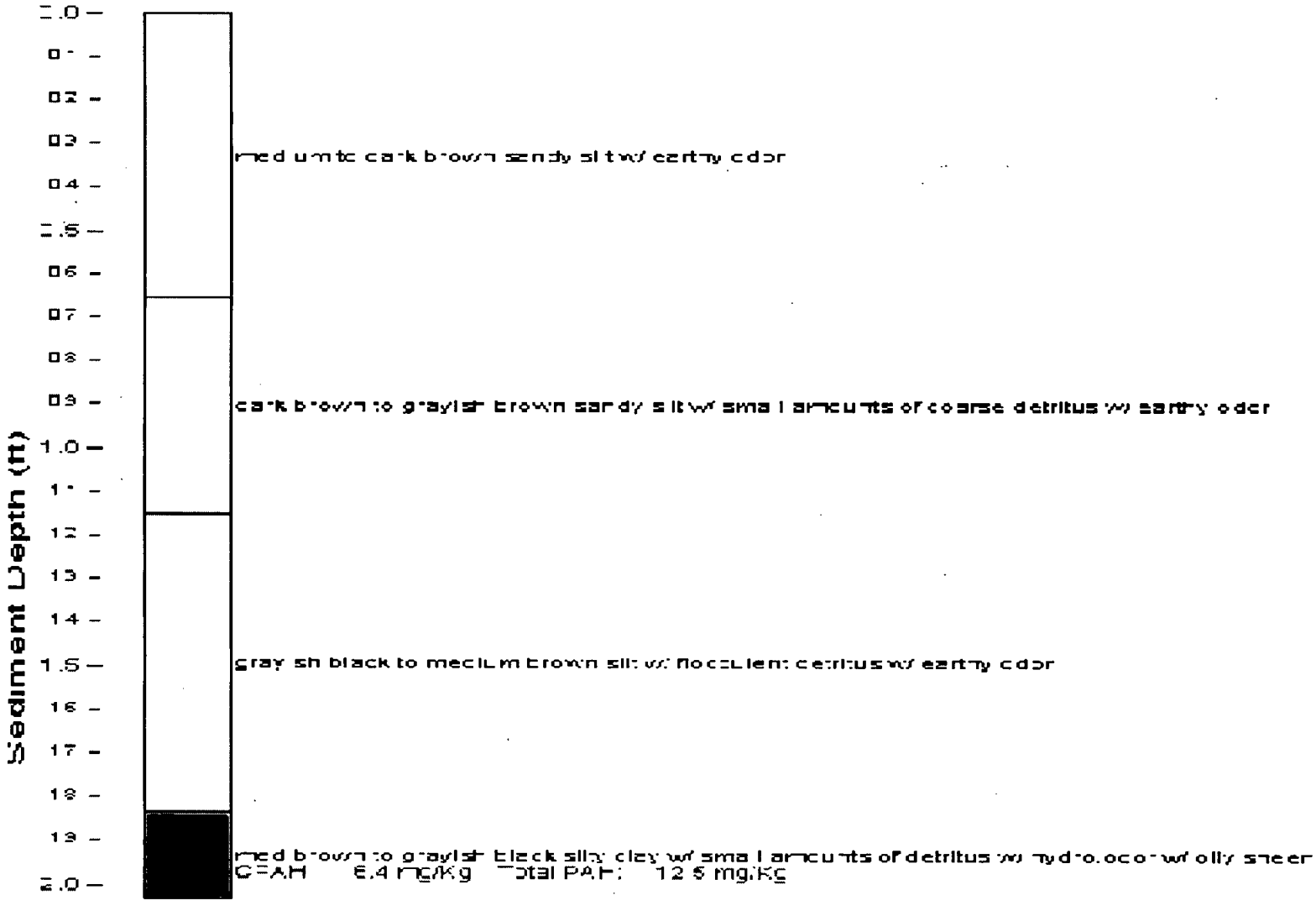

Station: SD04-0014 Dist Downstream: 20700 ft
Sediment Depth (ft)
gray sh black coarse sanc to smal and coarse gravel w/ detritus w/ septic odor
gray sh brown sanc sl t w/ large detritus w/ earthy odor

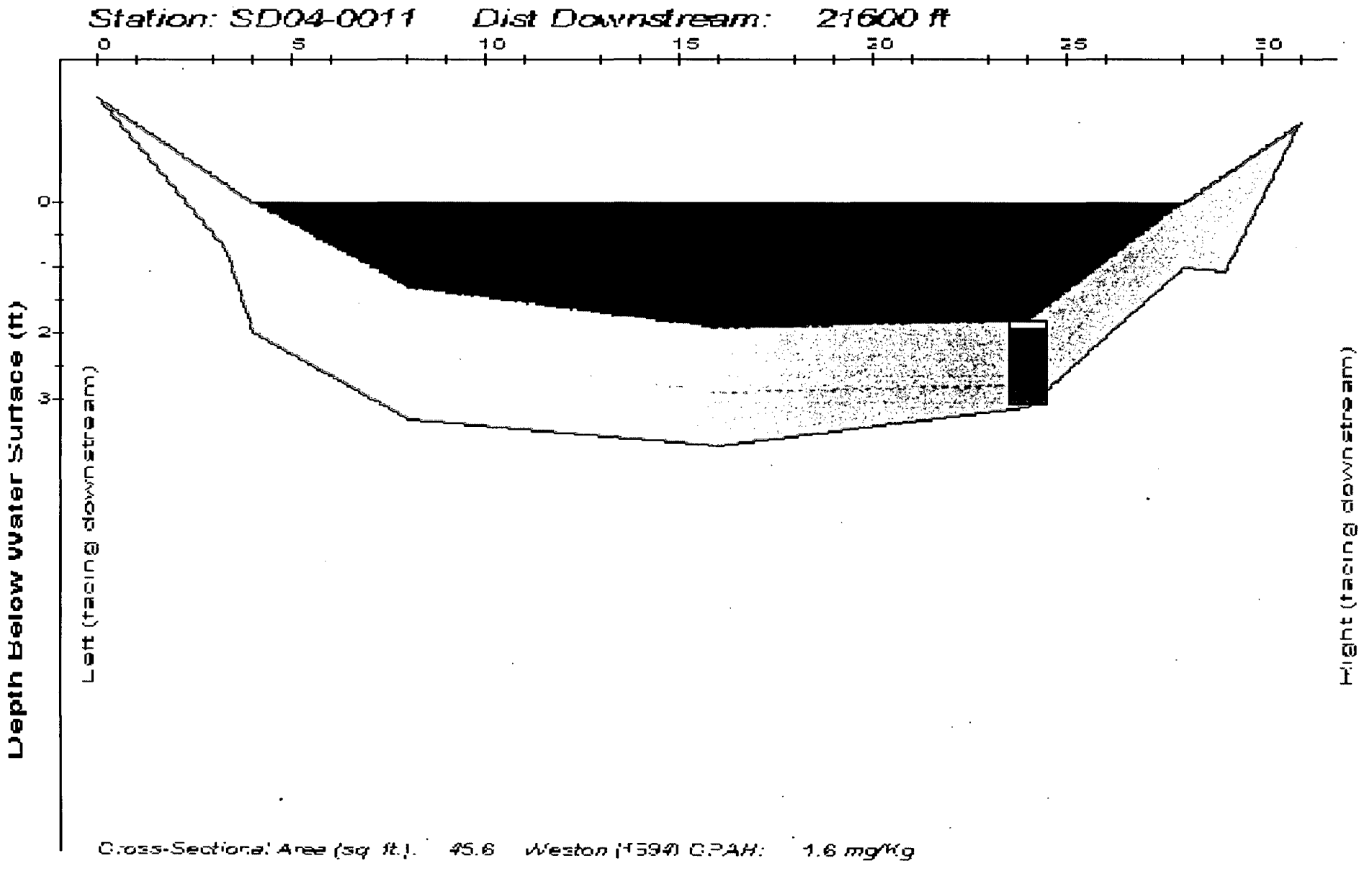

Station: SD04-0013
Dist Downstream: 21000 ft
0
5
10
15
20
25
30
Depth Below Water Surface (ft)
0
2
3
4
Left (facing downstream)
Right (facing downstream)
Cross-Sectional Area (sq. ft.): 48.0
Weston (1994) CPAH: 4.7 mg/Kg

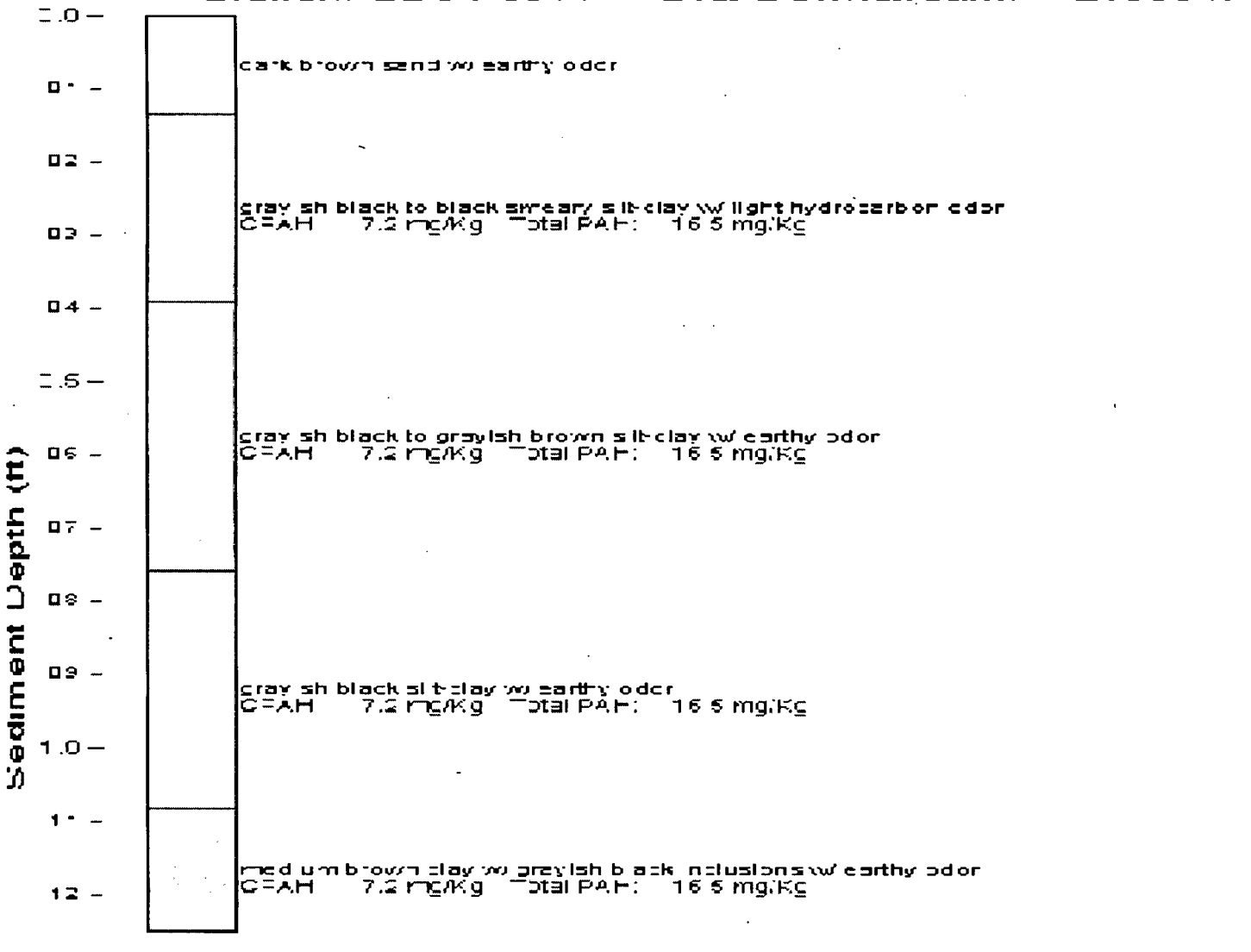
Station: SD04-0013 Dist Downstream: 21000 ft

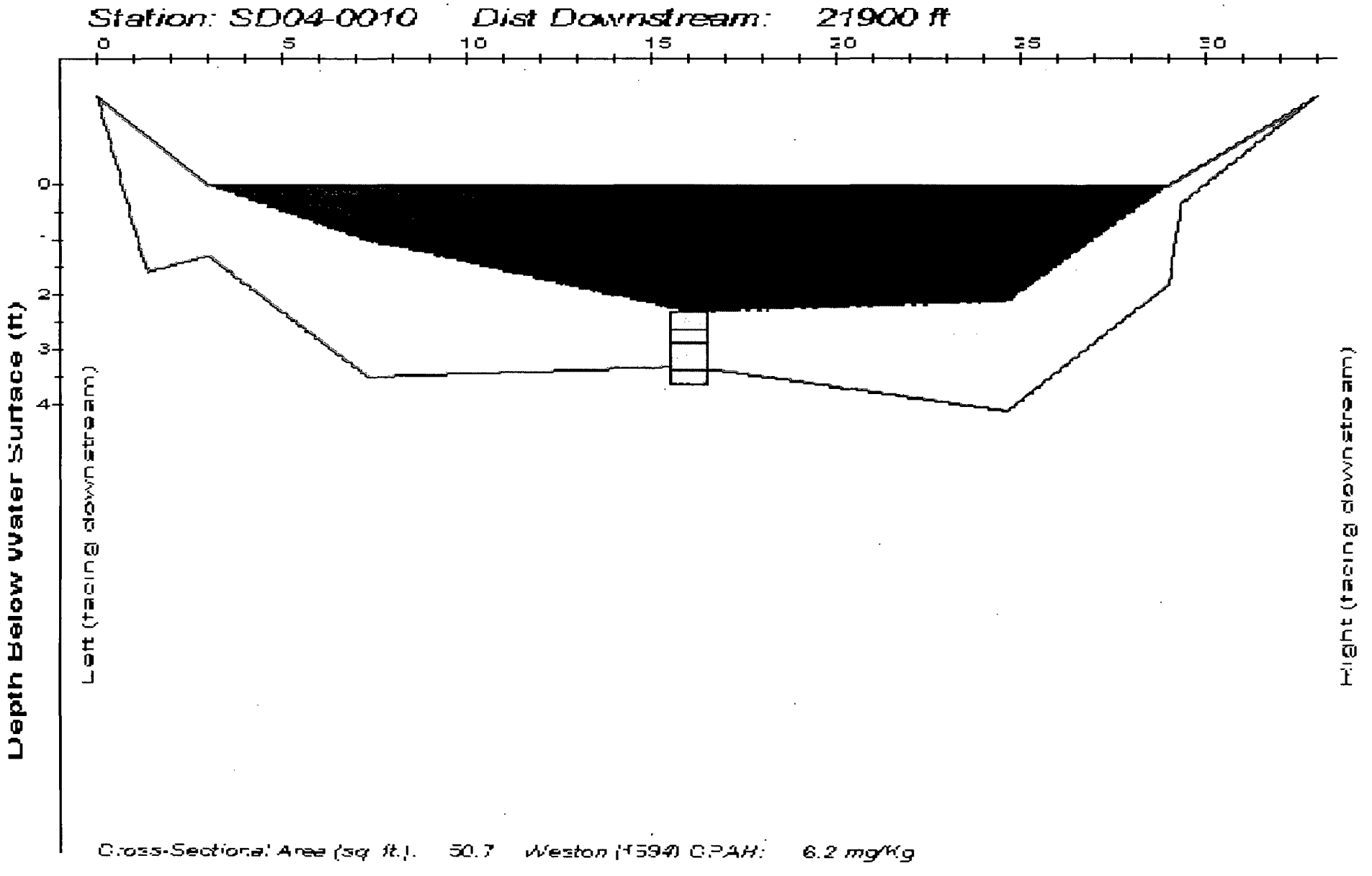


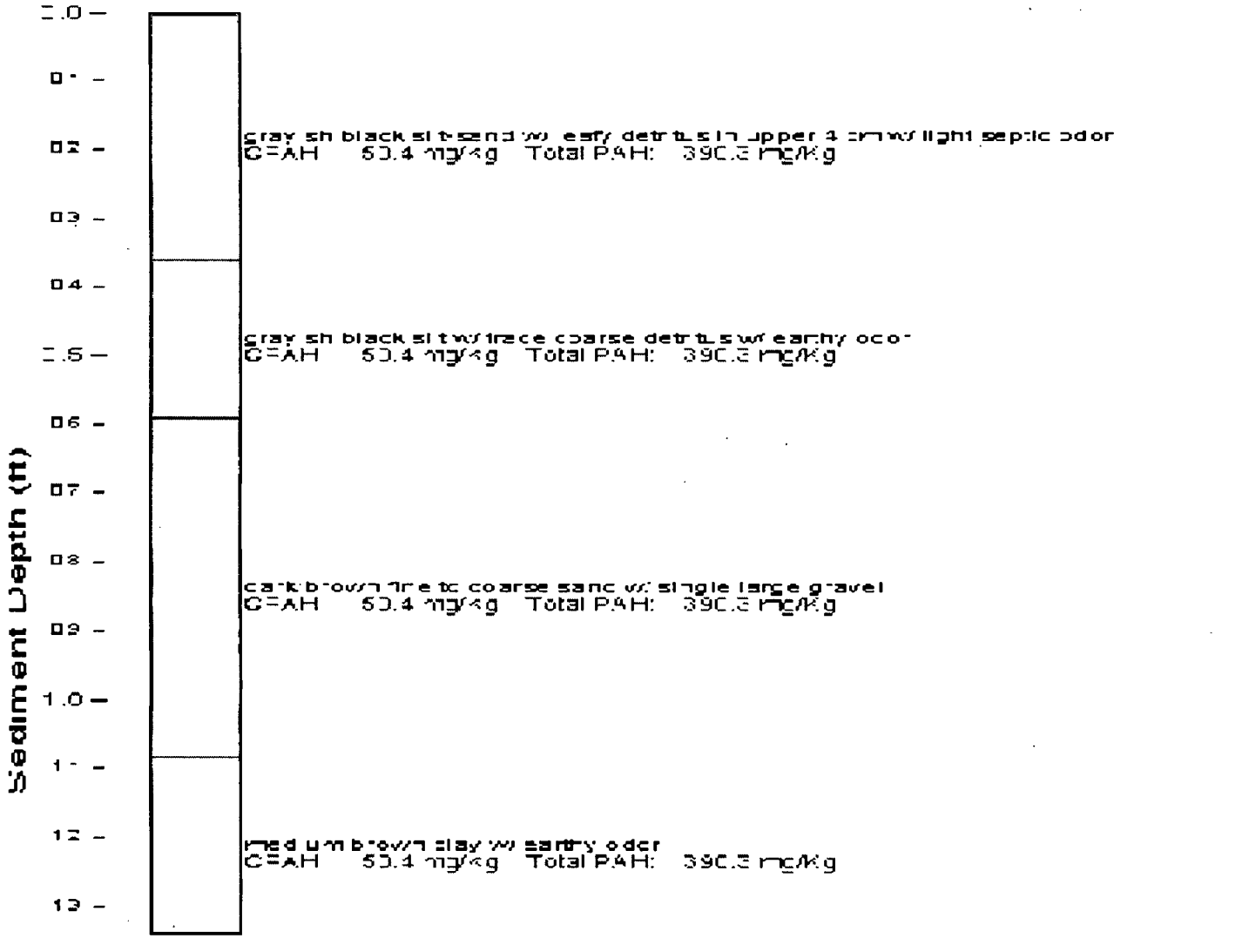

Station: SD04-0012 Dist Downstream: 21300 ft
0
5
10
15
20
25
30
35
0
2
3
Depth Below Water Surface (ft)
Left (facing downstream)
Right (facing downstream)
Cross-Sectional Area (sq. ft.): 63.8 Weston (1994) CPAH: 3.8 mg/Kg

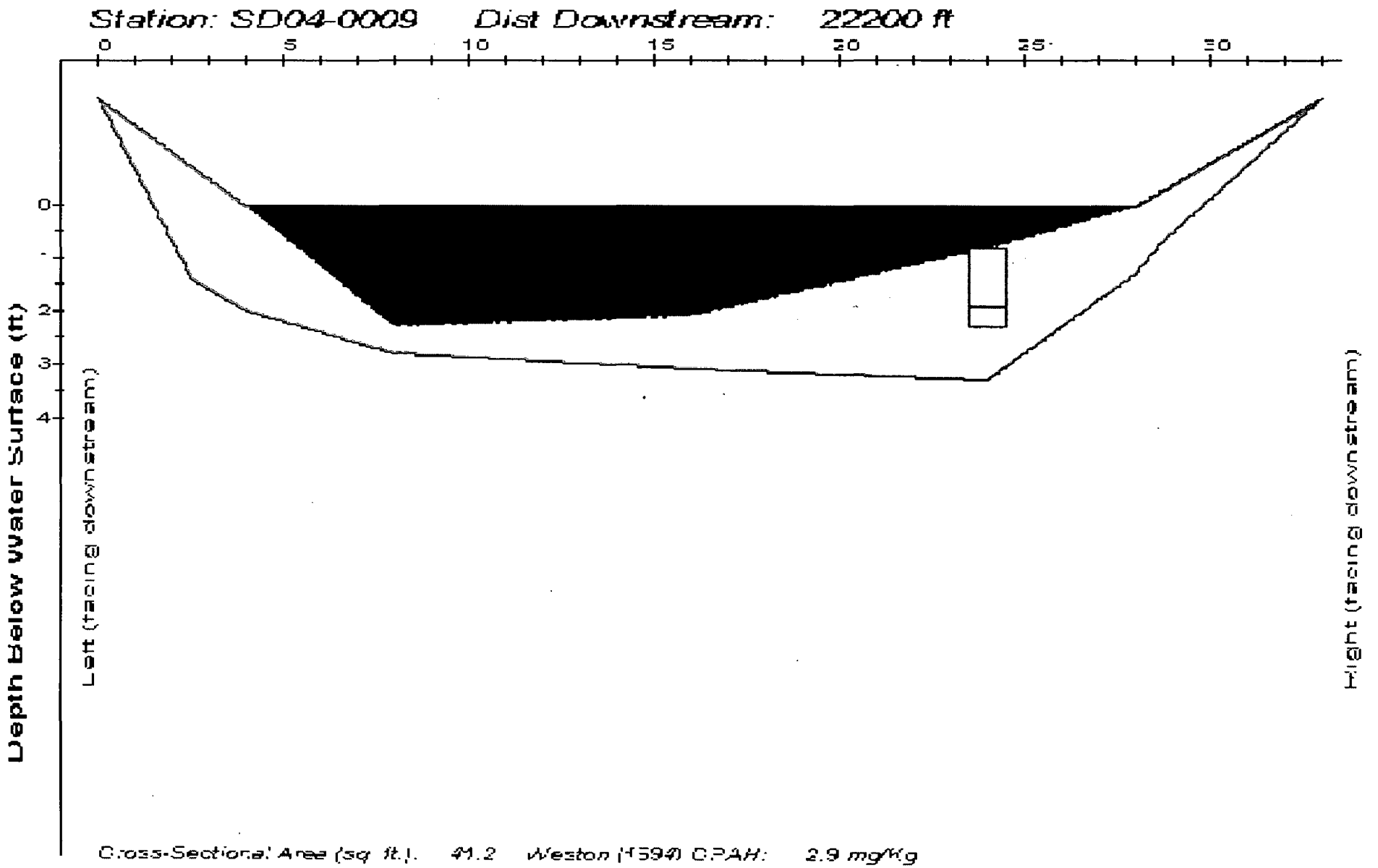

Station: SD04-0012
Dist Downstream: 21300 ft
Sediment Depth (ft)
med brn to dark brown sandy silt w/ earthy odor
dark brown to gray/dk brown sandy silt w/ small amounts of coarse detritus w/ earthy odor
gray sh black to medium brown silt w/ flocculent detritus w/ earthy odor
med brown to gray/dk black silty clay w/ small amounts of detritus w/ hydrocarbon w/ oily sheen
C-PAH 6.4 mg/Kg Total PAH: 12.5 mg/Kg

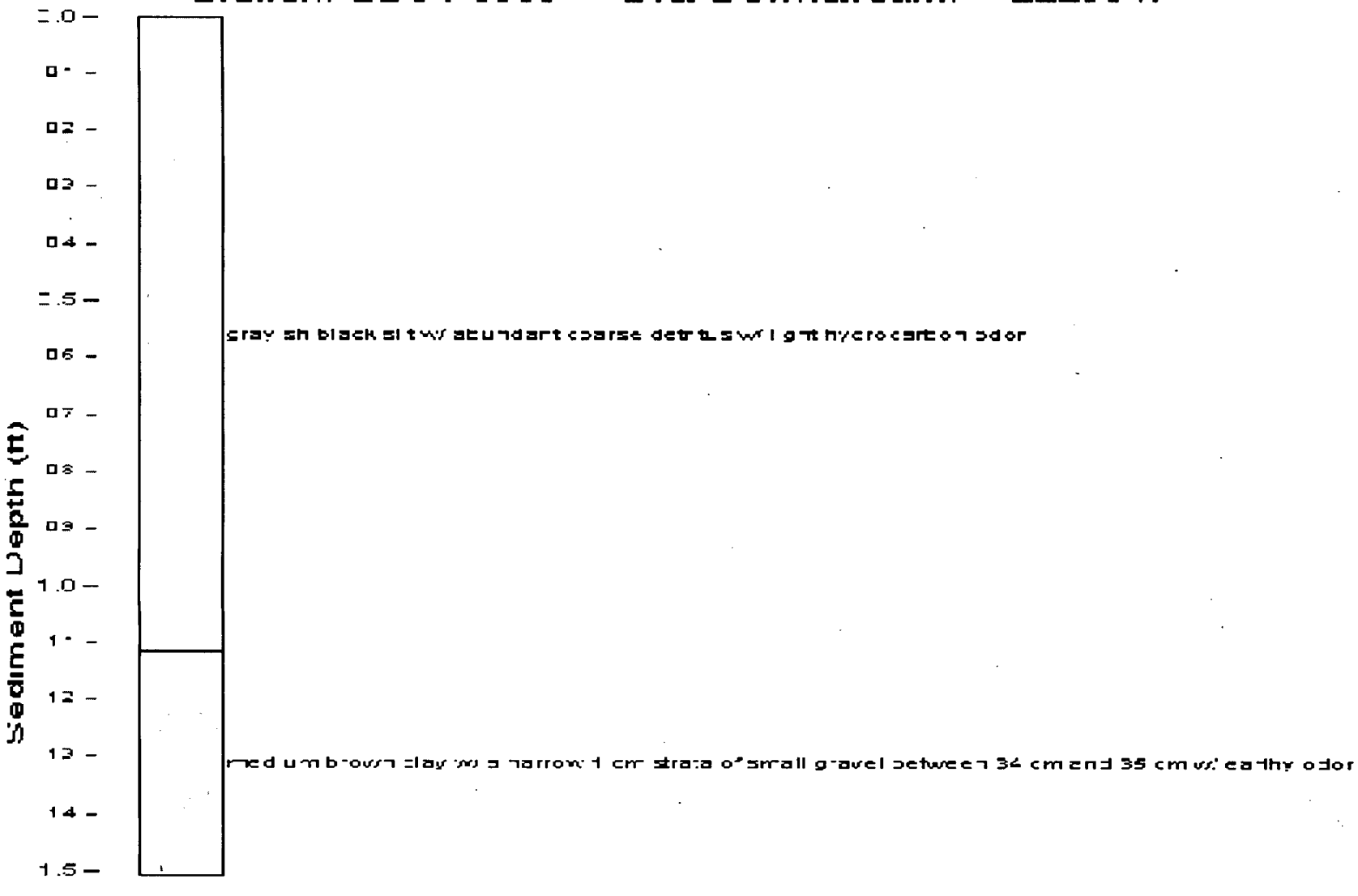

Station: SD04-0011
Dist Downstream: 21600 ft
0
5
10
15
20
25
30
0
2
3
Depth Below Water Surface (ft)
Left (facing downstream)
Right (facing downstream)
Cross-Sectional Area (sq. ft.): 45.6
Weston (1994) CPAH: 1.6 mg/kg

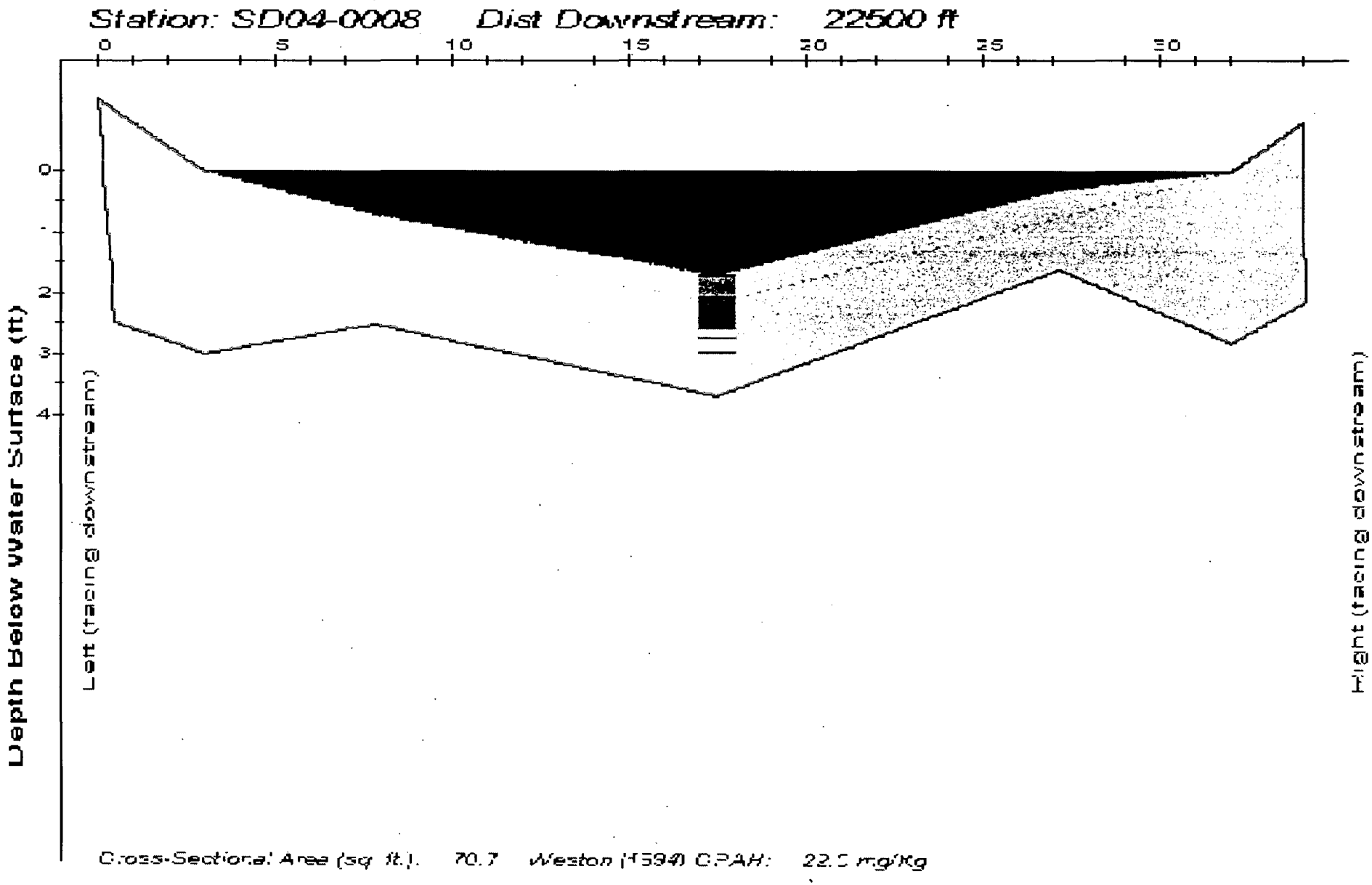

Station: SD04-0011 Dist Downstream: 21600 ft
Sediment Depth (ft)
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
1.1
1.2
dark brown sand w/ earthy odor
gray sh black to black shreary silt-clay w/ light hydrocarbon odor
CPAH 7.2 mg/Kg Total PAH: 16.5 mg/Kg
gray sh black to grayish brown silt-clay w/ earthy odor
CPAH 7.2 mg/Kg Total PAH: 16.5 mg/Kg
gray sh black silt-clay w/ earthy odor
CPAH 7.2 mg/Kg Total PAH: 16.5 mg/Kg
med brn brown clay w/ grayish black inclusions w/ earthy odor
CPAH 7.2 mg/Kg Total PAH: 16.5 mg/Kg


Station: SD04-0010 Dist Downstream: 21900 ft
0
5
10
15
20
25
30
0
2
3
4
Depth Below Water Surface (ft)
Left (facing downstream)
Right (facing downstream)
Cross-Sectional Area (sq. ft.): 50.7 Weston (1994) CPAH: 6.2 mg/Kg

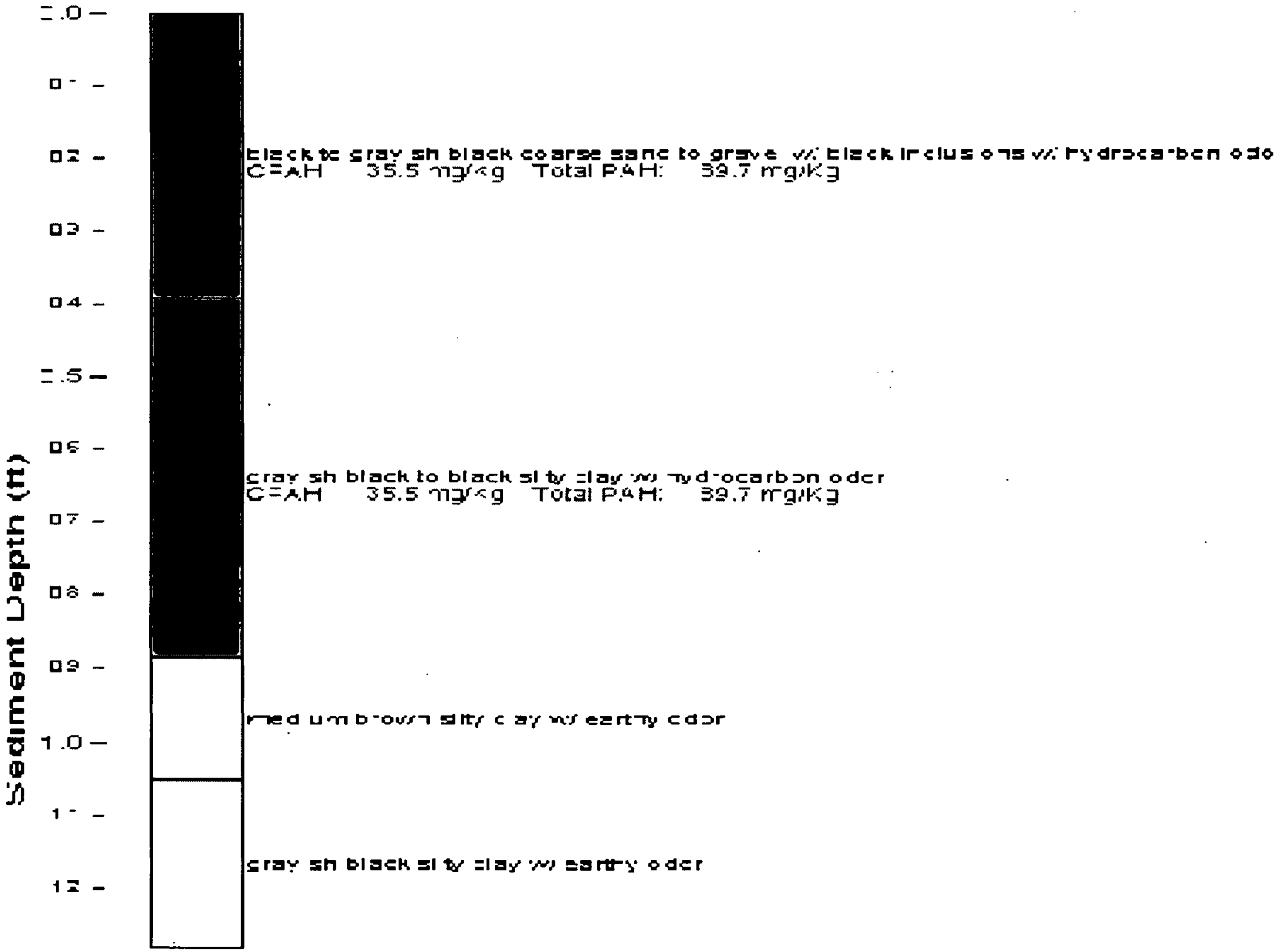

Station: SD04-0010 Dist Downstream: 21900 ft
Sediment Depth (ft)
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
1.1
1.2
1.3
gray sh black silt-sand w/ earthy detritus in upper 4 cm w/ slight septic odor
C-PAH 50.4 mg/Kg Total PAH: 390.3 mg/Kg
gray sh black silt w/ trace coarse detritus w/ earthy odor
C-PAH 50.4 mg/Kg Total PAH: 390.3 mg/Kg
dark brown fine to coarse sand w/ single large gravel
C-PAH 50.4 mg/Kg Total PAH: 390.3 mg/Kg
med gray brown clay w/ earthy odor
C-PAH 50.4 mg/Kg Total PAH: 390.3 mg/Kg

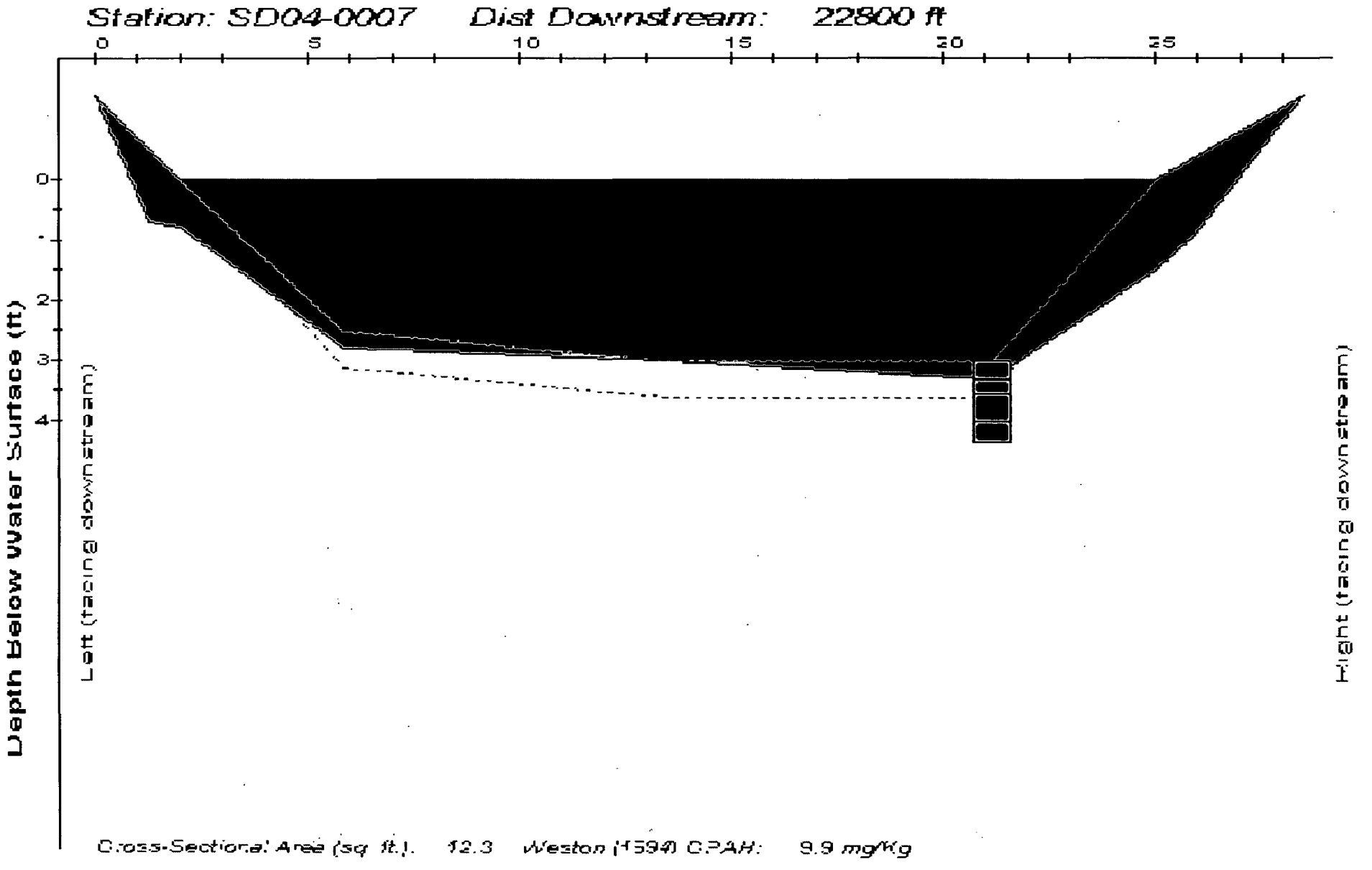

Station: SD04-0009 Dist Downstream: 22200 ft
0
5
10
15
20
25
30
0
2
3
4
Depth Below Water Surface (ft)
Left (facing downstream)
Right (facing downstream)
Cross-Sectional Area (sq. ft.): 41.2 Weston (1994) CPAH: 2.9 mg/Kg

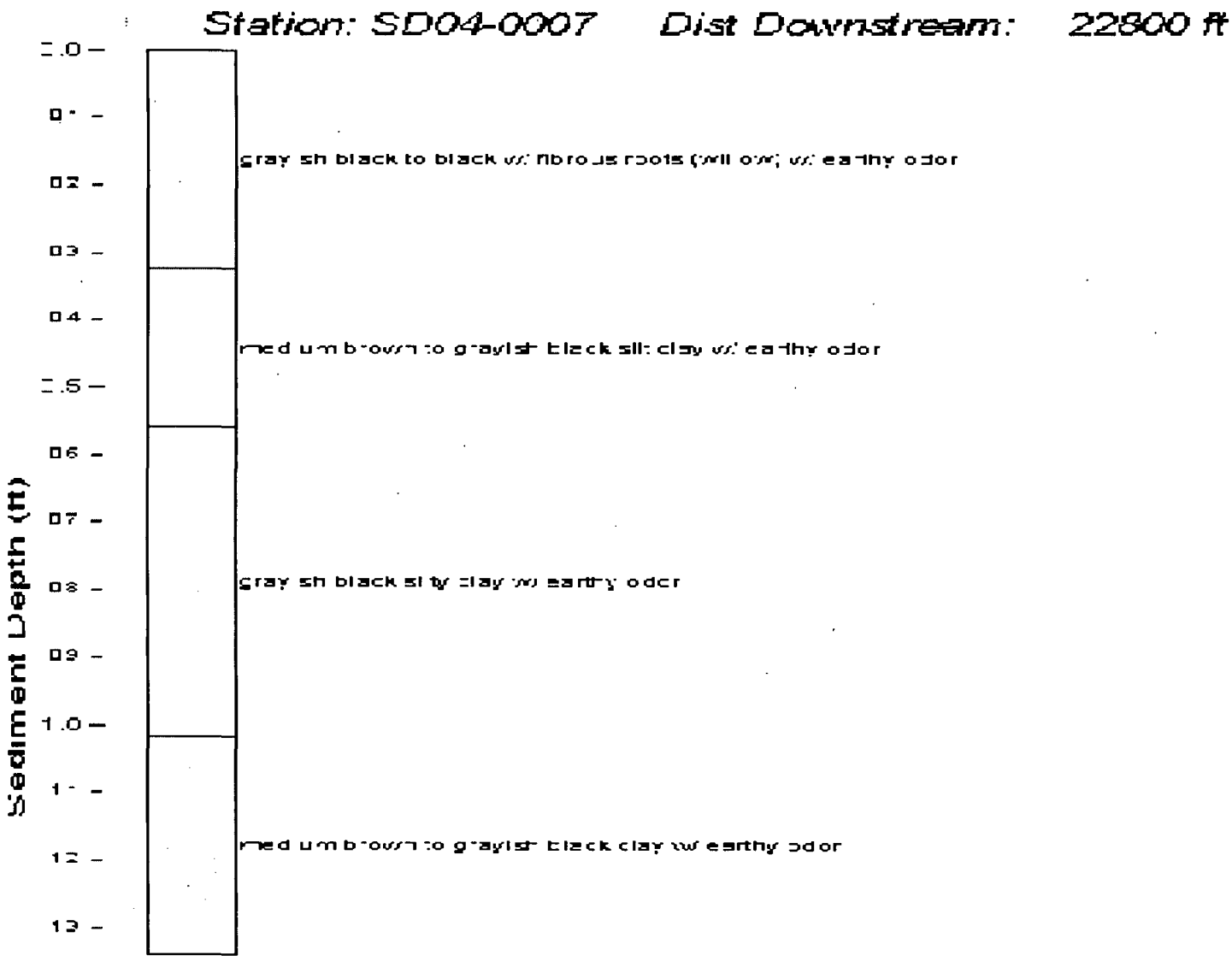

Station: SD04-0009
Dist Downstream: 22200 ft
Sediment Depth (ft)
0.0
0.5
1.0
1.5
gray sh black silt w/ abundant coarse detritus w/ light hydrocarbon odor
medium brown clay w/ a narrow 1 cm strata of small gravel between 34 cm and 35 cm w/ earthy odor

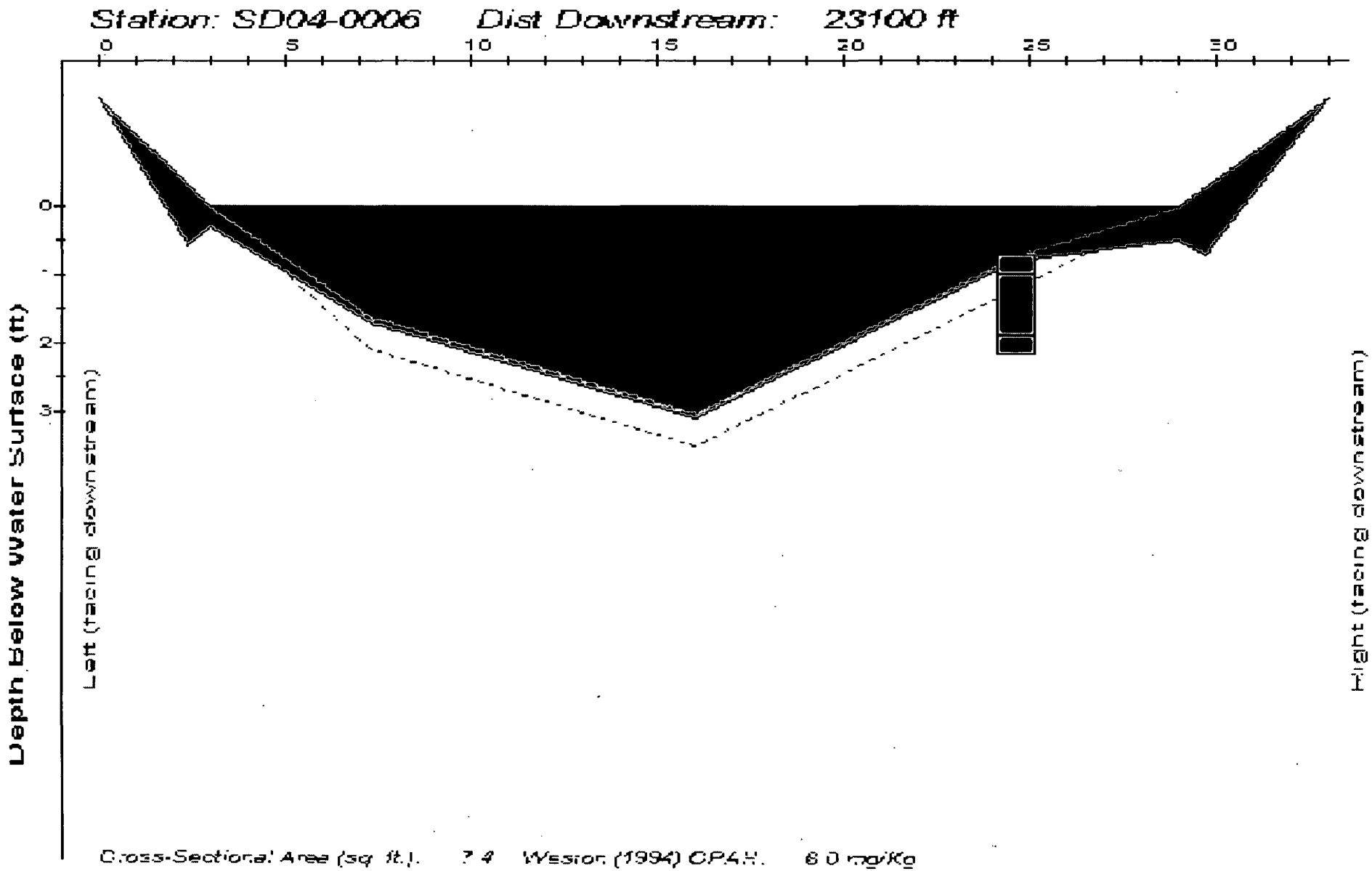

Station: SD04-0008 Dist Downstream: 22500 ft
0
5
10
15
20
25
30
0
2
3
4
Depth Below Water Surface (ft)
Left (facing downstream)
Right (facing downstream)
Cross-Sectional Area (sq. ft.): 70.7 Weston (1994) CPAH: 22.5 mg/Kg

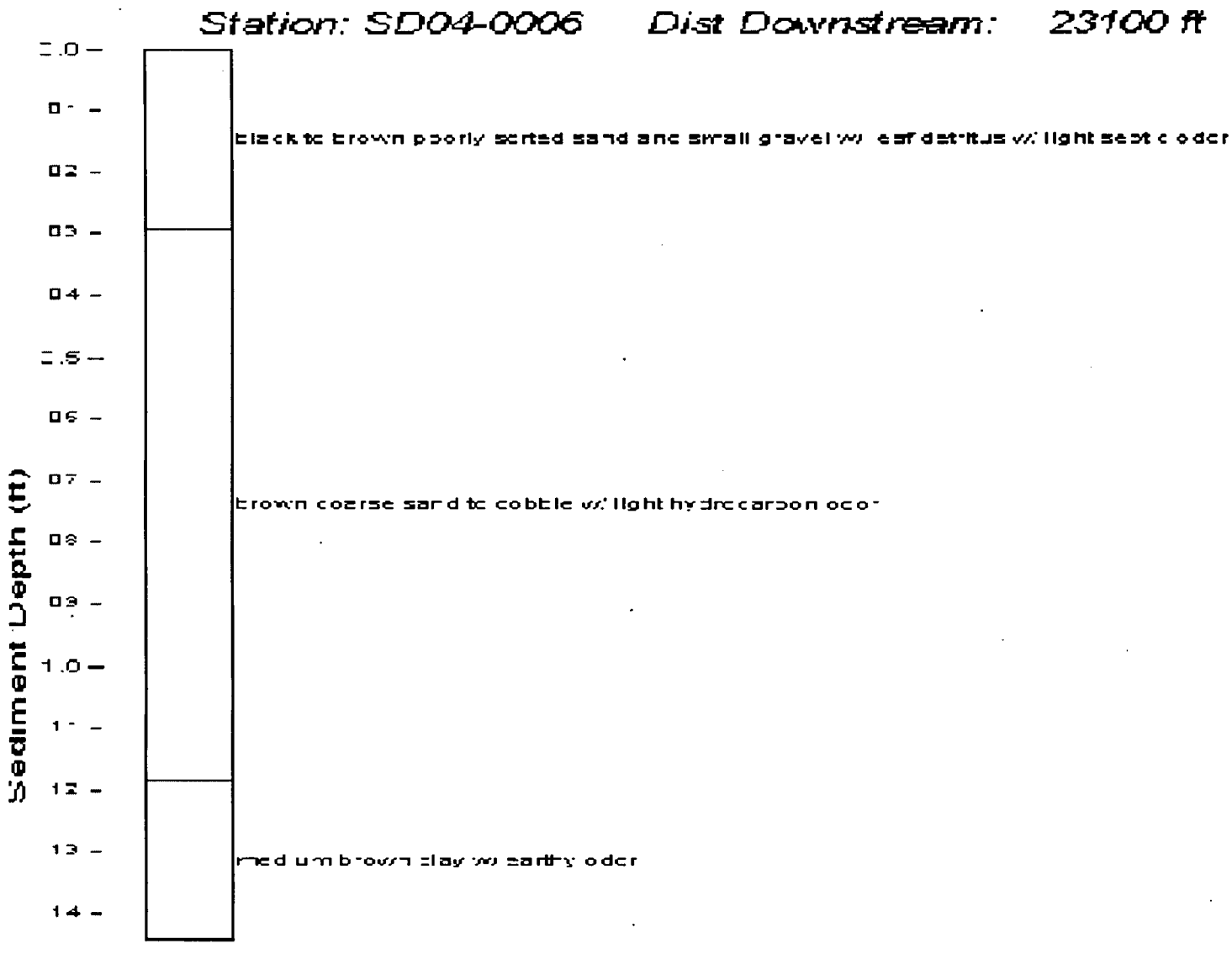
Station: SD04-0008   Dist Downstream: 22500 ft

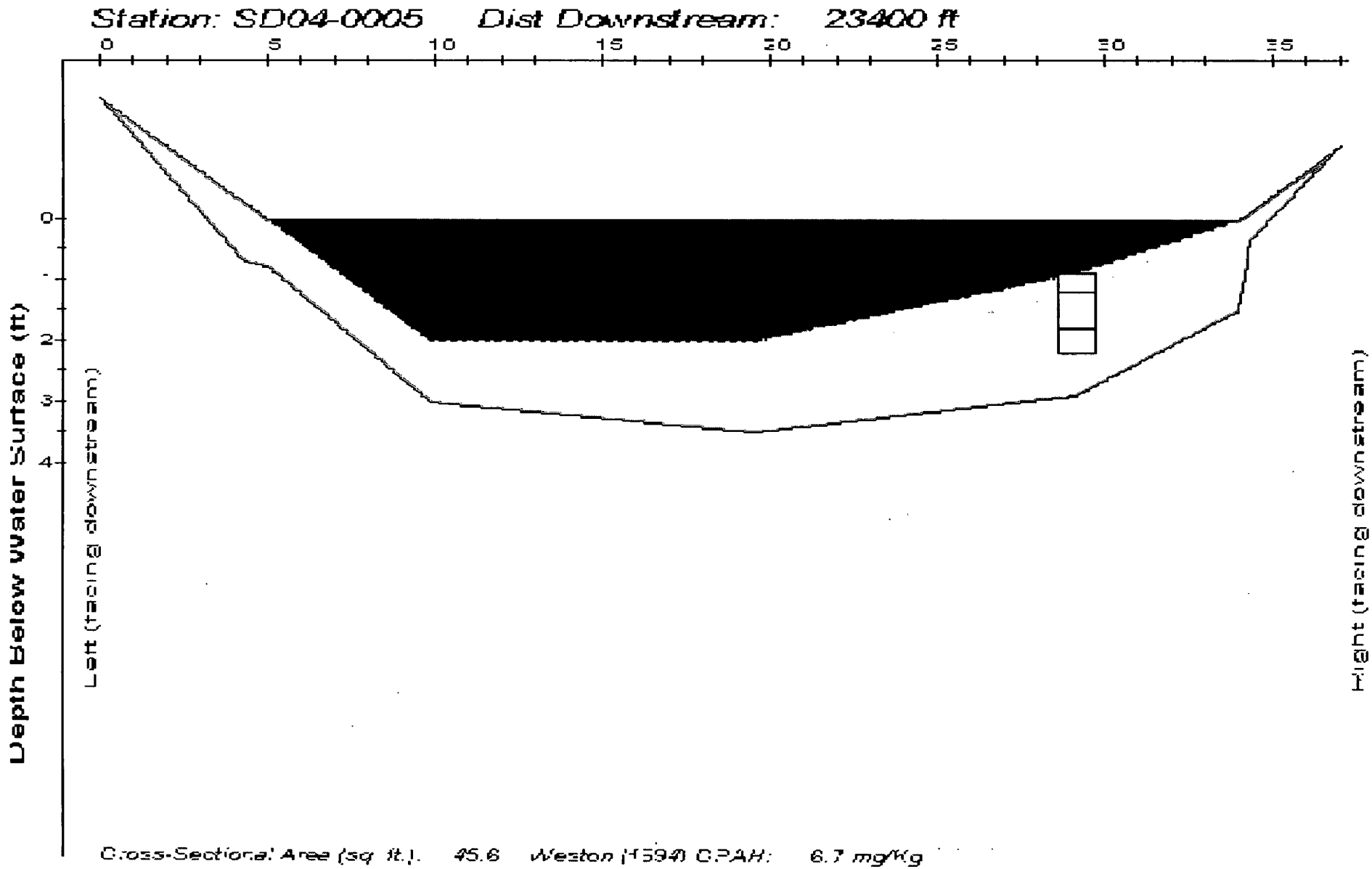


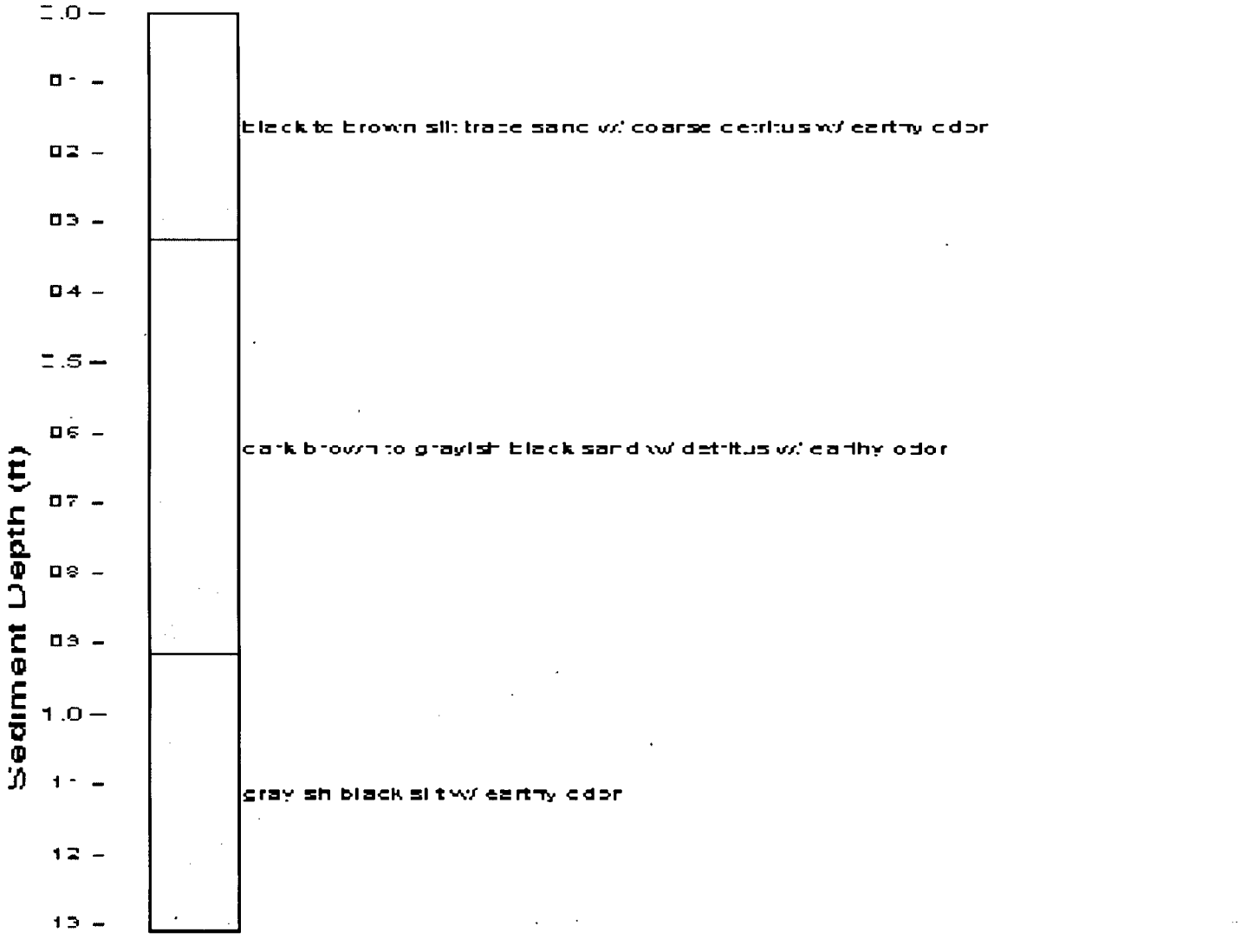

Station: SD04-0007 Dist Downstream: 22800 ft
0
5
10
15
20
25
0
2
3
4
Depth Below Water Surface (ft)
Left (facing downstream)
Right (facing downstream)
Cross-Sectional Area (sq. ft.): 12.3 Weston (1994) CPAH: 9.9 mg/kg

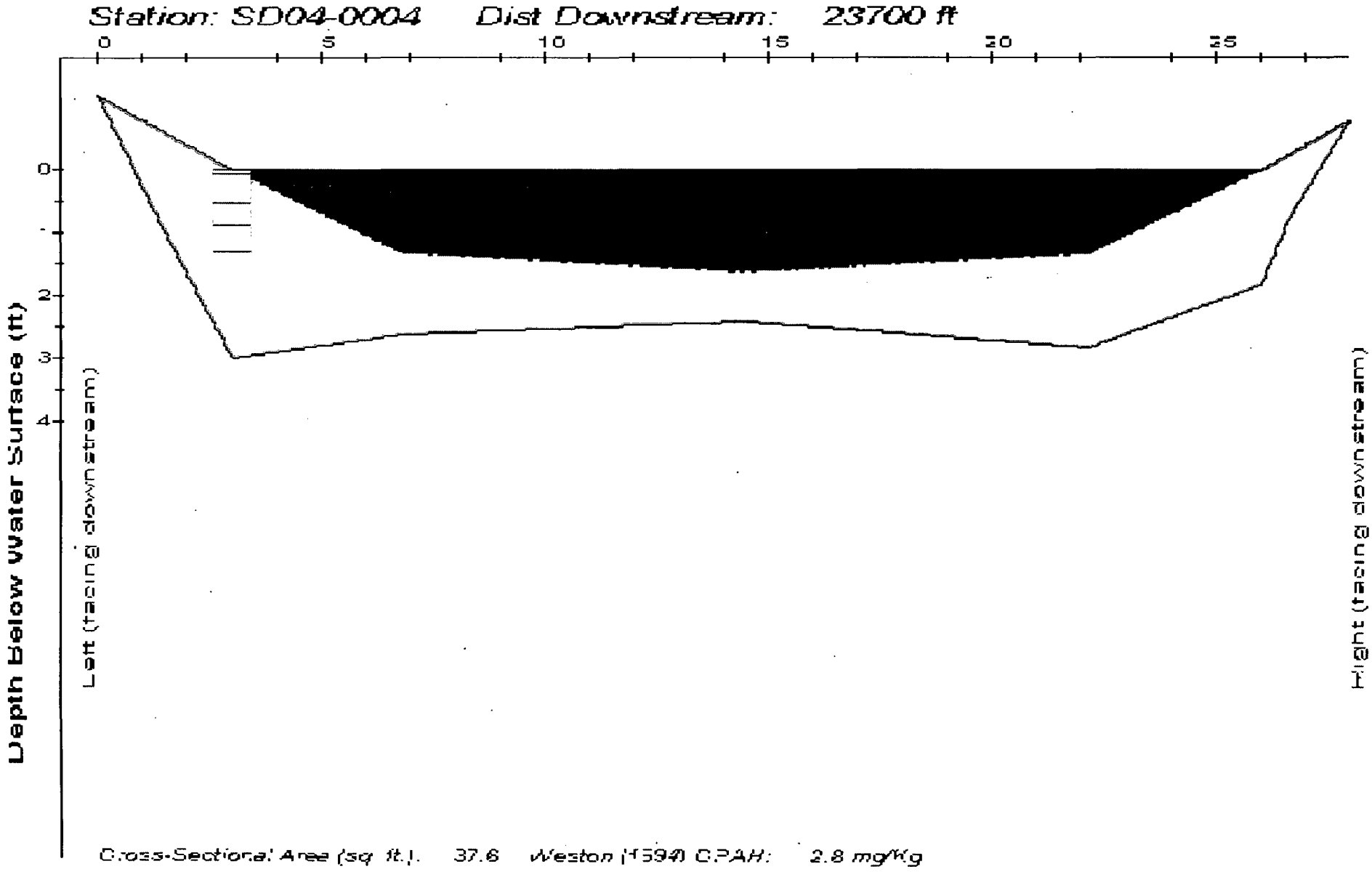

Station: SD04-0007 Dist Downstream: 22800 ft
Sediment Depth (ft)
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
1.1
1.2
1.3
gray sh black to black w/ fibrous roots (willow); w/ earthy odor
med um brown to grayish black silt clay w/ earthy odor
gray sh black silty clay w/ earthy odor
med um brown to grayish black clay w/ earthy odor


Station: SD04-0006 Dist Downstream: 23100 ft
0
5
10
15
20
25
30
0
2
3
Depth Below Water Surface (ft)
Left (facing downstream)
Right (facing downstream)
Cross-Sectional Area (sq. ft.). 7 4 Wesion (1994) CPAH. 6 0 mg/Kg

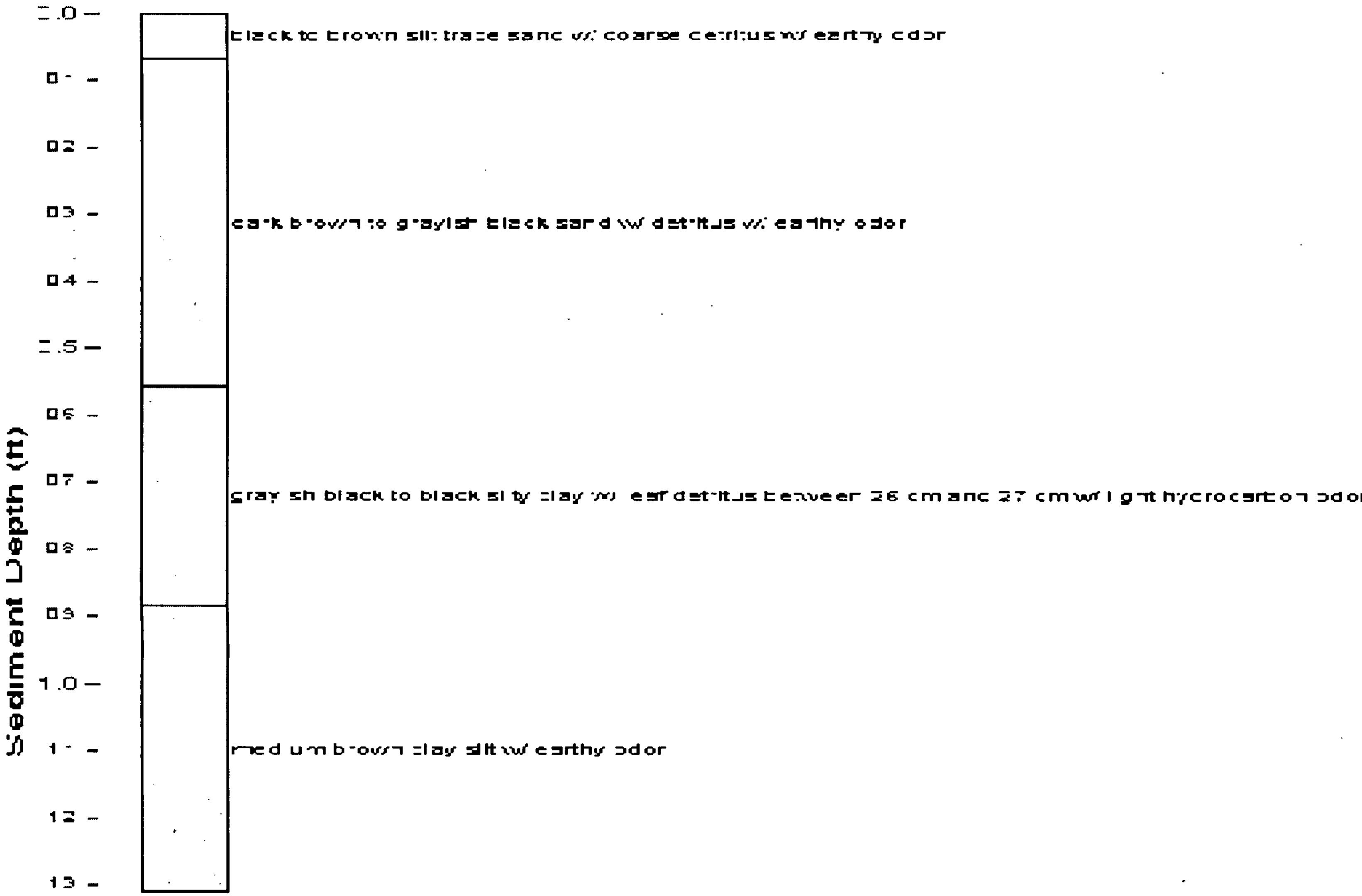

Station: SD04-0006
Dist Downstream: 23100 ft
Sediment Depth (ft)
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5
5.0
5.5
6.0
6.5
7.0
7.5
8.0
8.5
9.0
9.5
10.0
10.5
11.0
11.5
12.0
12.5
13.0
13.5
14.0
black to brown poorly sorted sand and small gravel w/ detritus w/ light sept c odor
brown coarse sand to cobble w/ light hydrocarbon odor
medium brown clay w/ earthy odor

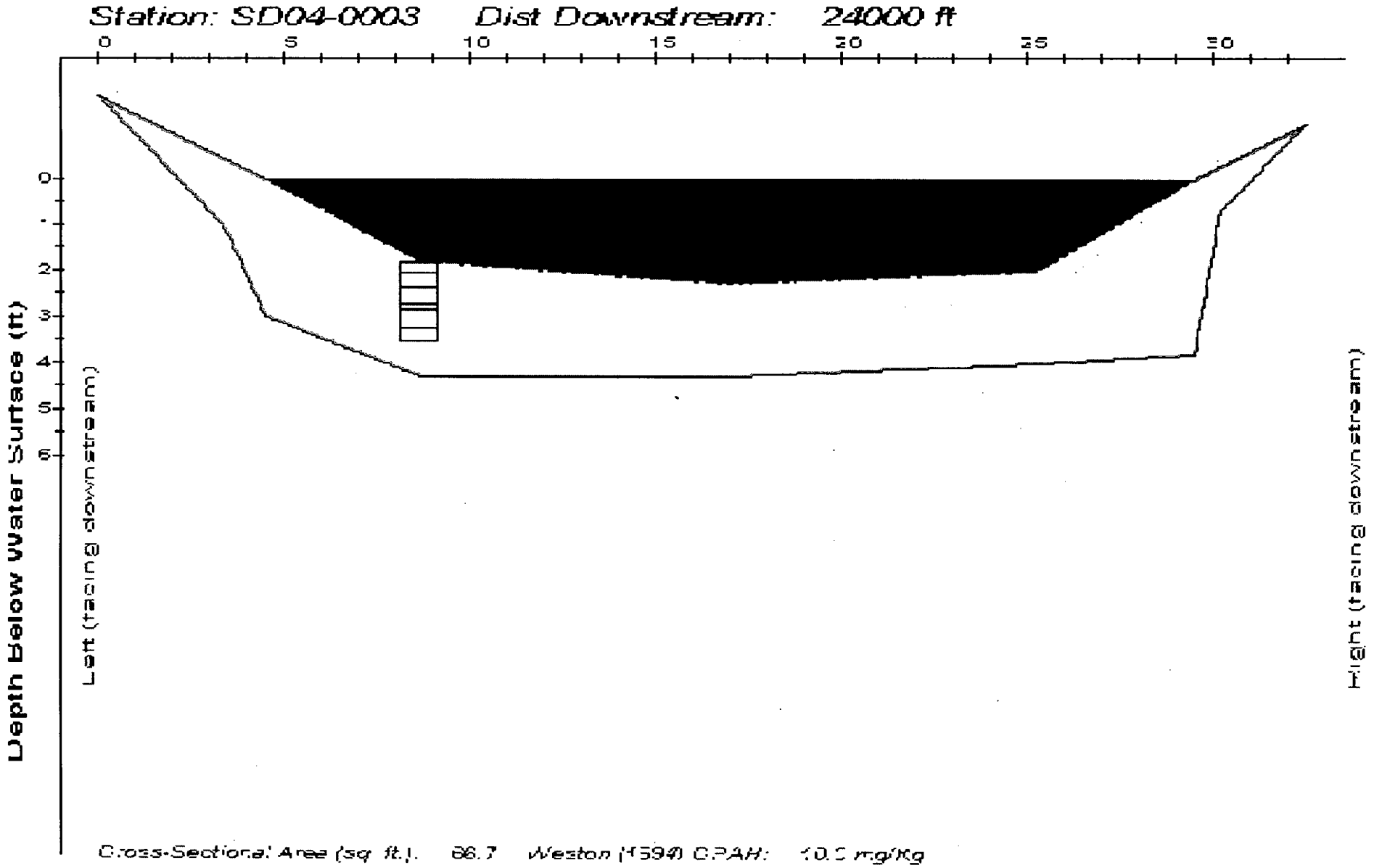

Station: SD04-0005 Dist Downstream: 23400 ft
0
5
10
15
20
25
30
35
0
2
3
4
Depth Below Water Surface (ft)
Left (facing downstream)
Right (facing downstream)
Cross-Sectional Area (sq. ft.): 45.6 Weston (1994) CPAH: 6.7 mg/Kg


Station: SD04-0005
Dist Downstream: 23400 ft
Sediment Depth (ft)
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
1.1
1.2
1.3
black to brown silt trace sand w/ coarse detritus w/ earthy odor
dark brown to grayish black sand w/ detritus w/ earthy odor
gray sh black silt w/ earthy odor

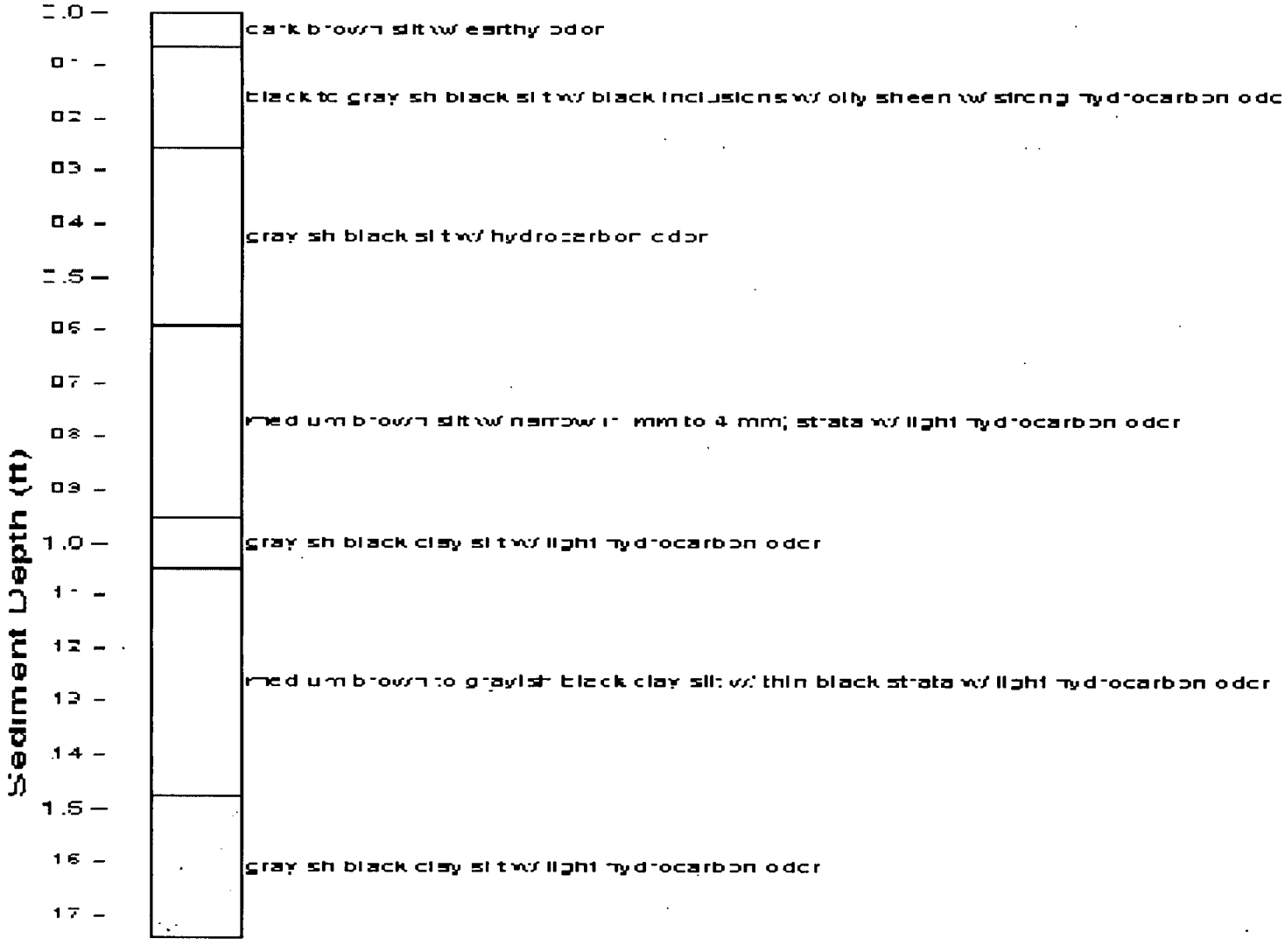

Station: SD04-0004
Dist Downstream: 23700 ft
0
5
10
15
20
25
0
2
3
4
Depth Below Water Surface (ft)
Left (facing downstream)
Right (facing downstream)
Cross-Sectional Area (sq. ft.): 37.6
Weston (1994) CPAH: 2.8 mg/kg

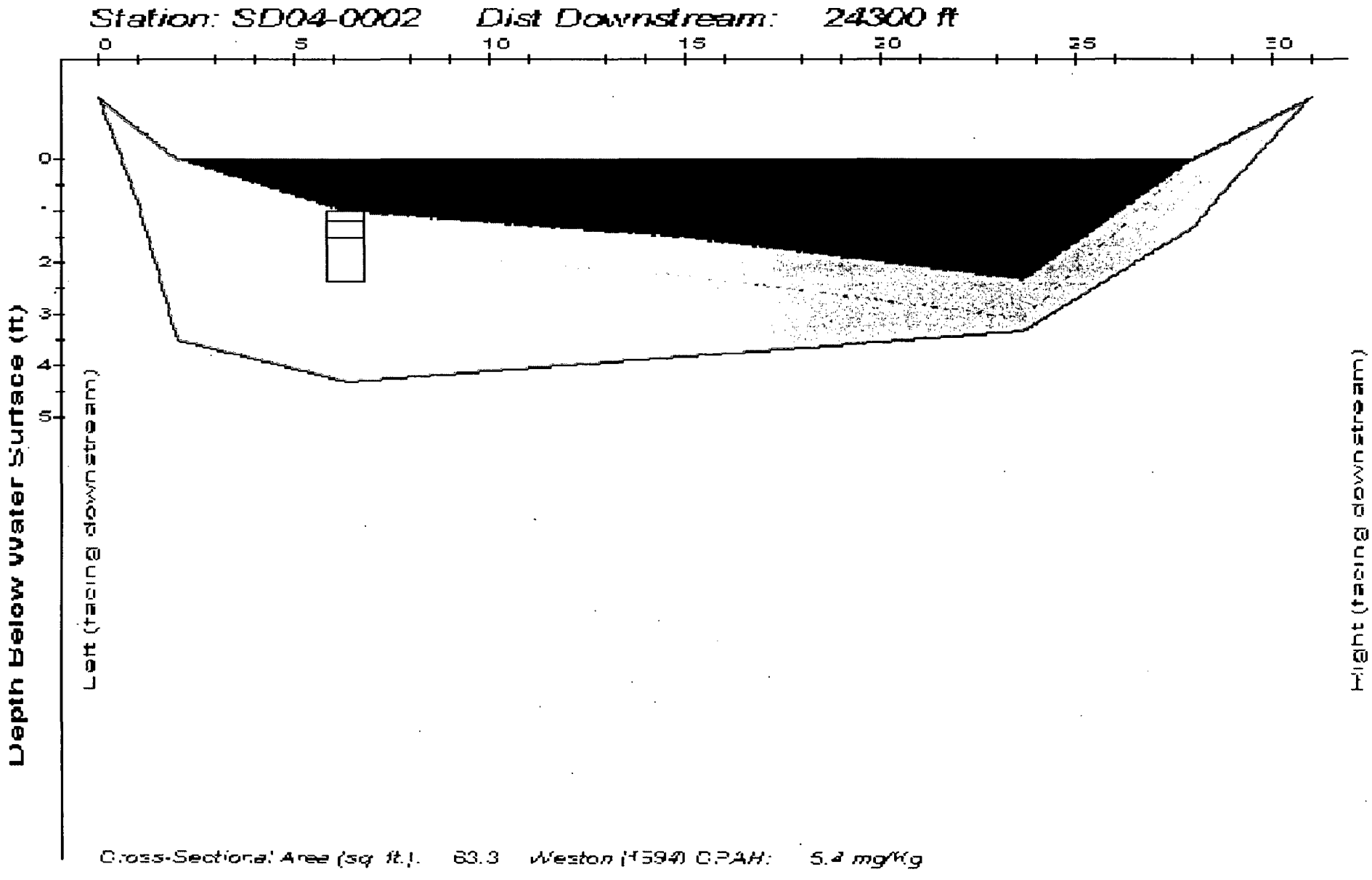
Station: SD04-0004   Dist Downstream: 23700 ft

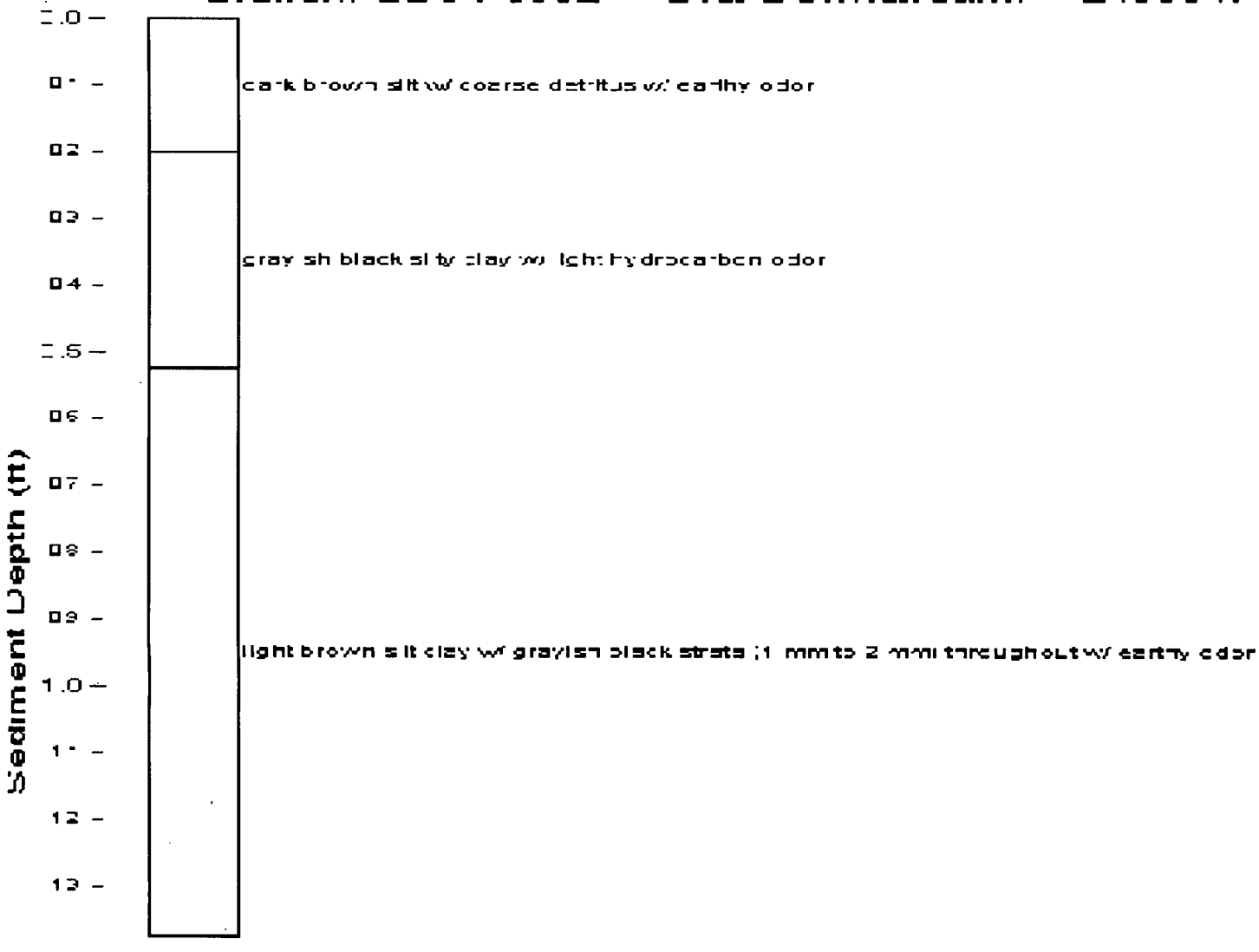


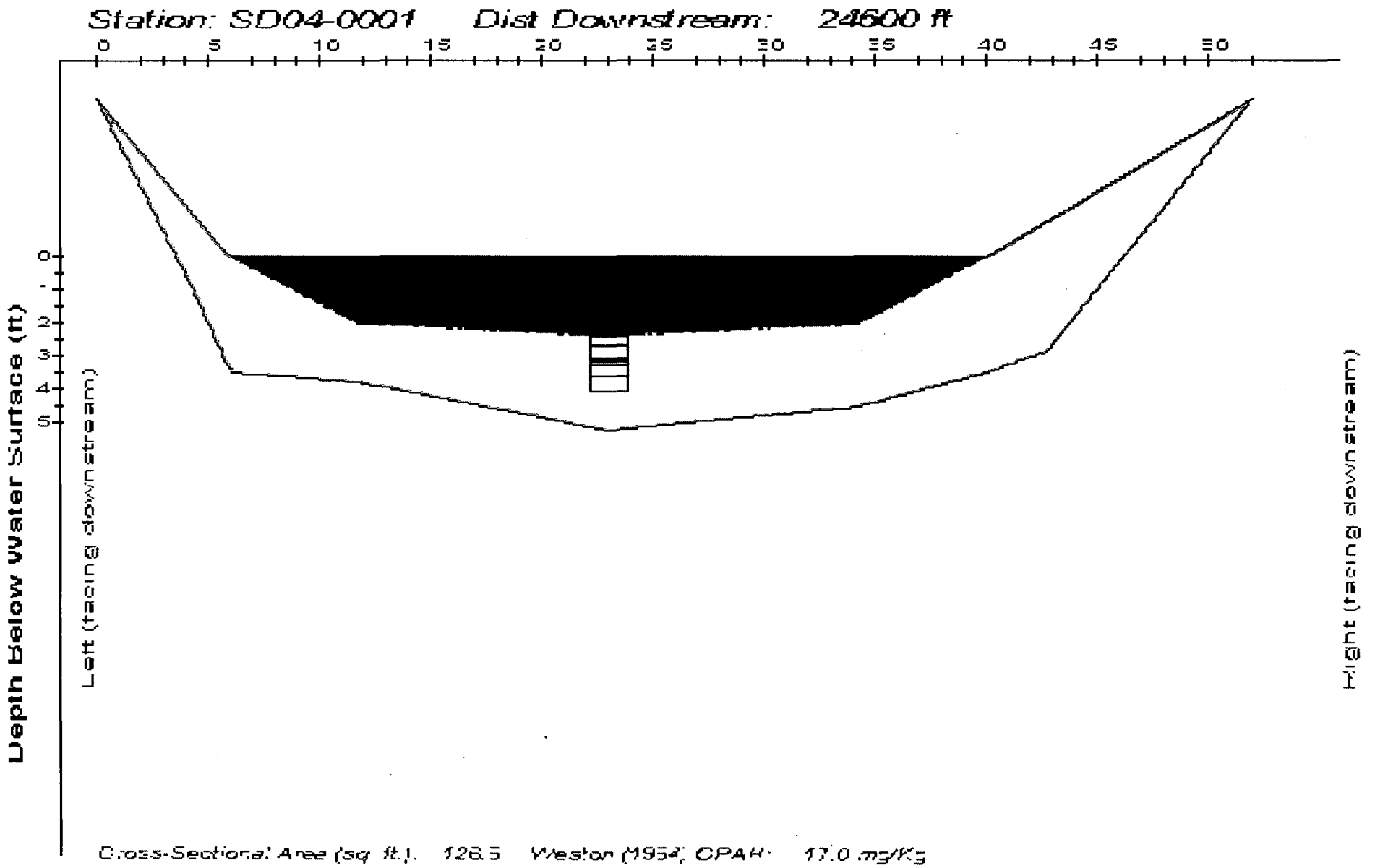

Station: SD04-0003 Dist Downstream: 24000 ft
0
5
10
15
20
25
30
0
2
3
4
5
6
Depth Below Water Surface (ft)
Left (facing downstream)
Right (facing downstream)
Cross-Sectional Area (sq. ft.): 86.7 Weston (1994) CPAH: 10.0 mg/Kg

Station: SD04-0003 Dist Downstream: 24000 ft

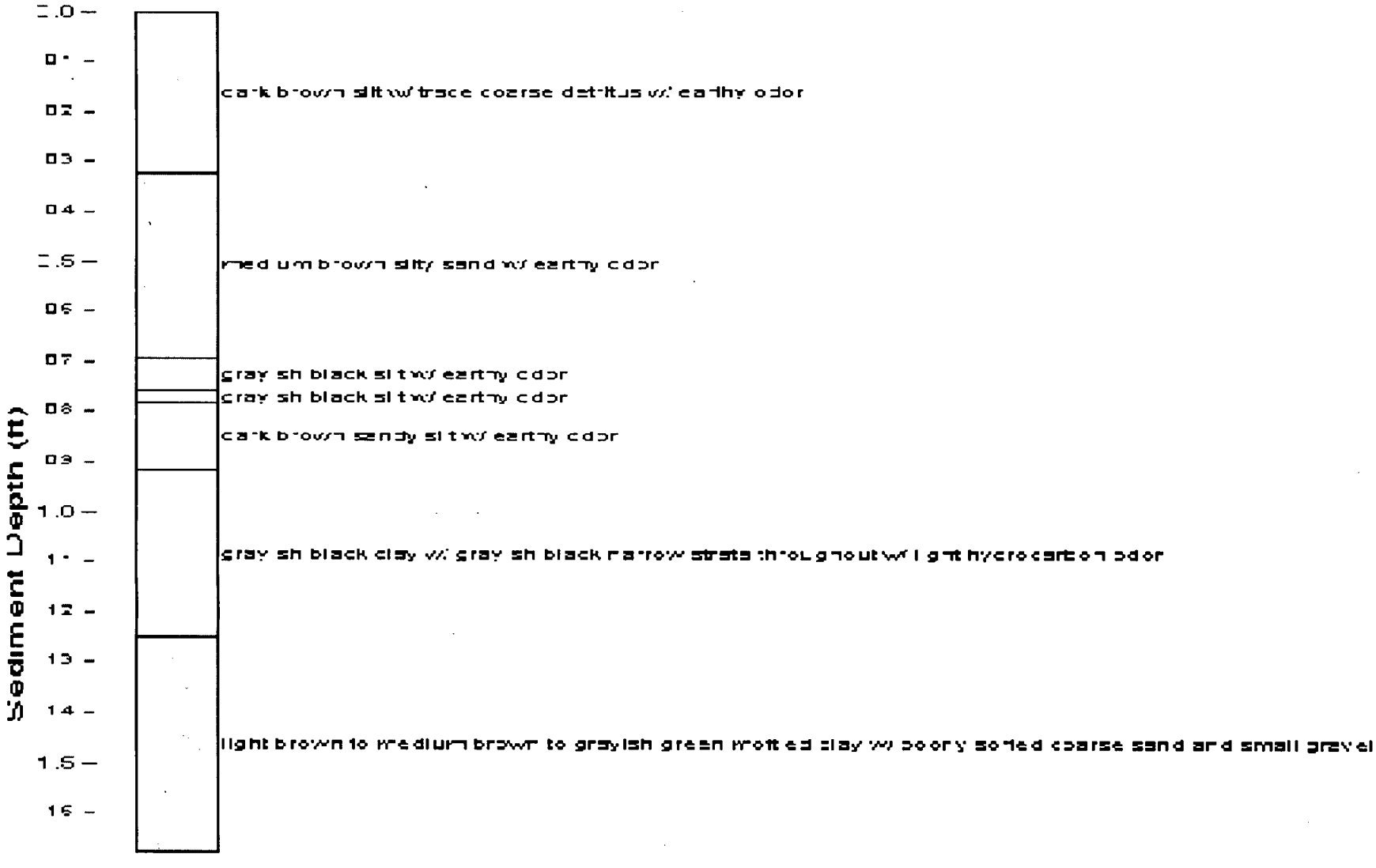


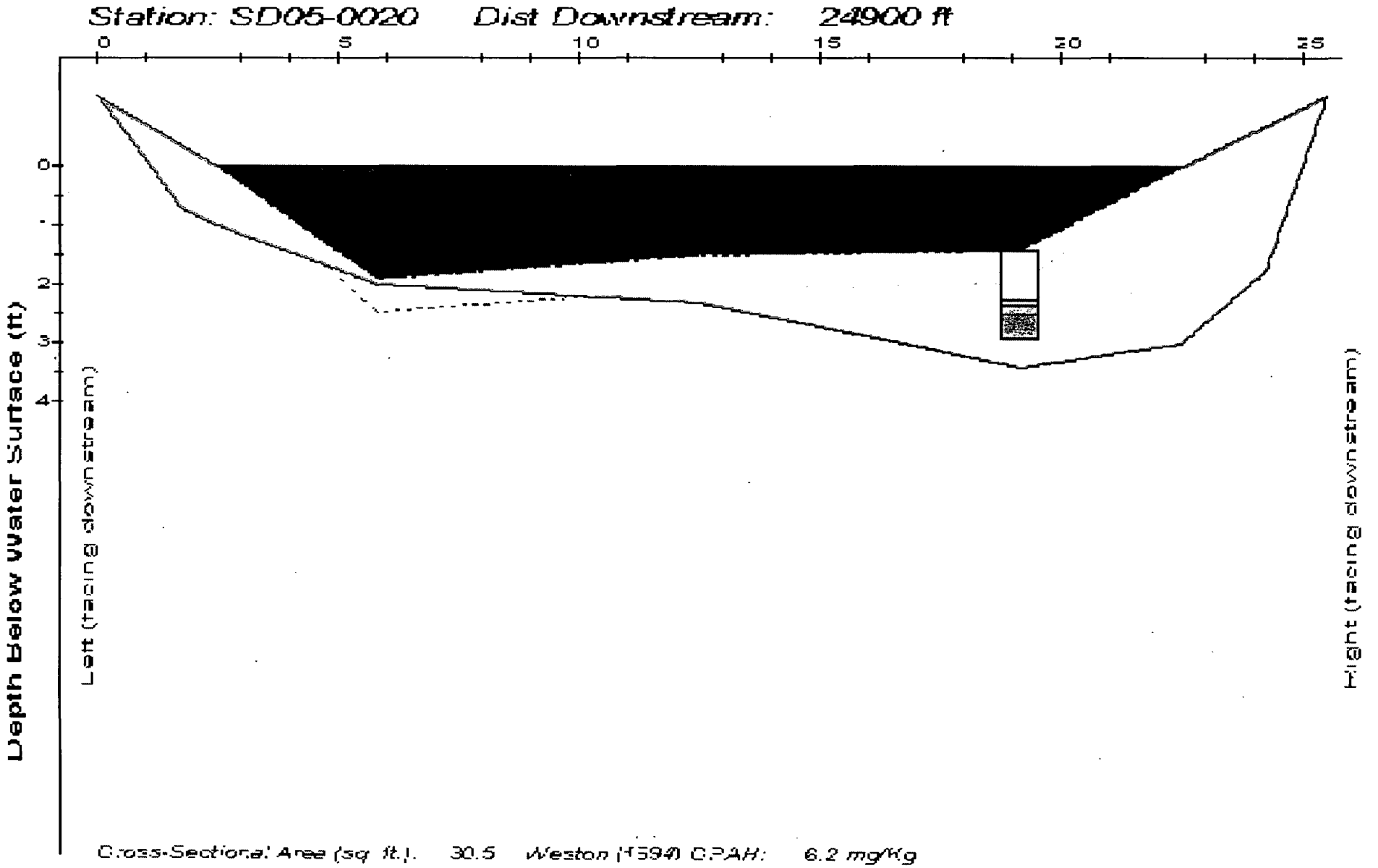

Station: SD04-0002
Dist Downstream: 24300 ft
0
5
10
15
20
25
30
0
1
2
3
4
5
Depth Below Water Surface (ft)
Left (facing downstream)
Right (facing downstream)
Cross-Sectional Area (sq. ft.): 83.3
Weston (1994) CPAH: 5.4 mg/Kg

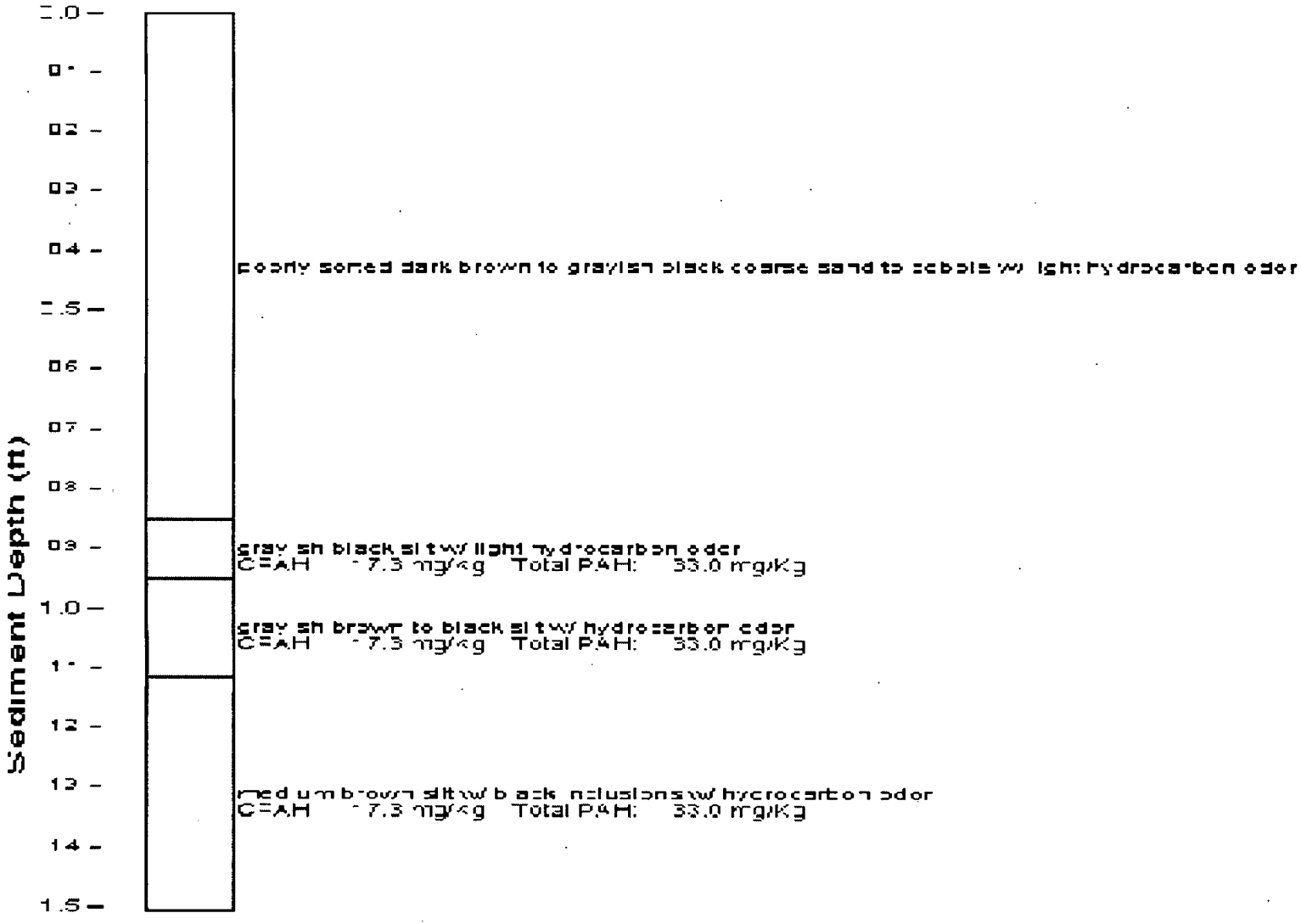

Station: SD04-0002 Dist Downstream: 24300 ft
Sediment Depth (ft)
0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5
5.0
5.5
dark brown silt w/ coarse detritus w/ earthy odor
gray sh black silty clay w/ light hydrocarbon odor
light brown silt clay w/ grayish black strata (1 mm to 2 mm) throughout w/ earthy odor

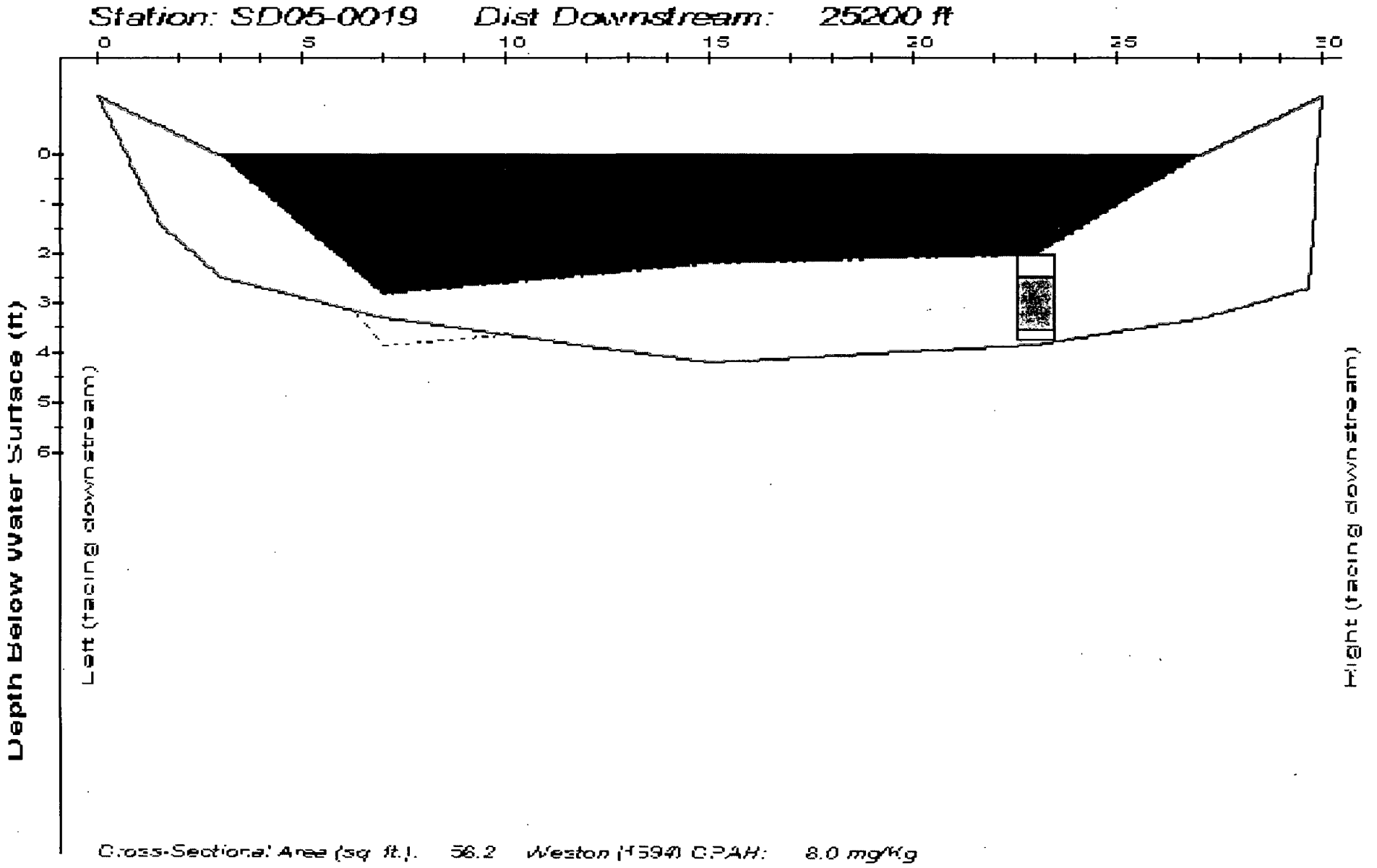

Station: SD04-0001 Dist Downstream: 24600 ft
0
5
10
15
20
25
30
35
40
45
50
0
2
3
4
5
Depth Below Water Surface (ft)
Left (facing downstream)
Right (facing downstream)
Cross-Sectional Area (sq. ft.): 128.5 Weston (1954) CPAH: 17.0 mg/Kg

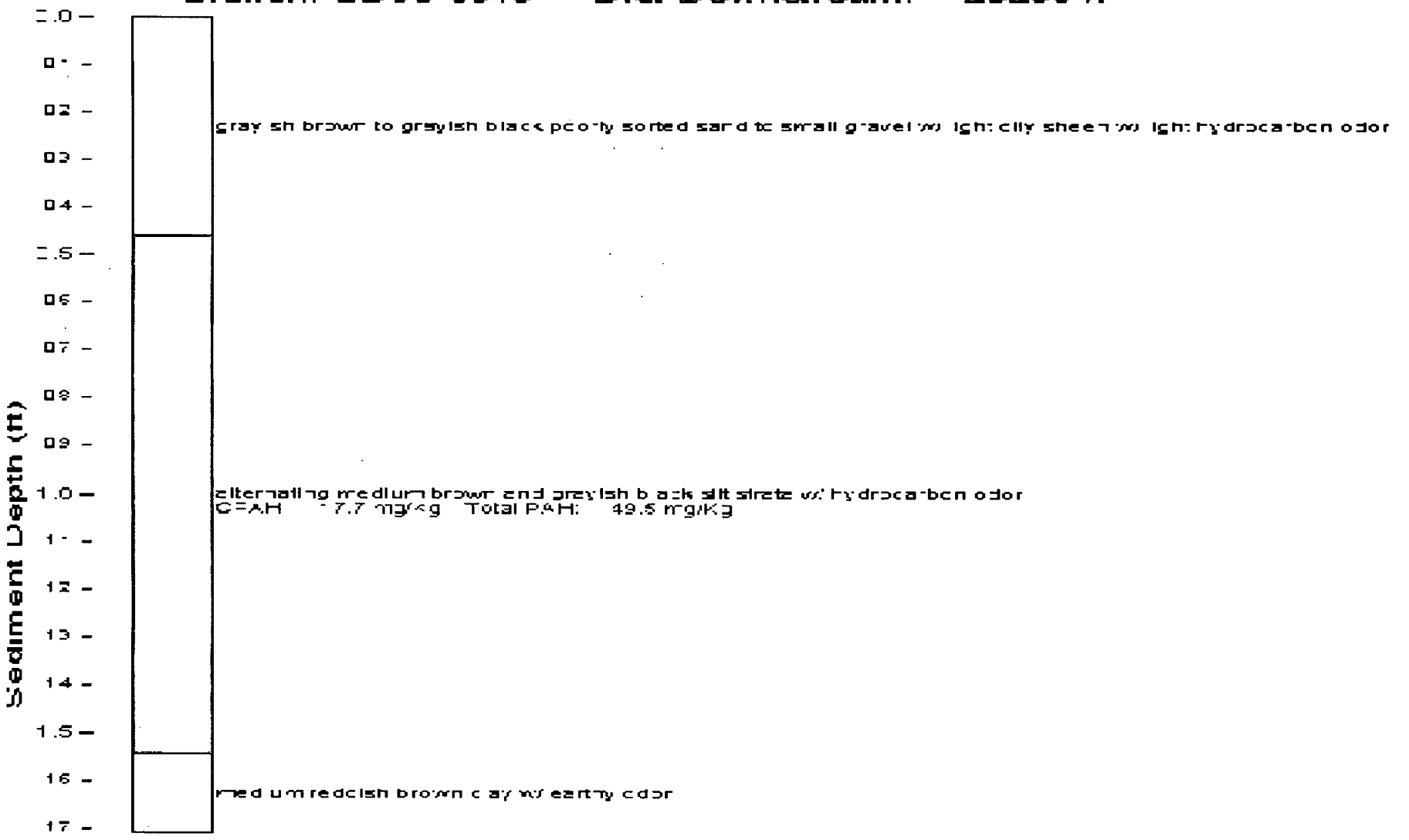
Station: SD04-0001 Dist Downstream: 24600 ft

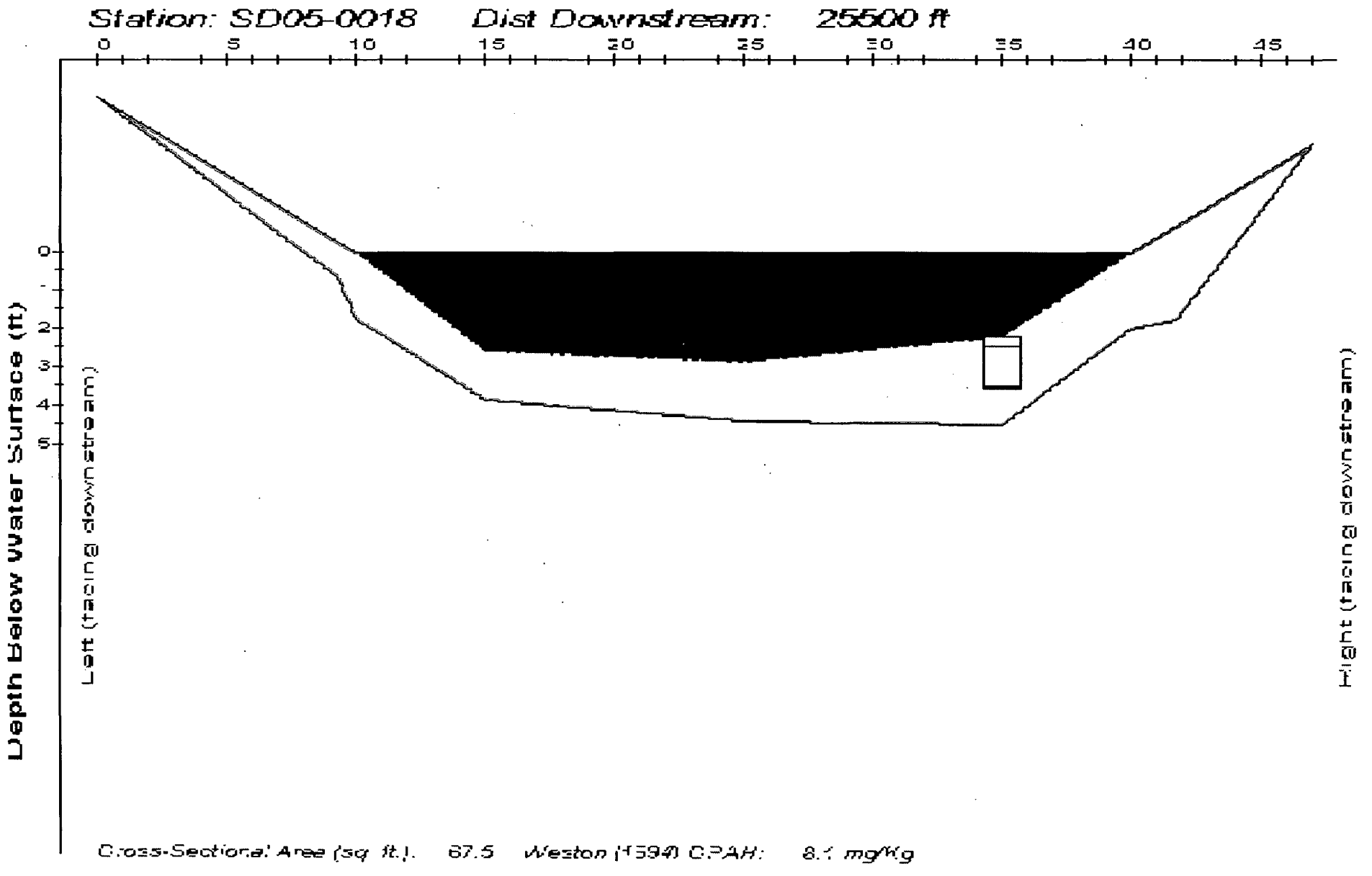


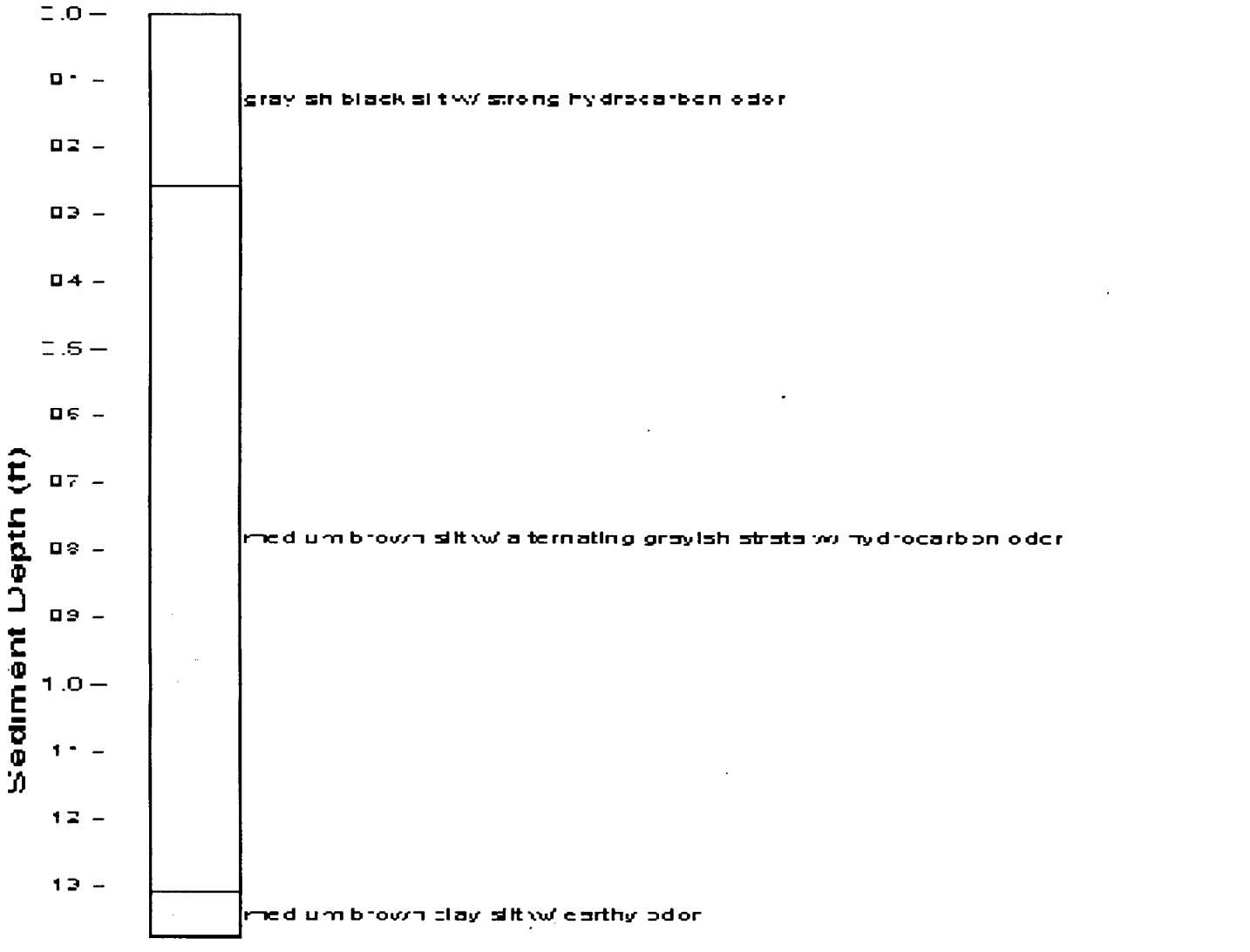

Station: SD05-0020
Dist Downstream: 24900 ft
0
5
10
15
20
25
0
2
3
4
Depth Below Water Surface (ft)
Left (facing downstream)
Right (facing downstream)
Cross-Sectional Area (sq. ft.): 30.5
Weston (1994) CPAH: 6.2 mg/Kg

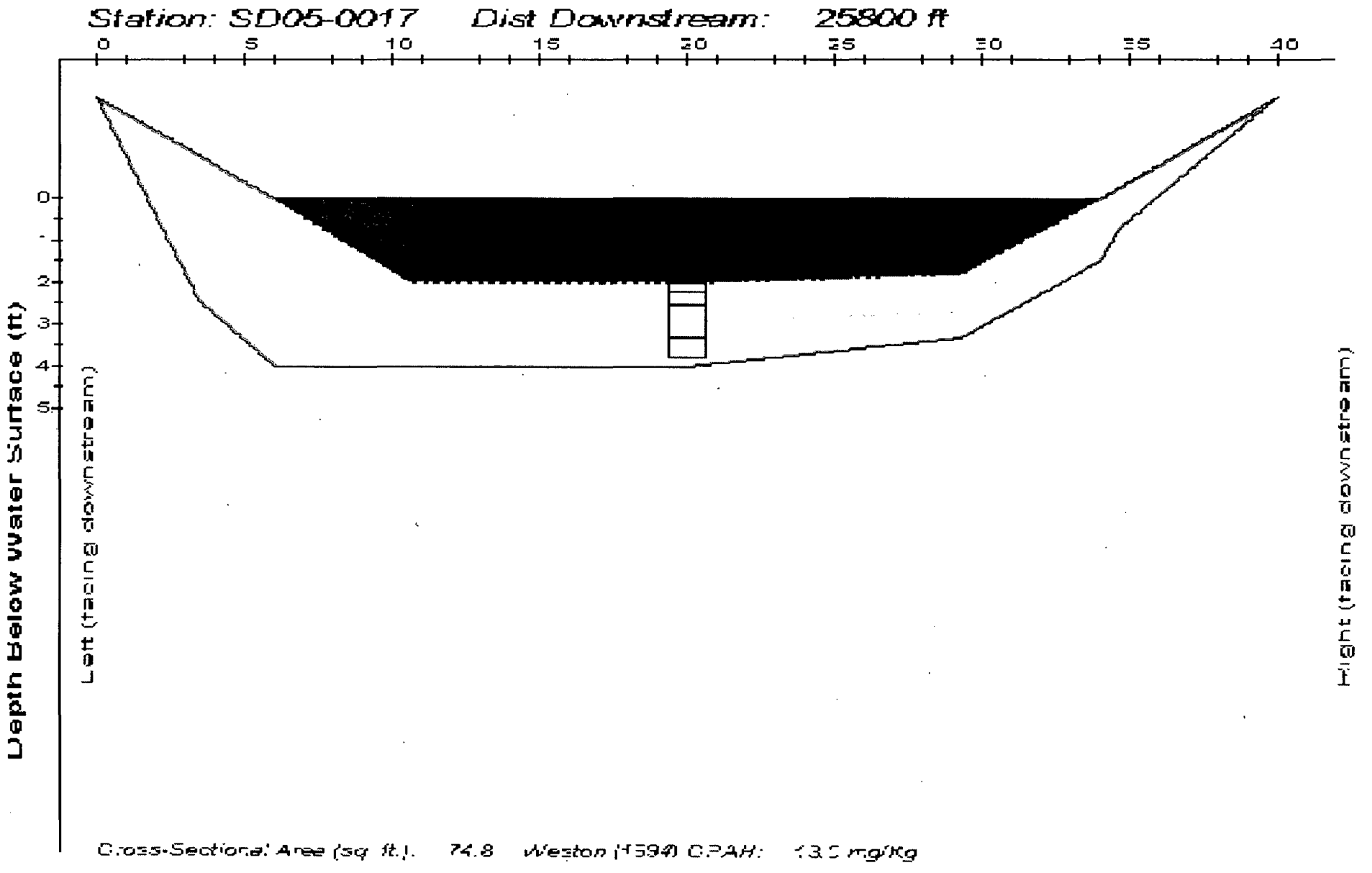

Station: SD05-0020 Dist Downstream: 24900 ft
Sediment Depth (ft)
poorly sorted dark brown to grayish black coarse sand to cobble w/ light hydrocarbon odor
gray sh black silt w/ light hydrocarbon odor
CPAH 7.3 mg/kg Total PAH: 33.0 mg/Kg
gray sh brown to black silt w/ hydrocarbon odor
CPAH 7.3 mg/kg Total PAH: 33.0 mg/Kg
medium brown silt w/ black inclusions w/ hydrocarbon odor
CPAH 7.3 mg/kg Total PAH: 33.0 mg/Kg


Station: SD05-0019
Dist Downstream: 25200 ft
0
5
10
15
20
25
30
0
1
2
3
4
5
6
Depth Below Water Surface (ft)
Left (facing downstream)
Right (facing downstream)
Cross-Sectional Area (sq. ft.): 56.2
Weston (1994) CPAH: 8.0 mg/Kg

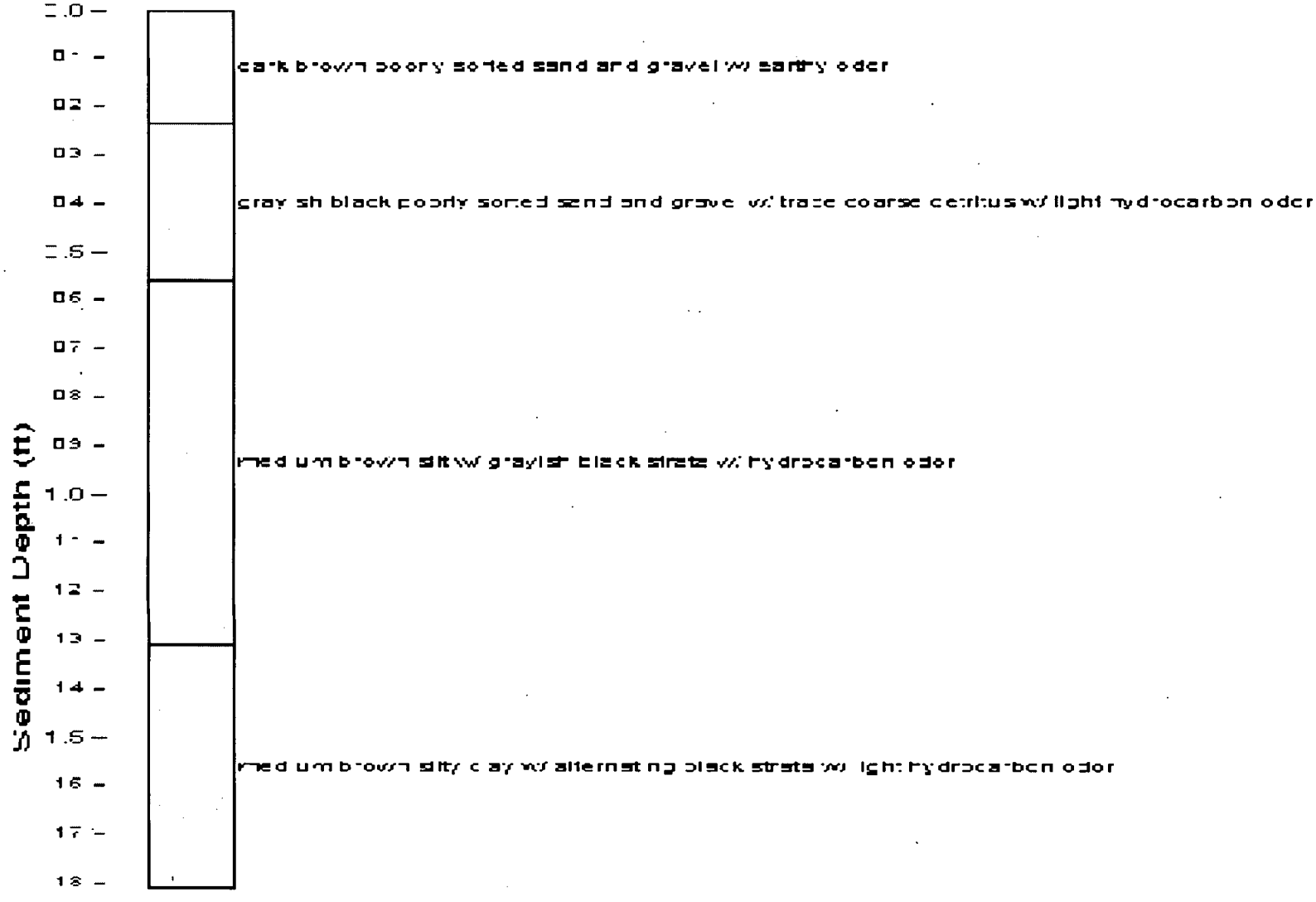

Station: SD05-0019
Dist Downstream: 25200 ft
Sediment Depth (ft)
gray sh brown to greyish black poorly sorted sand to small gravel w/ light silty sheen w/ light hydrocarbon odor
alternating medium brown and greyish black silt strata w/ hydrocarbon odor
CPAH 7.7 mg/kg Total PAH: 49.5 mg/Kg
med um reddish brown clay w/ earthy odor


Station: SD05-0018 Dist Downstream: 25500 ft
0
5
10
15
20
25
30
35
40
45
0
1
2
3
4
5
Depth Below Water Surface (ft)
Left (facing downstream)
Right (facing downstream)
Cross-Sectional Area (sq. ft.): 67.5 Weston (1994) CPAH: 8.1 mg/kg

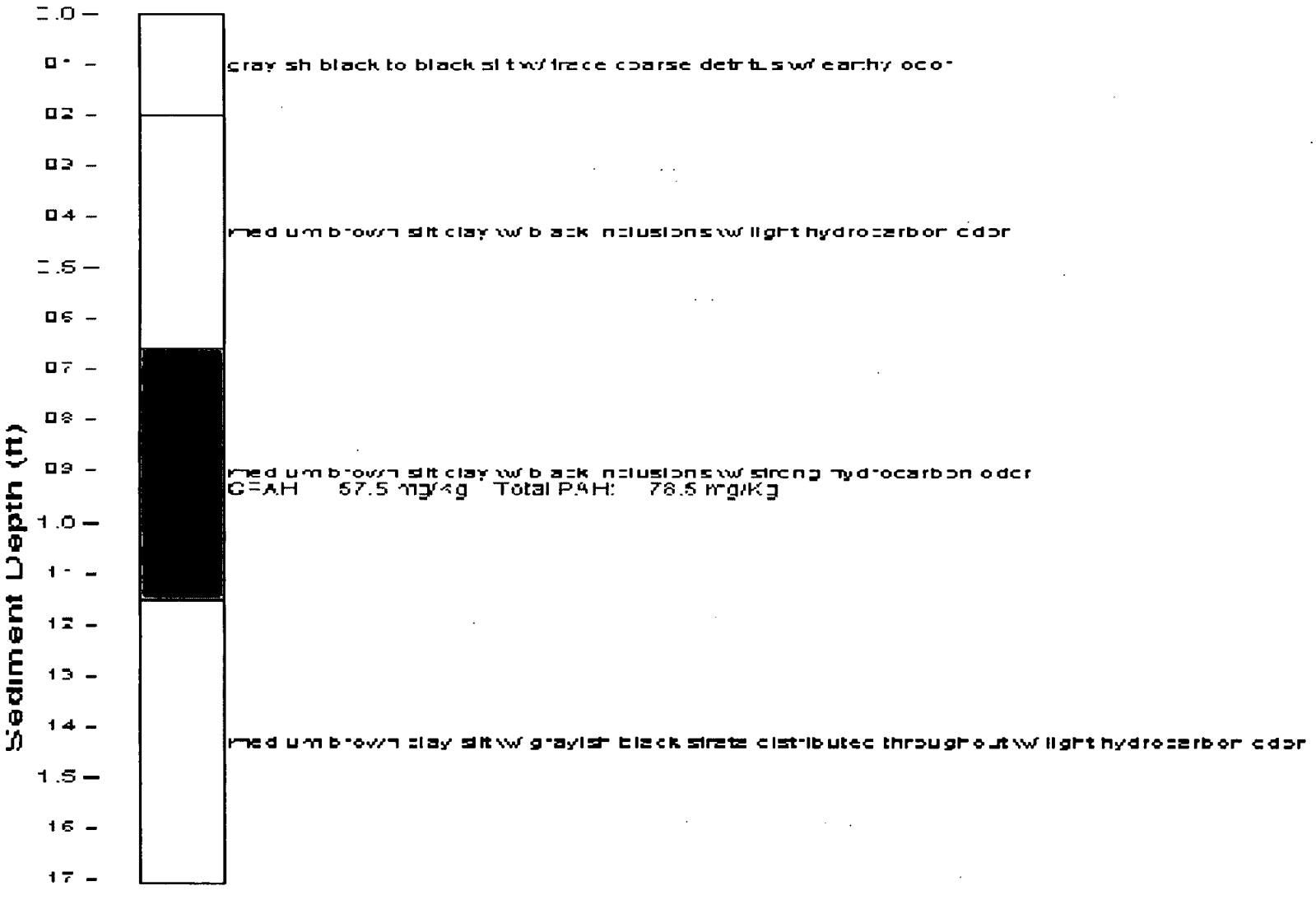

Station: SD05-0018 Dist Downstream: 25500 ft
Sediment Depth (ft)
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
1.1
1.2
1.3
gray sh black silt w/ strong hydrocarbon odor
med umbrown silt w/ alternating grayish strata w/ hydrocarbon odor
med umbrown clay silt w/ earthy odor

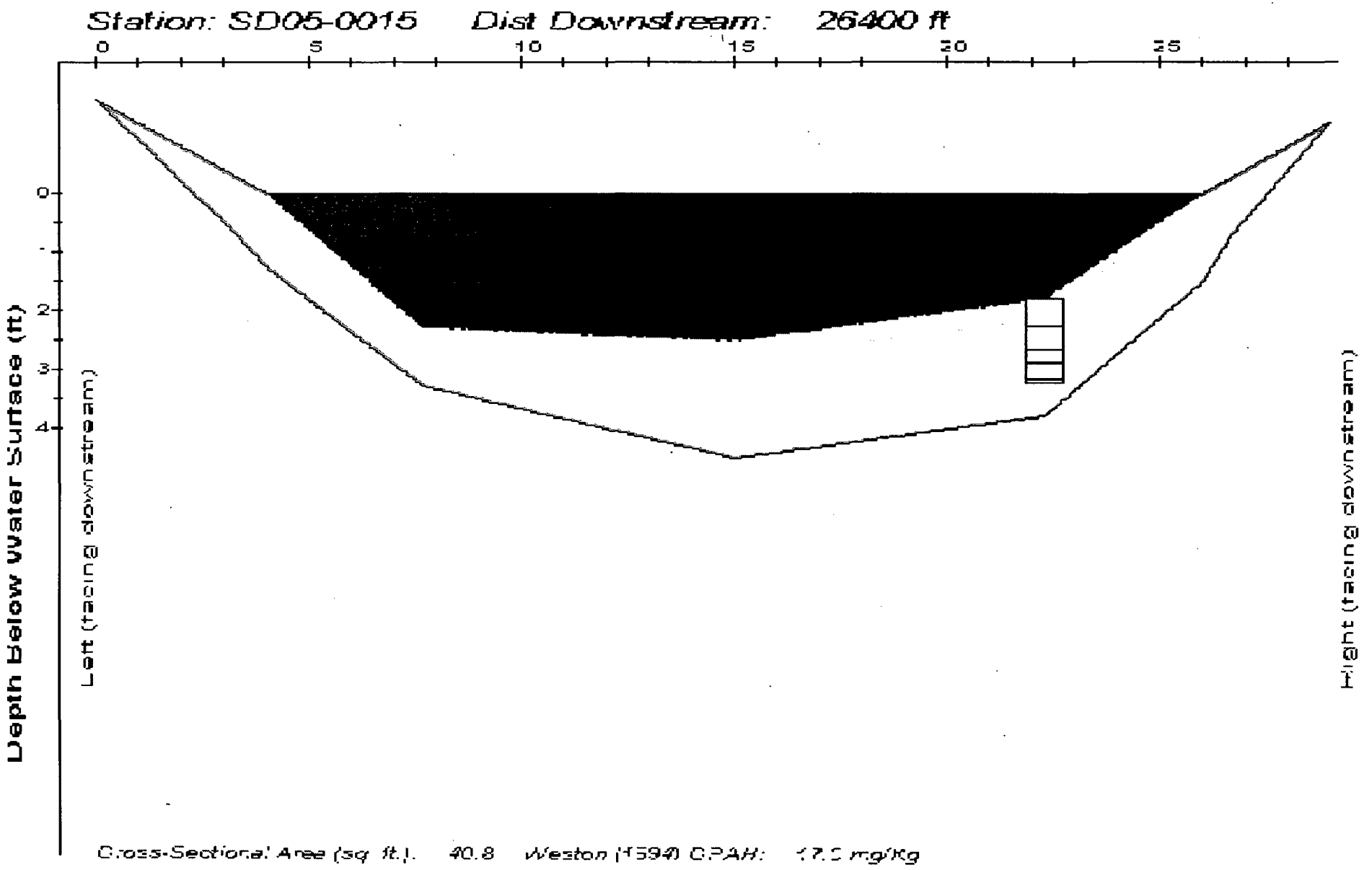

Station: SD05-0017 Dist Downstream: 25800 ft
0
5
10
15
20
25
30
35
40
0
1
2
3
4
5
Depth Below Water Surface (ft)
Left (facing downstream)
Right (facing downstream)
Cross-Sectional Area (sq. ft.): 74.8 Weston (1994) CPAH: 13.5 mg/kg

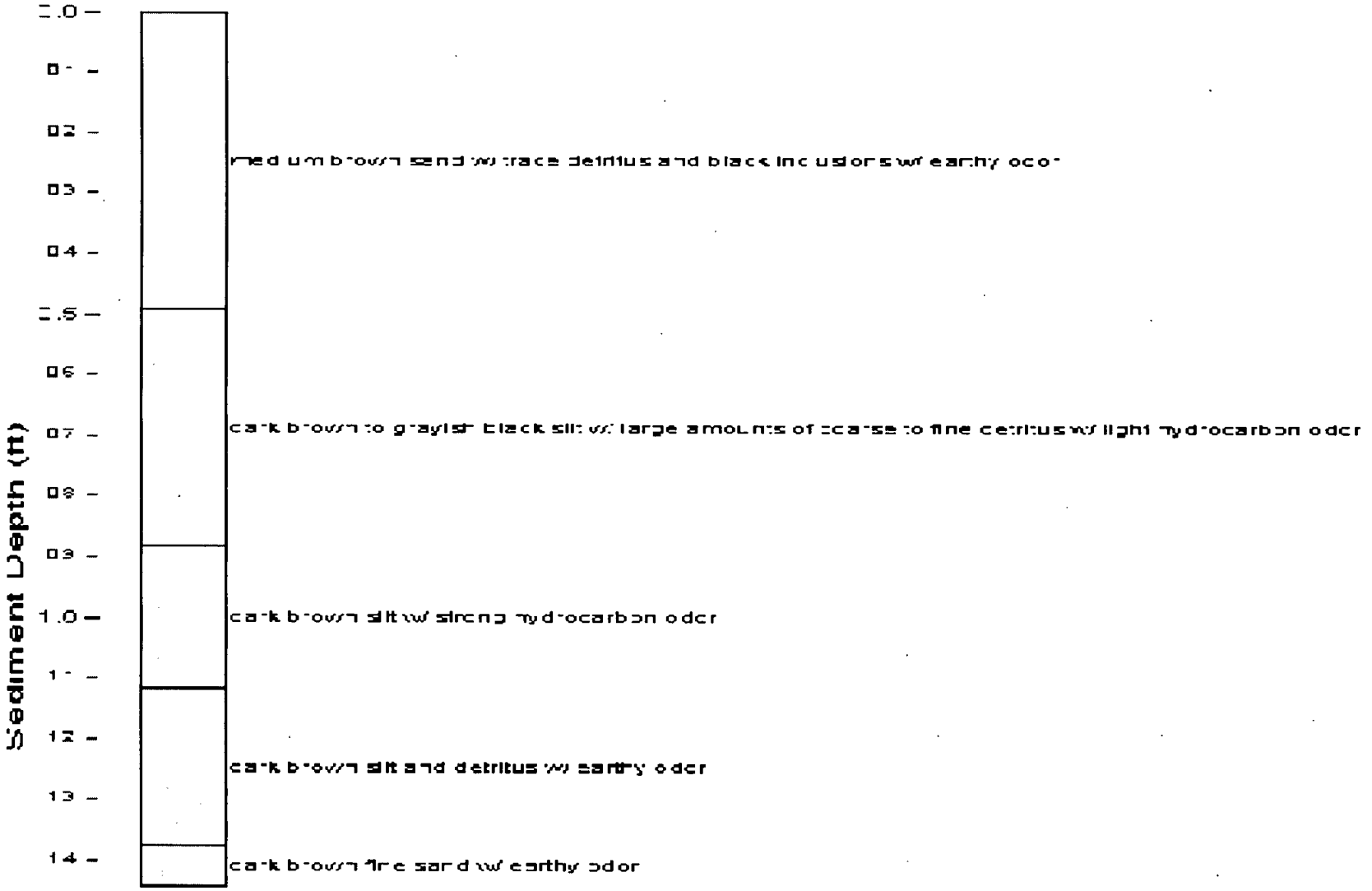
Station: SD05-0017 Dist Downstream: 25800 ft

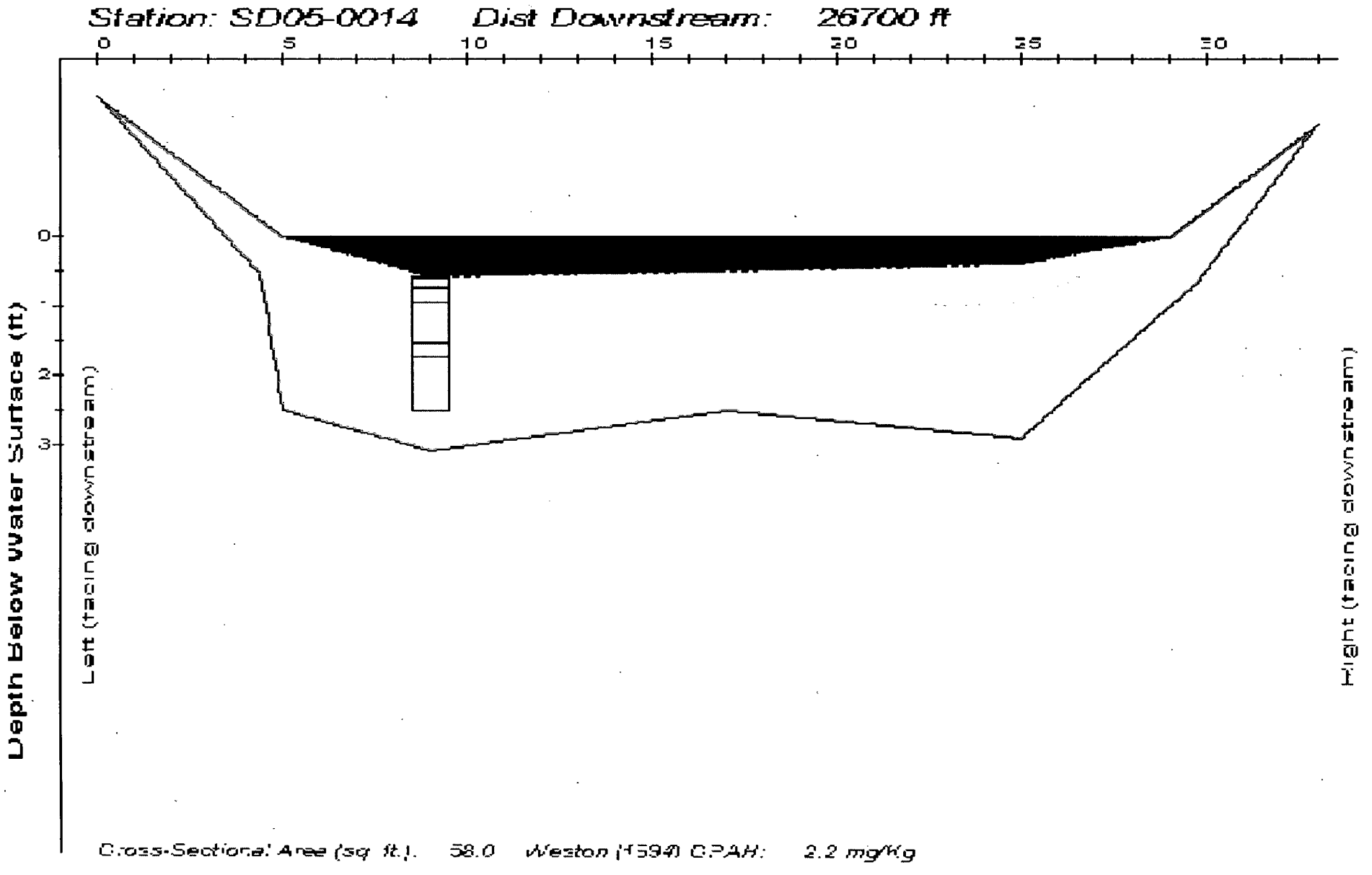


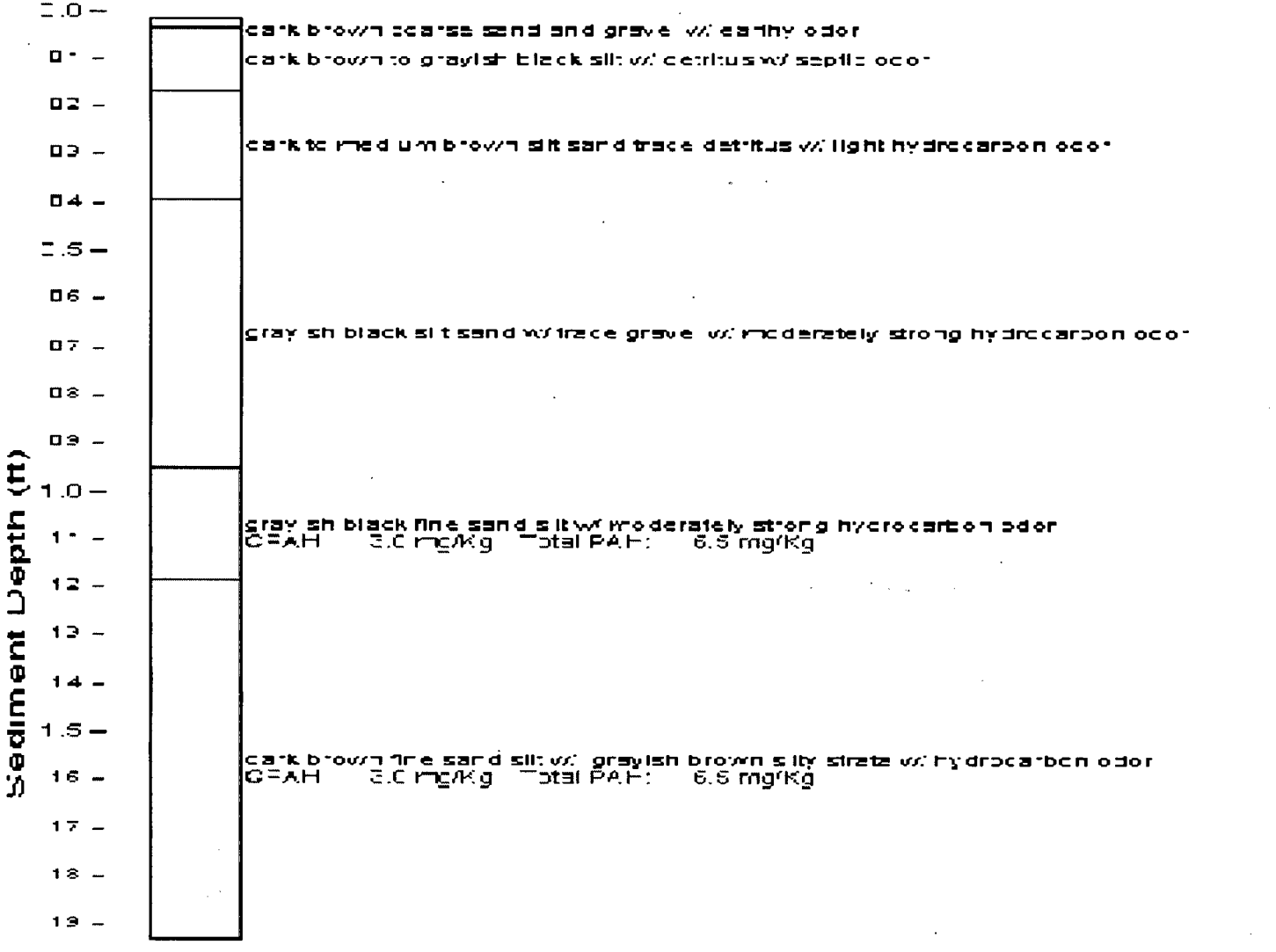
Station: SD05-0016
Dist Downstream: 26100 ft
0
5
10
15
20
25
30
0
2
3
4
5
6
Depth Below Water Surface (ft)
Left (facing downstream)
Right (facing downstream)
Cross-Sectional Area (sq. ft.): 67.9
Weston (1994) CPAH: 15.0 mg/Kg

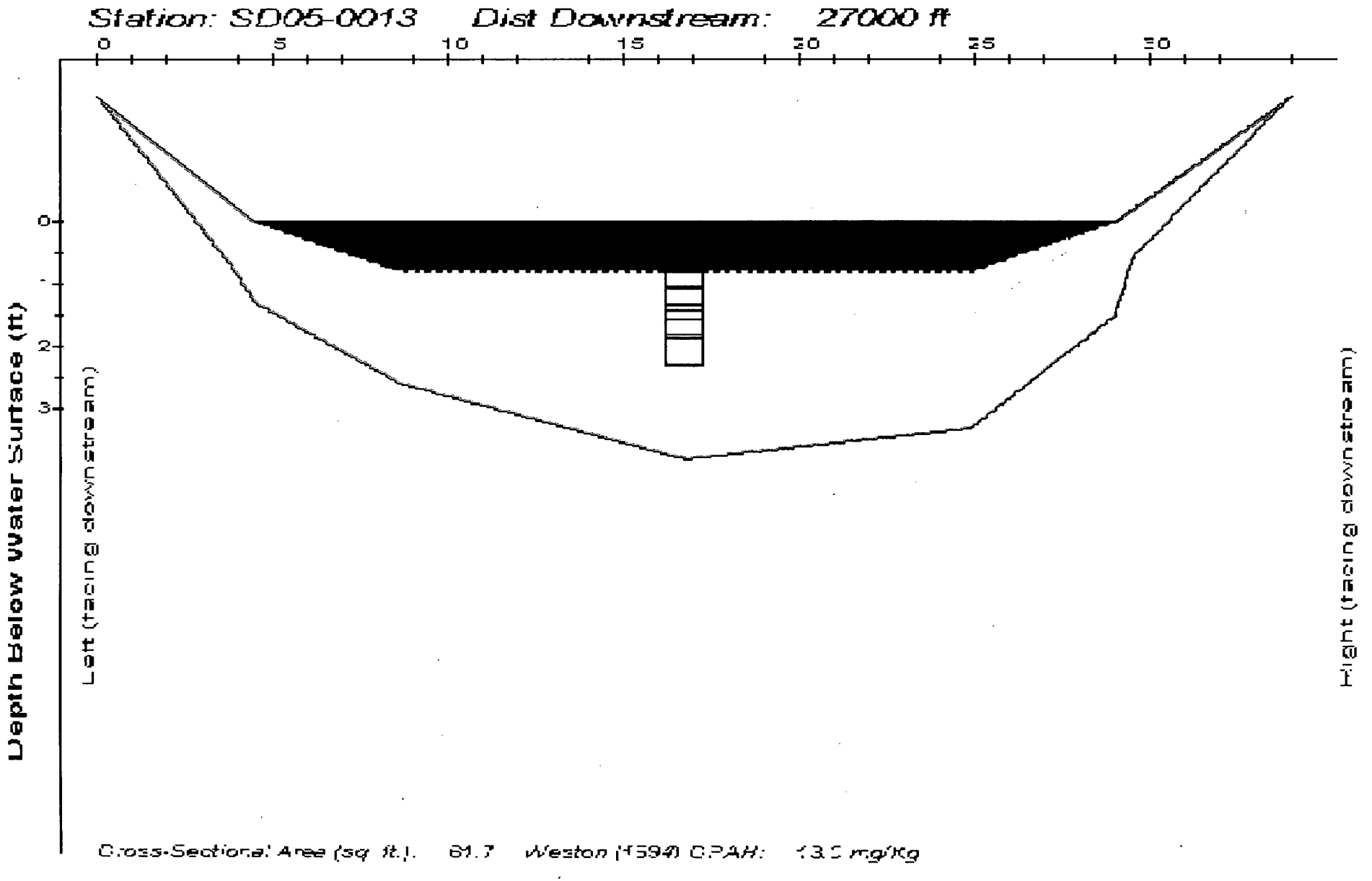

Station: SD05-0016
Dist Downstream: 26100 ft
Sediment Depth (ft)
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
1.1
1.2
1.3
1.4
1.5
1.6
1.7
gray sh black to black silt w/ trace coarse detritus w/ earthy odor
med um brown silt clay w/ black inclusions w/ light hydrocarbon odor
med um brown silt clay w/ black inclusions w/ strong hydrocarbon odor
CPAH 57.5 mg/Kg Total PAH: 78.5 mg/Kg
med um brown clay silt w/ grayish black strata distributed throughout w/ light hydrocarbon odor


Station: SD05-0015
Dist Downstream: 26400 ft
0
5
10
15
20
25
0
2
3
4
Depth Below Water Surface (ft)
Left (facing downstream)
Right (facing downstream)
Cross-Sectional Area (sq. ft.): 40.8
Weston (1994) CPAH: 17.5 mg/Kg

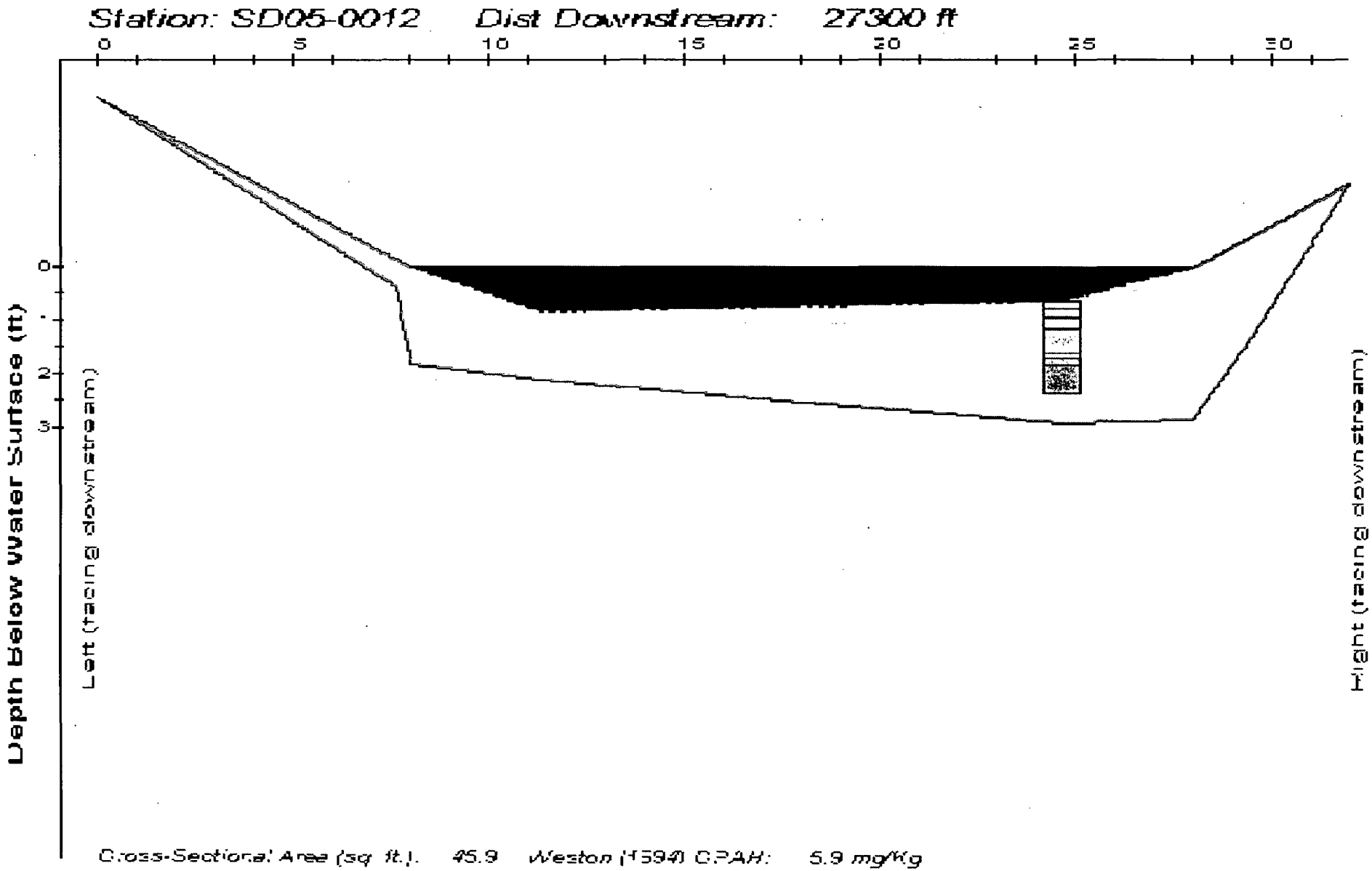

Station: SD05-0015
Dist Downstream: 26400 ft
Sediment Depth (ft)
medium brown sand w/ trace detritus and black inclusions w/ earthy odor
dark brown to grayish black silt w/ large amounts of coarse to fine detritus w/ light hydrocarbon odor
dark brown silt w/ strong hydrocarbon odor
dark brown silt and detritus w/ earthy odor
dark brown fine sand w/ earthy odor


Station: SD05-0014 Dist Downstream: 26700 ft
0
5
10
15
20
25
30
0
2
3
Depth Below Water Surface (ft)
Left (facing downstream)
Right (facing downstream)
Cross-Sectional Area (sq. ft.): 58.0 Weston (1994) CPAH: 2.2 mg/Kg

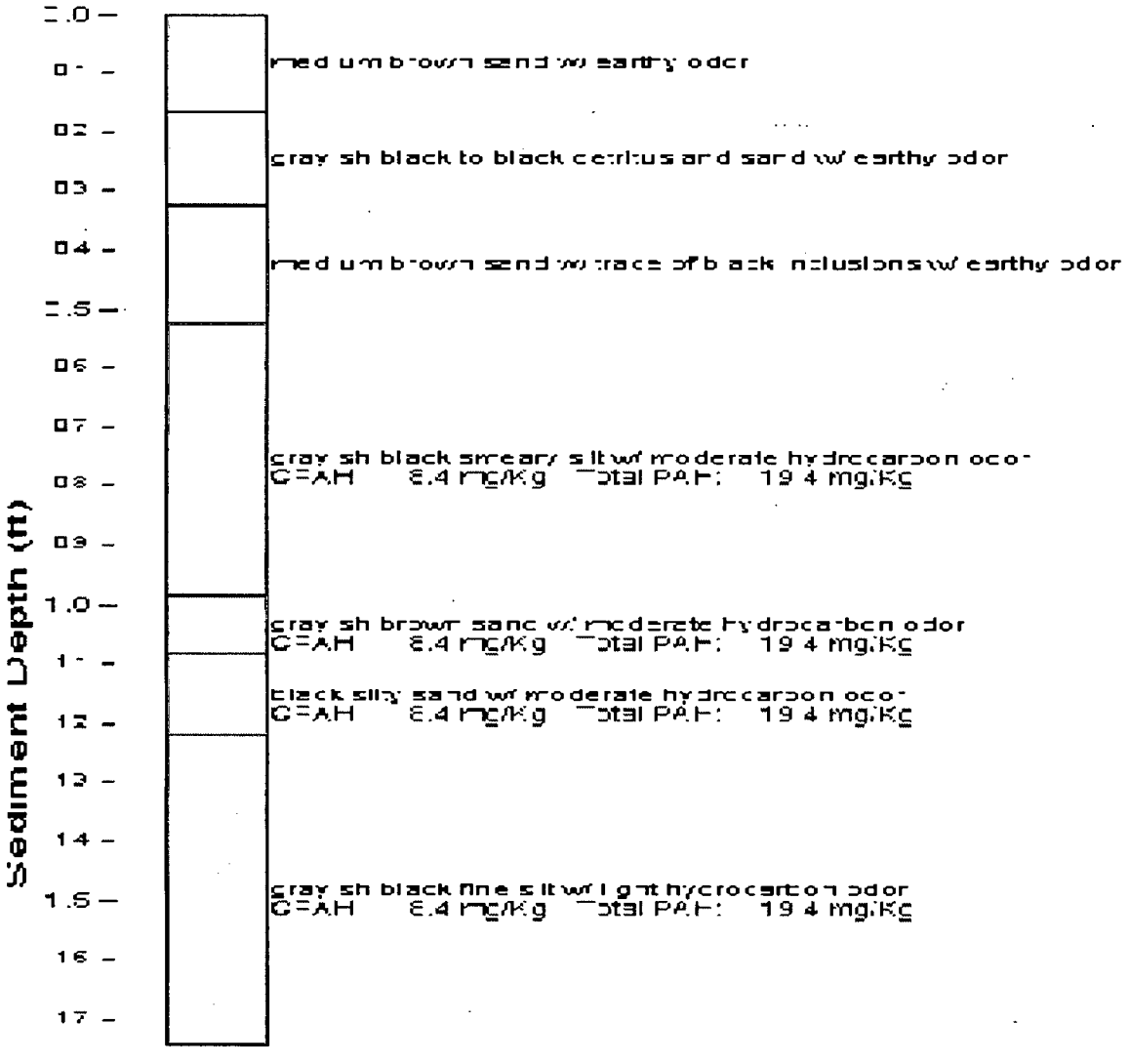

Station: SD05-0014 Dist Downstream: 26700 ft
Sediment Depth (ft)
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
1.1
1.2
1.3
1.4
1.5
1.6
1.7
1.8
1.9
dark brown coarse sand and gravel w/ earthy odor
dark brown to grayish black silt w/ detritus w/ septic odor
dark to med um brown silt sand trace detritus w/ light hydrocarbon odor
gray sh black silt sand w/ trace gravel w/ moderately strong hydrocarbon odor
gray sh black fine sand silt w/ moderately strong hydrocarbon odor
CPAH 3.0 mg/Kg Total PAH: 6.5 mg/Kg
dark brown fine sand silt w/ grayish brown silty strata w/ hydrocarbon odor
CPAH 3.0 mg/Kg Total PAH: 6.5 mg/Kg

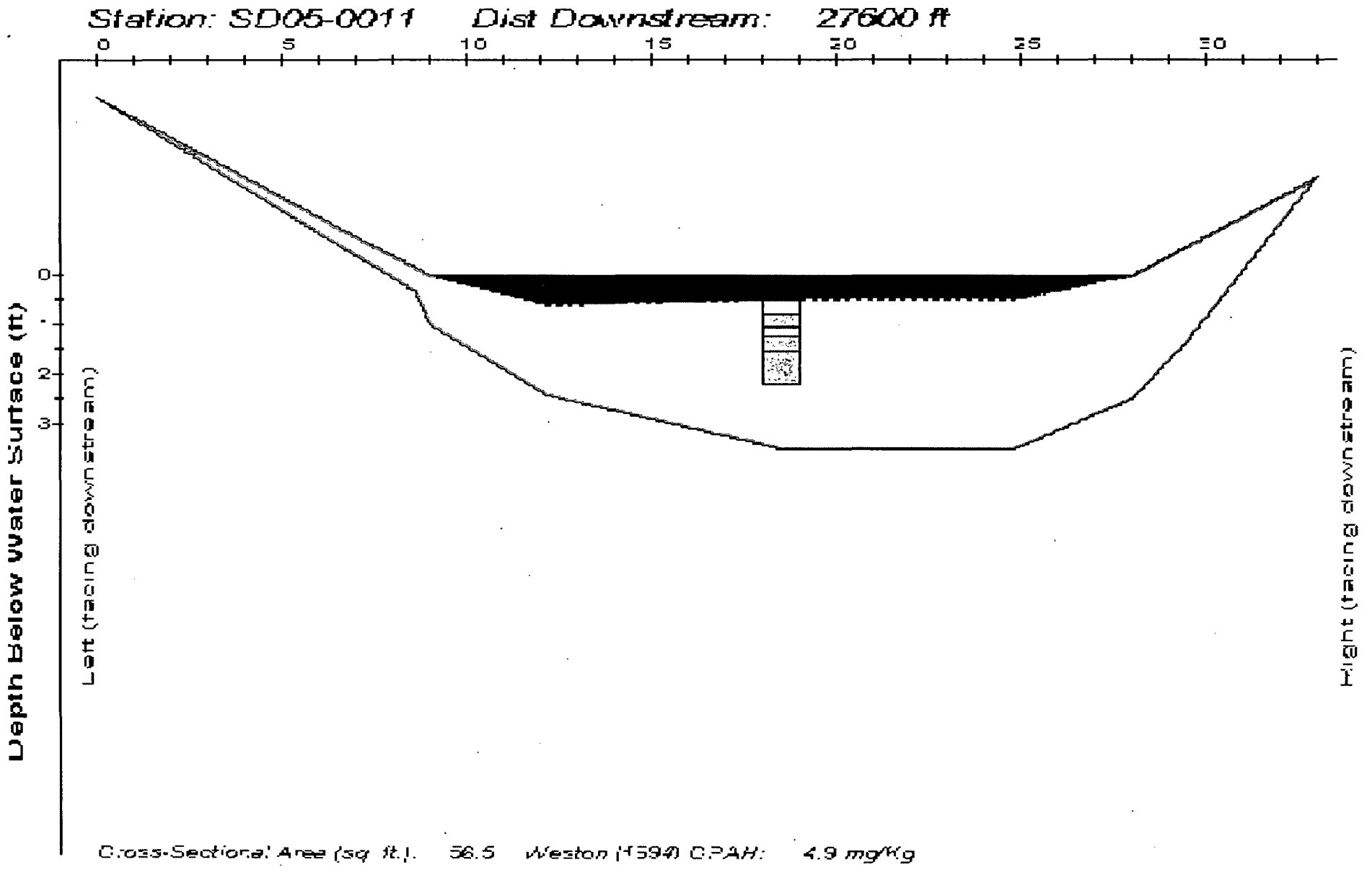

Station: SD05-0013 Dist Downstream: 27000 ft
0
5
10
15
20
25
30
0
2
3
Depth Below Water Surface (ft)
Left (facing downstream)
Right (facing downstream)
Cross-Sectional Area (sq. ft.): 61.7 Weston (1994) CPAH: 13.0 mg/Kg

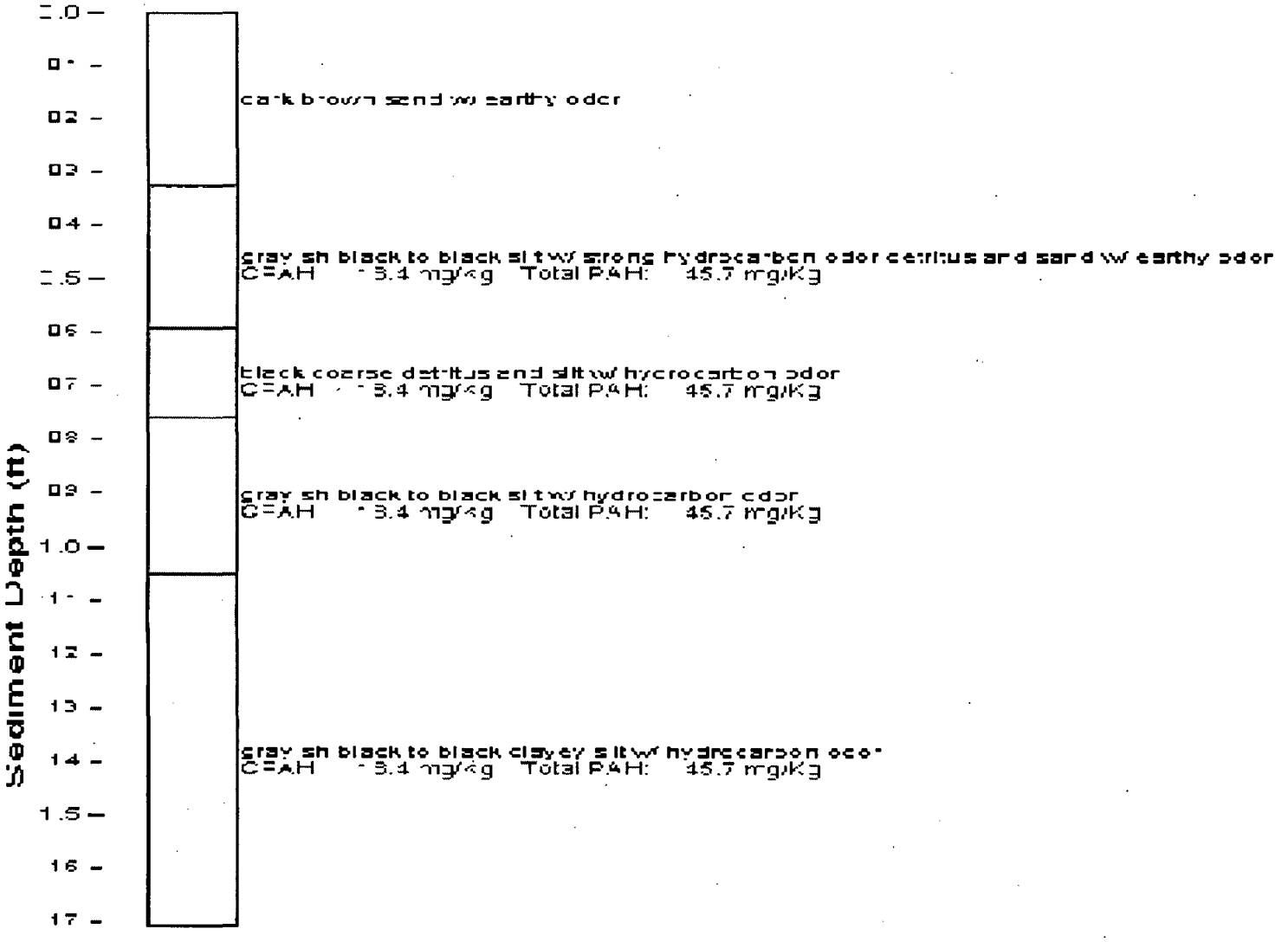
Station: SD05-0013 Dist Downstream: 27000 ft


Station: SD05-0012 Dist Downstream: 27300 ft
0
5
10
15
20
25
30
0
2
3
Depth Below Water Surface (ft)
Left (facing downstream)
Right (facing downstream)
Cross-Sectional Area (sq. ft.): 45.9 Weston (1994) CPAH: 5.9 mg/Kg

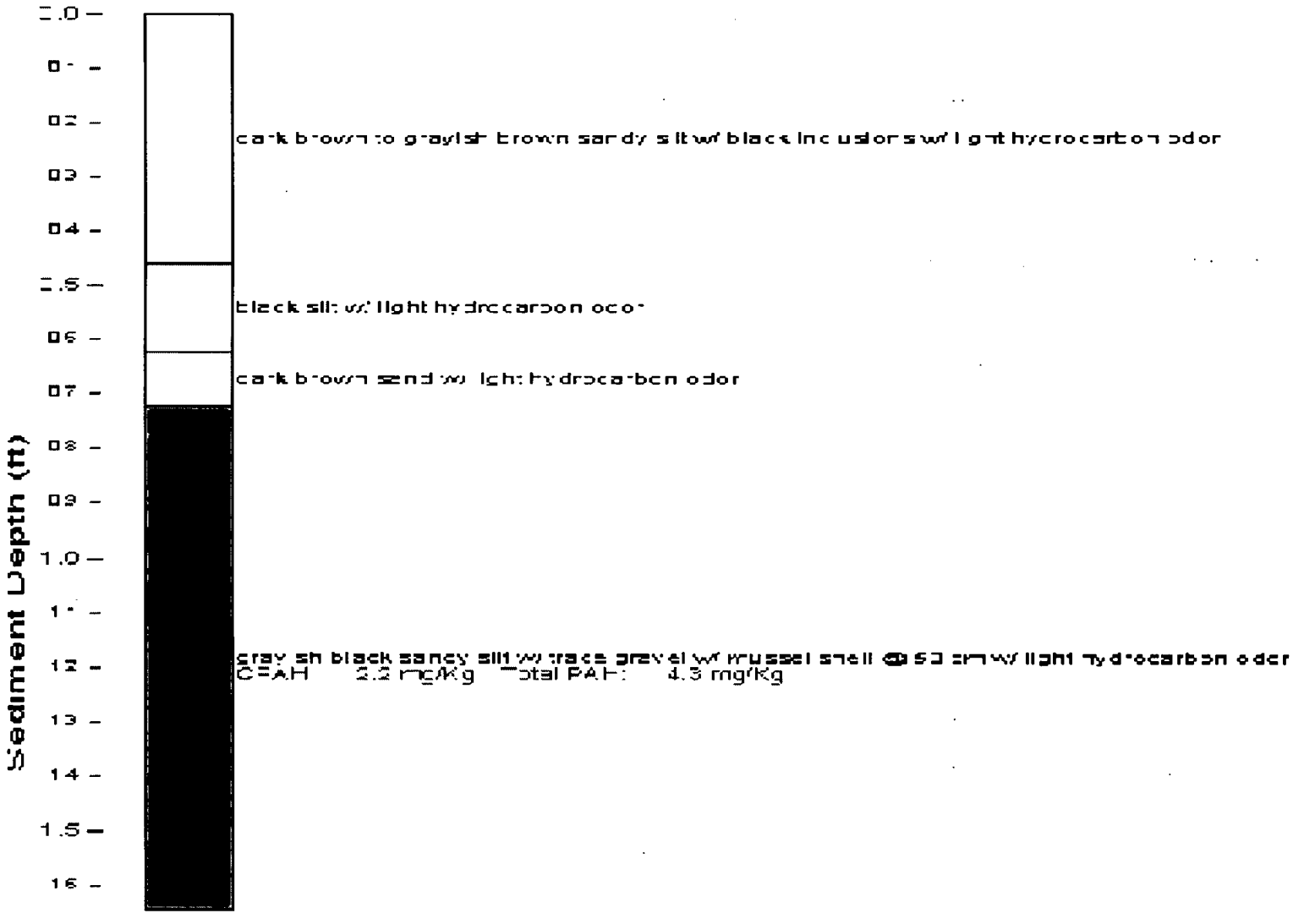
Station: SD05-0012 Dist Downstream: 27300 ft

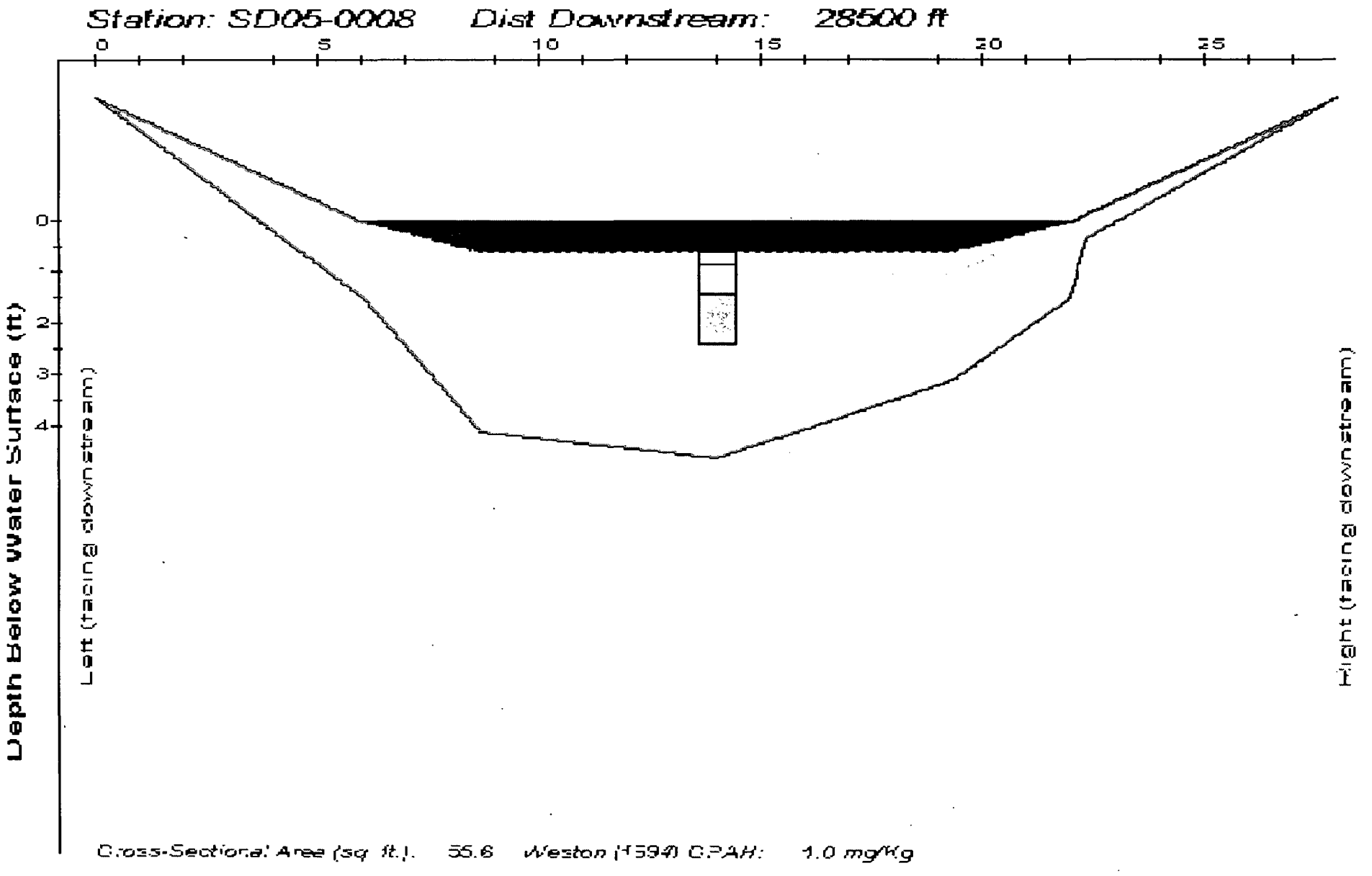



Station: SD05-0011 Dist Downstream: 27600 ft
0
5
10
15
20
25
30
Depth Below Water Surface (ft)
0
2
3
Left (facing downstream)
Right (facing downstream)
Cross-Sectional Area (sq. ft.): 56.5 Weston (1994) CPAH: 4.9 mg/Kg

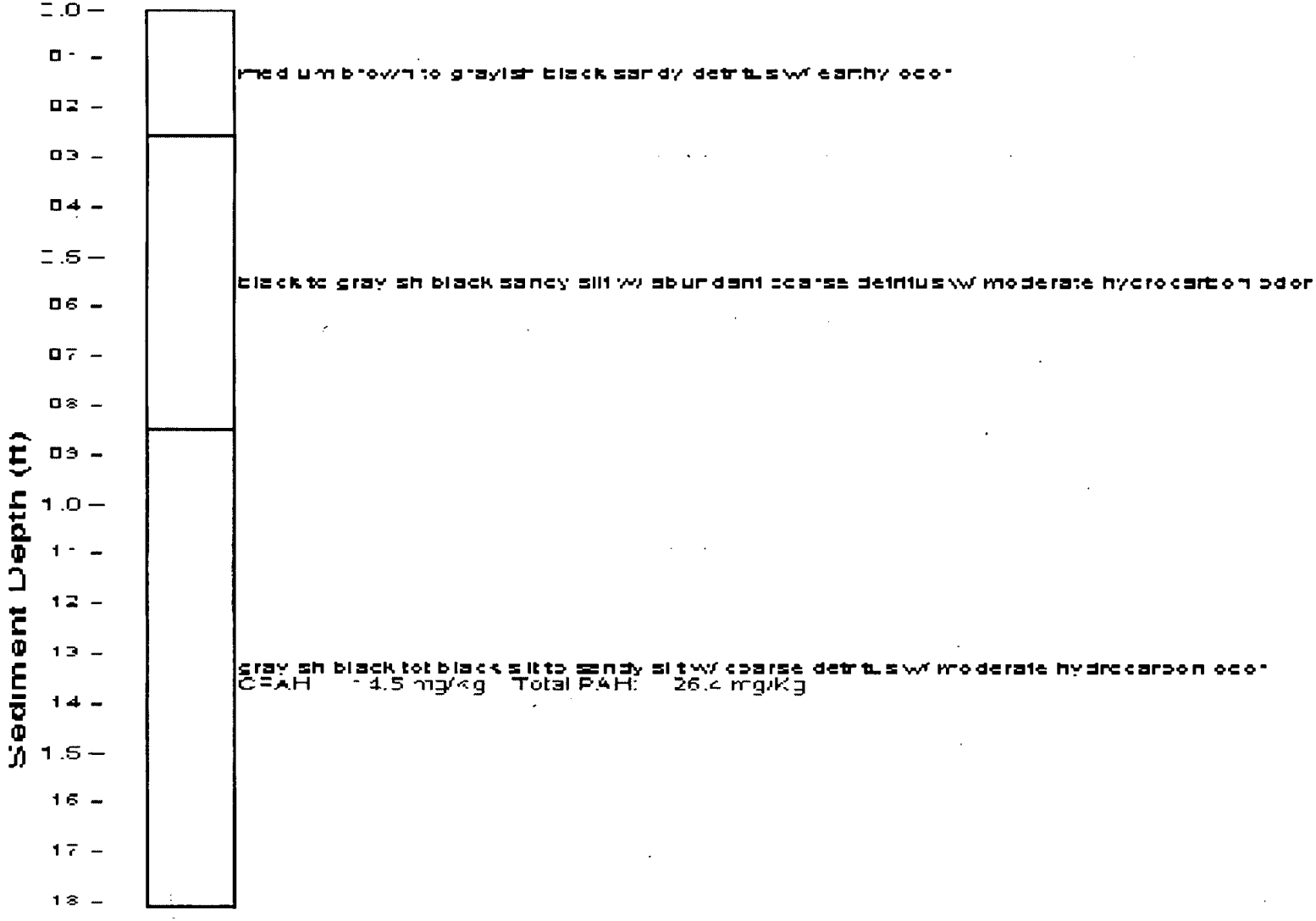

Station: SD05-0011 Dist Downstream: 27600 ft
Sediment Depth (ft)
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
1.1
1.2
1.3
1.4
1.5
1.6
1.7
dark brown sand w/ earthy odor
gray sh black to black slt w/ strong hydrocarbon odor detritus and sand w/ earthy odor
CPAH 3.4 mg/kg Total PAH: 45.7 mg/Kg
black coarse detritus and silt w/ hydrocarbon odor
CPAH 3.4 mg/kg Total PAH: 45.7 mg/Kg
gray sh black to black slt w/ hydrocarbon odor
CPAH 3.4 mg/kg Total PAH: 45.7 mg/Kg
gray sh black to black clayey slt w/ hydrocarbon odor
CPAH 3.4 mg/kg Total PAH: 45.7 mg/Kg

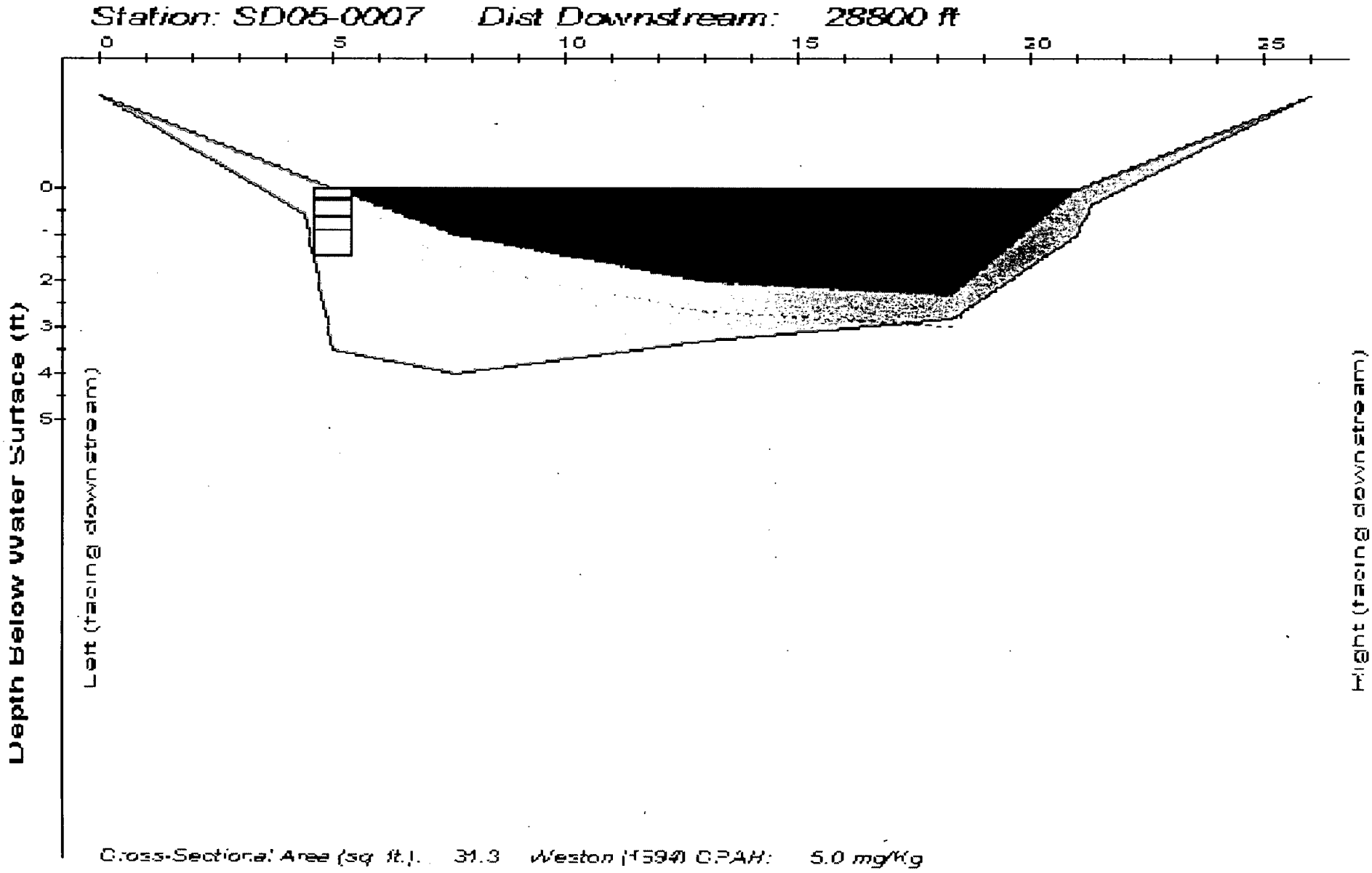
Station: SD05-0009
Dist Downstream: 28200 ft
0
5
10
15
20
25
0
2
Depth Below Water Surface (ft)
Left (facing downstream)
Right (facing downstream)
Cross-Sectional Area (sq. ft.): 34.3
Weston (1994) CPAH: 8.3 mg/Kg


Station: SD05-0009
Dist Downstream: 28200 ft
Sediment Depth (ft)
dark brown to grayish brown sandy silt w/ black inclusions w/ light hydrocarbon odor
black silt w/ light hydrocarbon odor
dark brown sand w/ light hydrocarbon odor
gray sh black sandy silt w/ trace gravel w/ mussel shell @ 53 cm w/ light hydrocarbon odor
CPAH 2.2 mg/Kg Total PAH: 4.3 mg/Kg

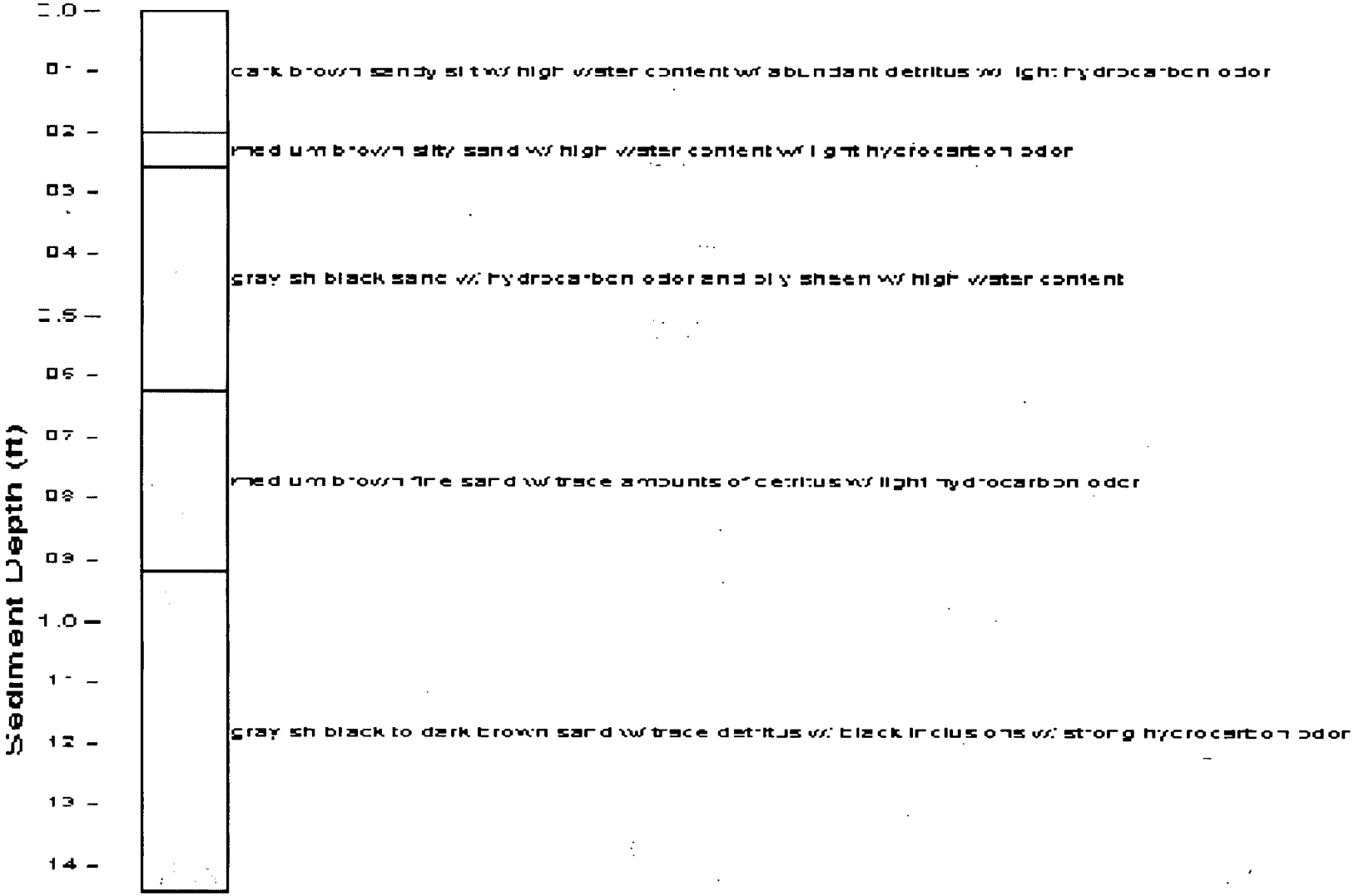

Station: SD05-0008
Dist Downstream: 28500 ft
0
5
10
15
20
25
0
2
3
4
Depth Below Water Surface (ft)
Left (facing downstream)
Right (facing downstream)
Cross-Sectional Area (sq. ft.): 55.6
Weston (1994) CPAH: 1.0 mg/Kg

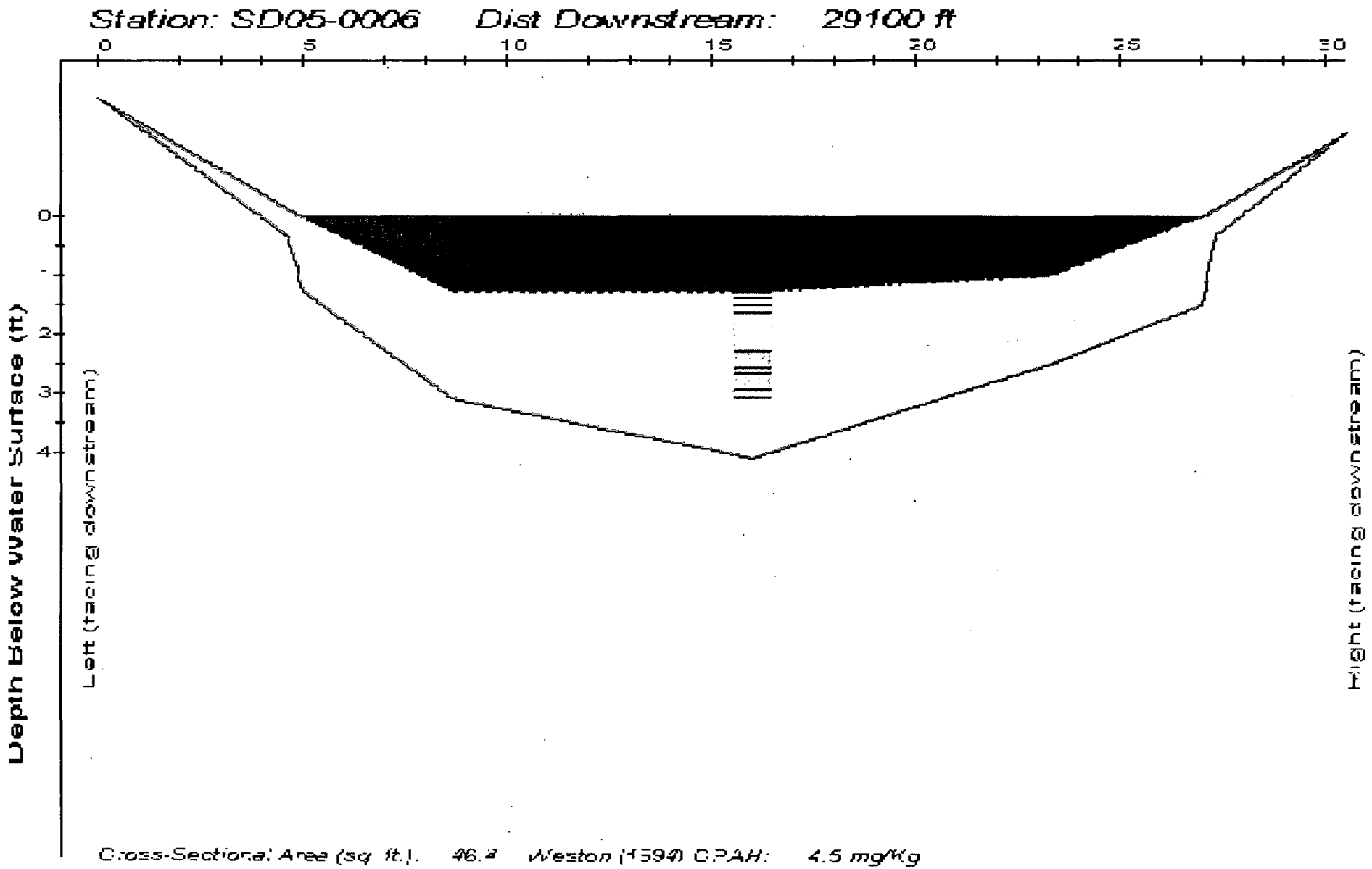
Station: SD05-0008 Dist Downstream: 28500 ft

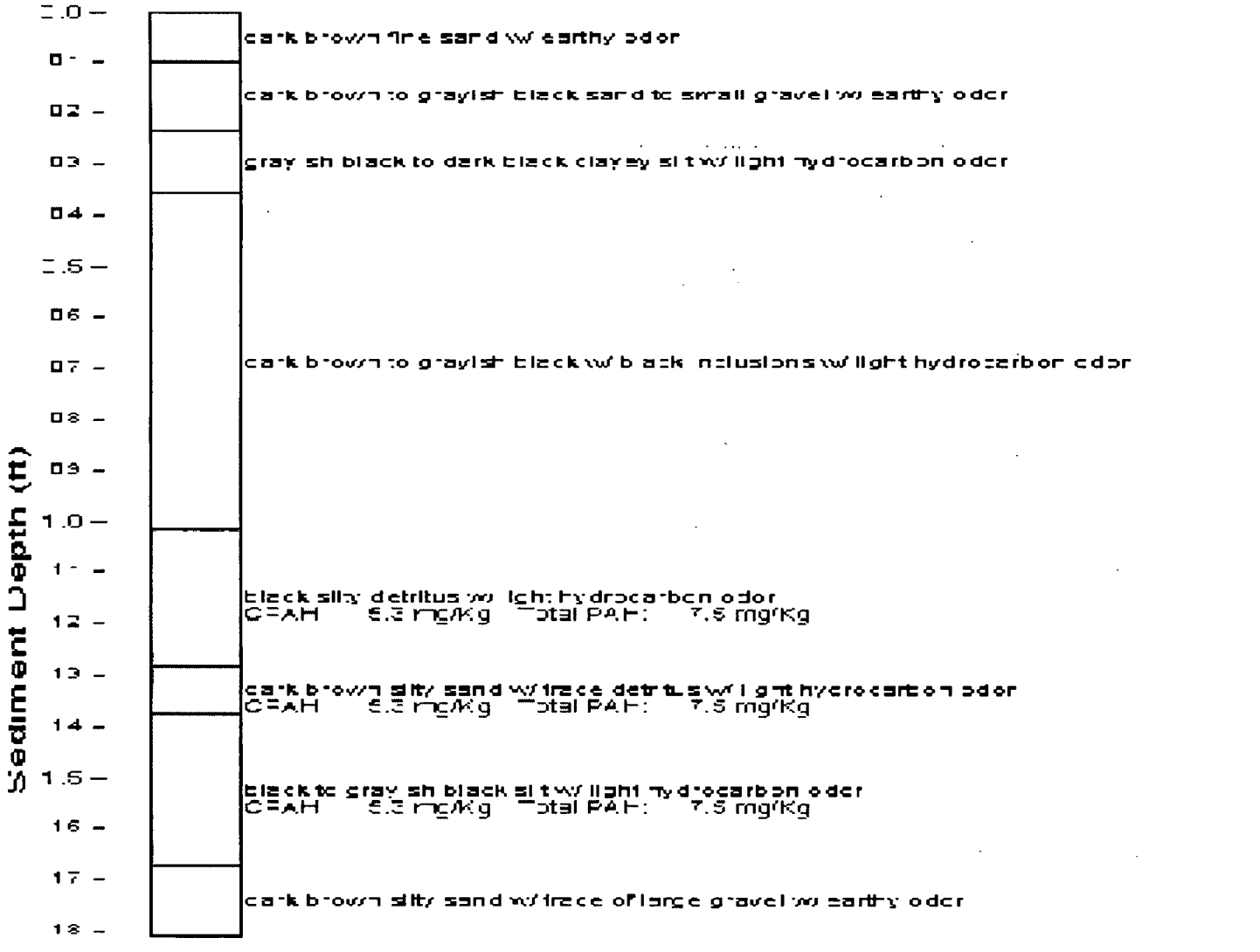


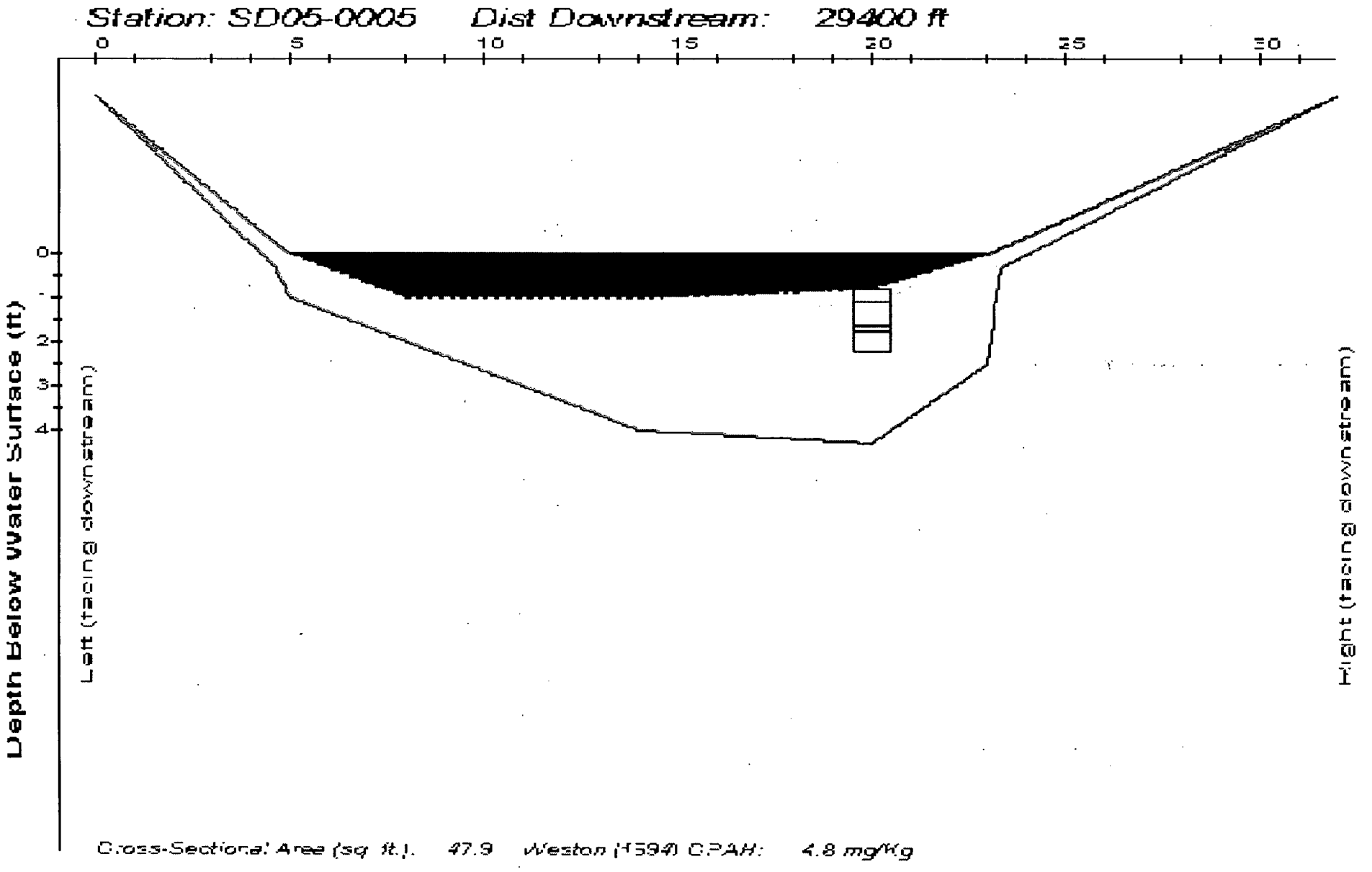

Station: SD05-0007 Dist Downstream: 28800 ft
0
5
10
15
20
25
0
2
3
4
5
Depth Below Water Surface (ft)
Left (facing downstream)
Right (facing downstream)
Cross-Sectional Area (sq. ft.). 31.3 Weston (1994) CPAH: 5.0 mg/Kg

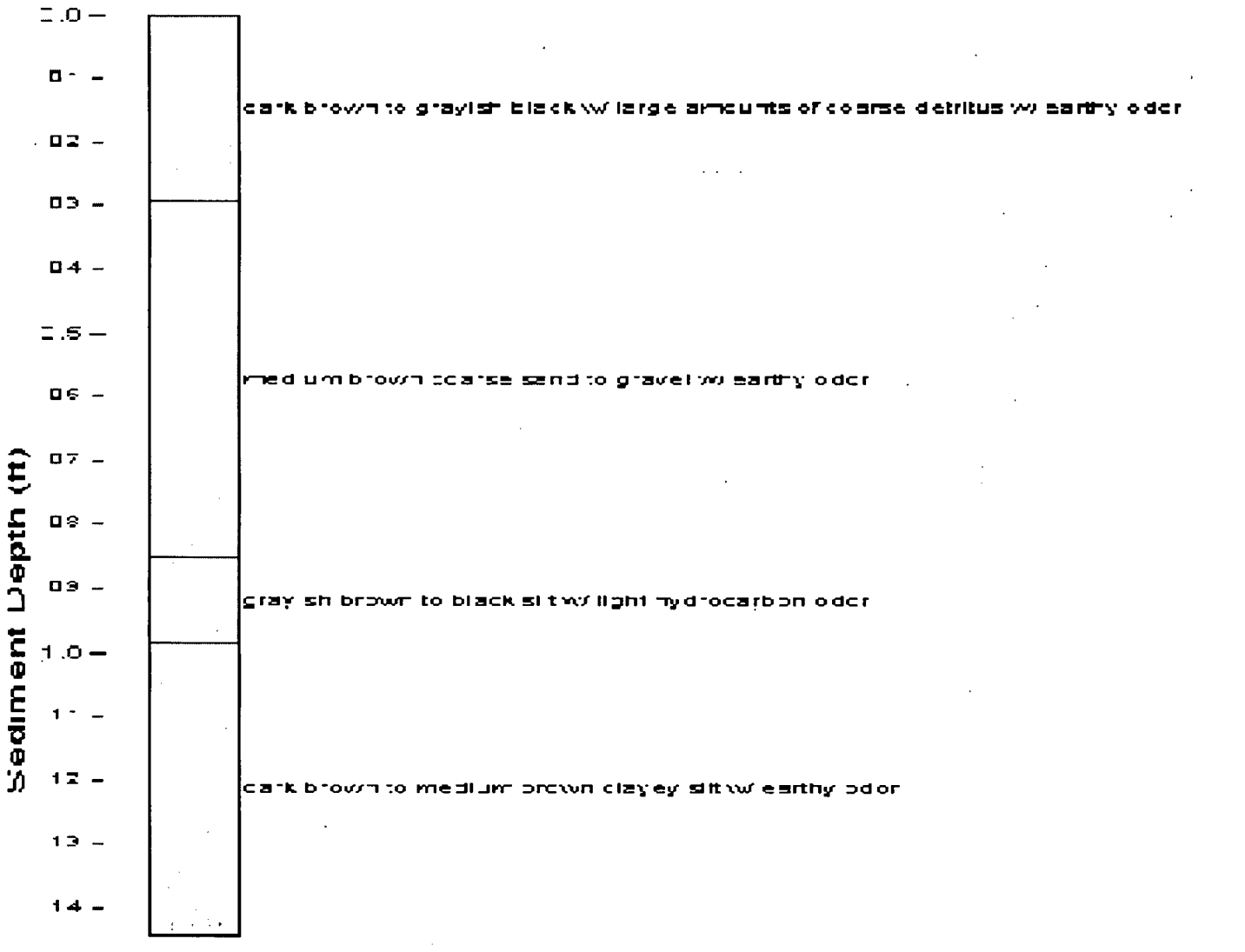
Station: SD05-0007 Dist Downstream: 28800 ft

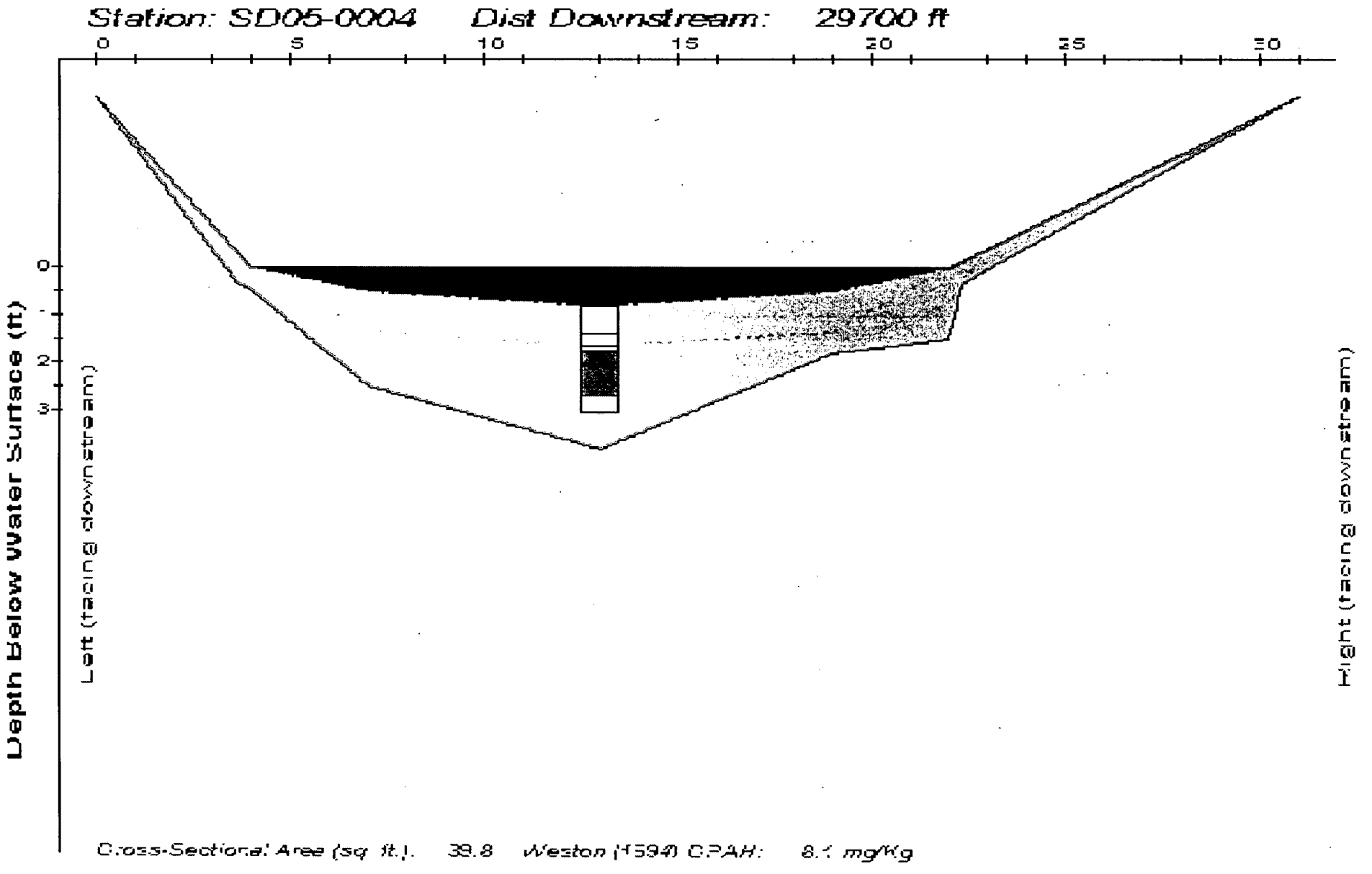



Station: SD05-0006
Dist Downstream: 29100 ft
0
5
10
15
20
25
30
0
2
3
4
Depth Below Water Surface (ft)
Left (facing downstream)
Right (facing downstream)
Cross-Sectional Area (sq. ft.): 46.2
Weston (1994) CPAH: 4.5 mg/Kg

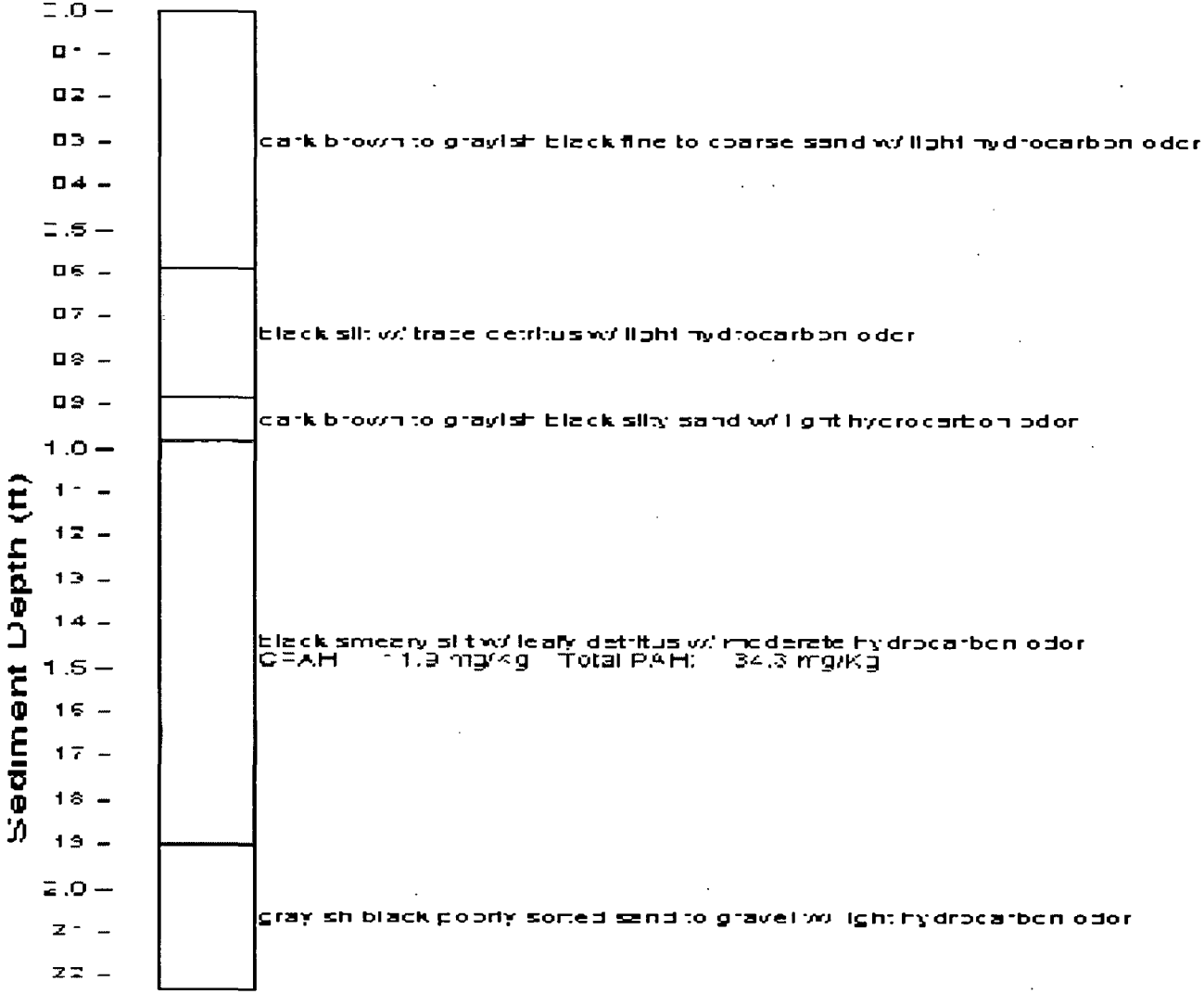

Station: SD05-0006
Dist Downstream: 29100 ft
Sediment Depth (ft)
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
1.1
1.2
1.3
1.4
1.5
1.6
1.7
1.8
dark brown fine sand w/ earthy odor
dark brown to grayish black sand to small gravel w/ earthy odor
gray sh black to dark black clayey silt w/ light hydrocarbon odor
dark brown to grayish black w/ black inclusions w/ light hydrocarbon odor
black silty detritus w/ light hydrocarbon odor
CPAH 5.3 mg/Kg Total PAH: 7.5 mg/Kg
dark brown silty sand w/ trace detritus w/ light hydrocarbon odor
CPAH 5.3 mg/Kg Total PAH: 7.5 mg/Kg
black to gray sh black silt w/ light hydrocarbon odor
CPAH 5.3 mg/Kg Total PAH: 7.5 mg/Kg
dark brown silty sand w/ trace of large gravel w/ earthy odor

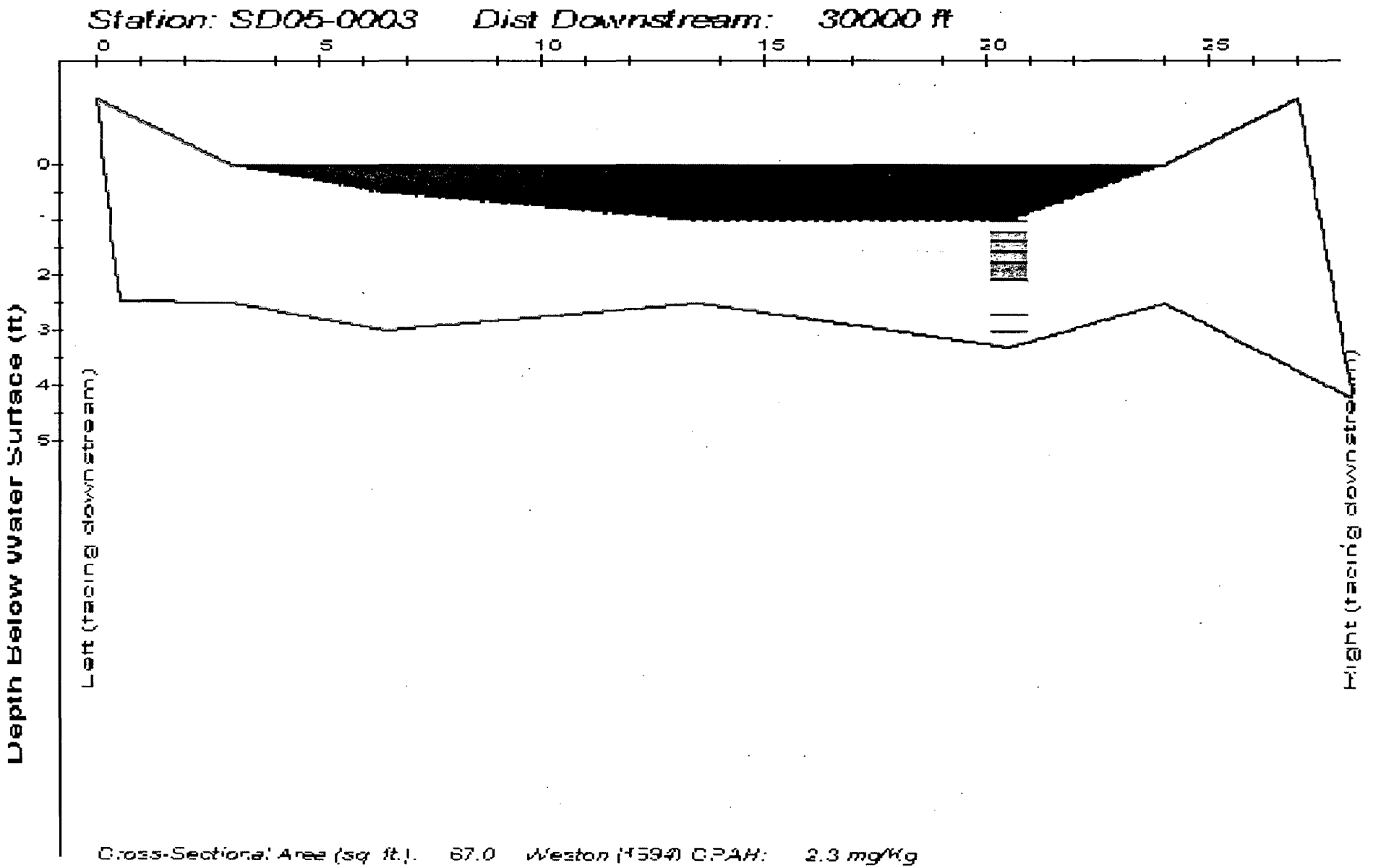

Station: SD05-0005 Dist Downstream: 29400 ft
0
5
10
15
20
25
30
Depth Below Water Surface (ft)
0
2
3
4
Left (facing downstream)
Right (facing downstream)
Cross-Sectional Area (sq. ft.). 47.9 Weston (1994) CPAH: 4.8 mg/kg

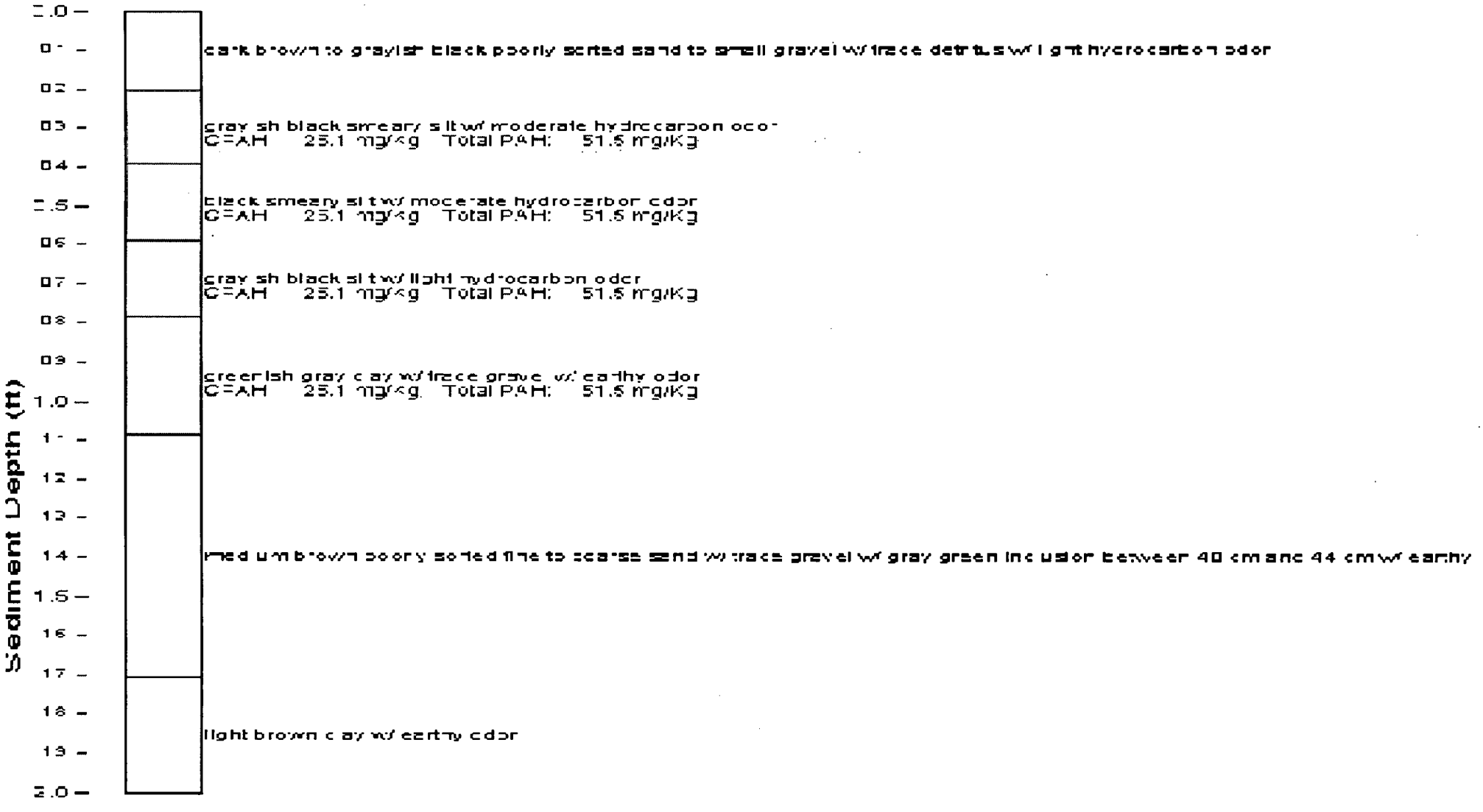

Station: SD05-0005
Dist Downstream: 29400 ft
Sediment Depth (ft)
dark brown to grayish black w/ large amounts of coarse detritus w/ earthy odor
medium brown coarse sand to gravel w/ earthy odor
gray sh brown to black silt w/ light hydrocarbon odor
dark brown to medium brown clayey silt w/ earthy odor

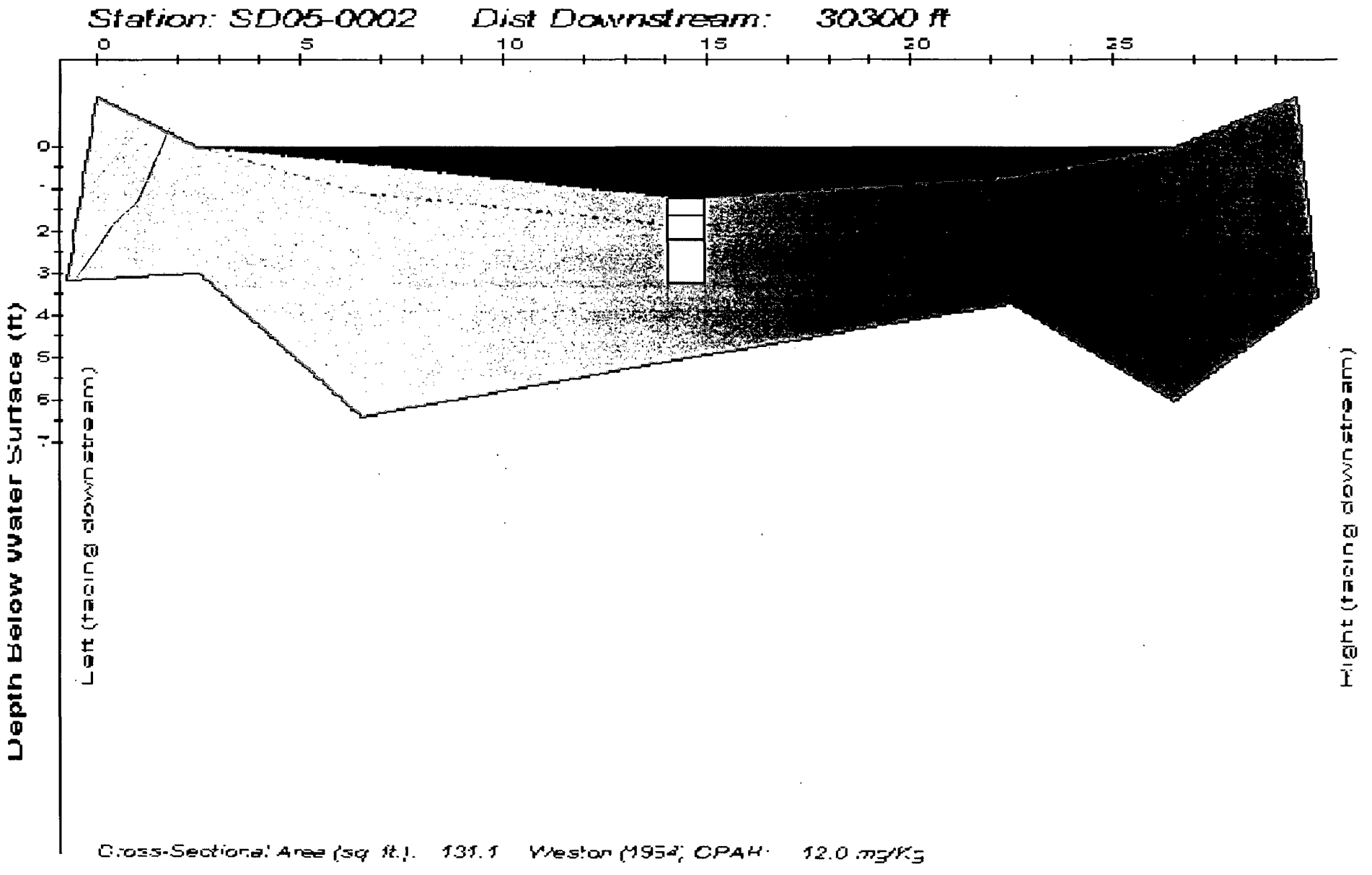

Station: SD05-0004 Dist Downstream: 29700 ft
0
5
10
15
20
25
30
0
2
3
Depth Below Water Surface (ft)
Left (facing downstream)
Right (facing downstream)
Cross-Sectional Area (sq. ft.): 38.8 Weston (1994) CPAH: 8.1 mg/Kg

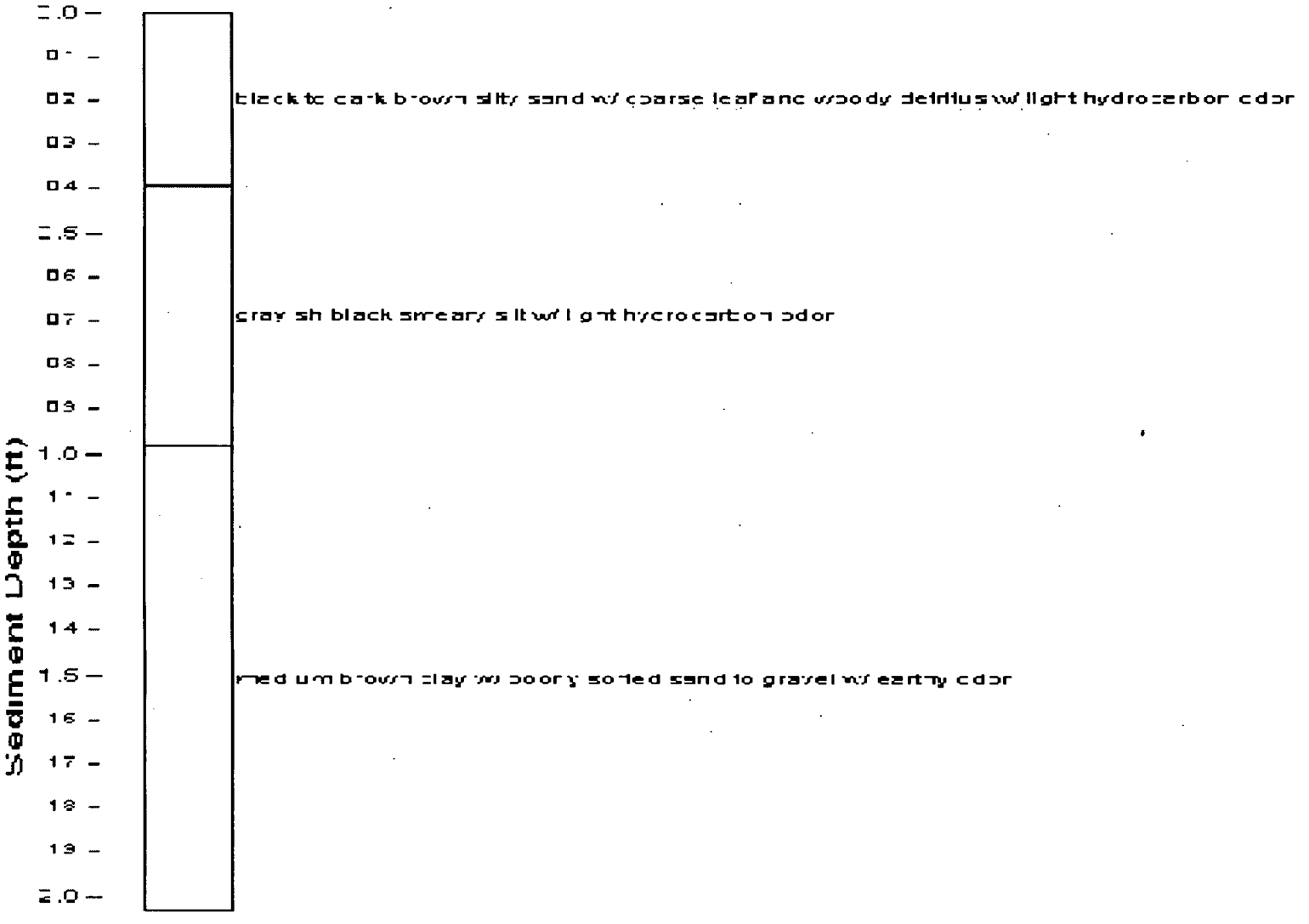
Station: SD05-0004 Dist Downstream: 29700 ft

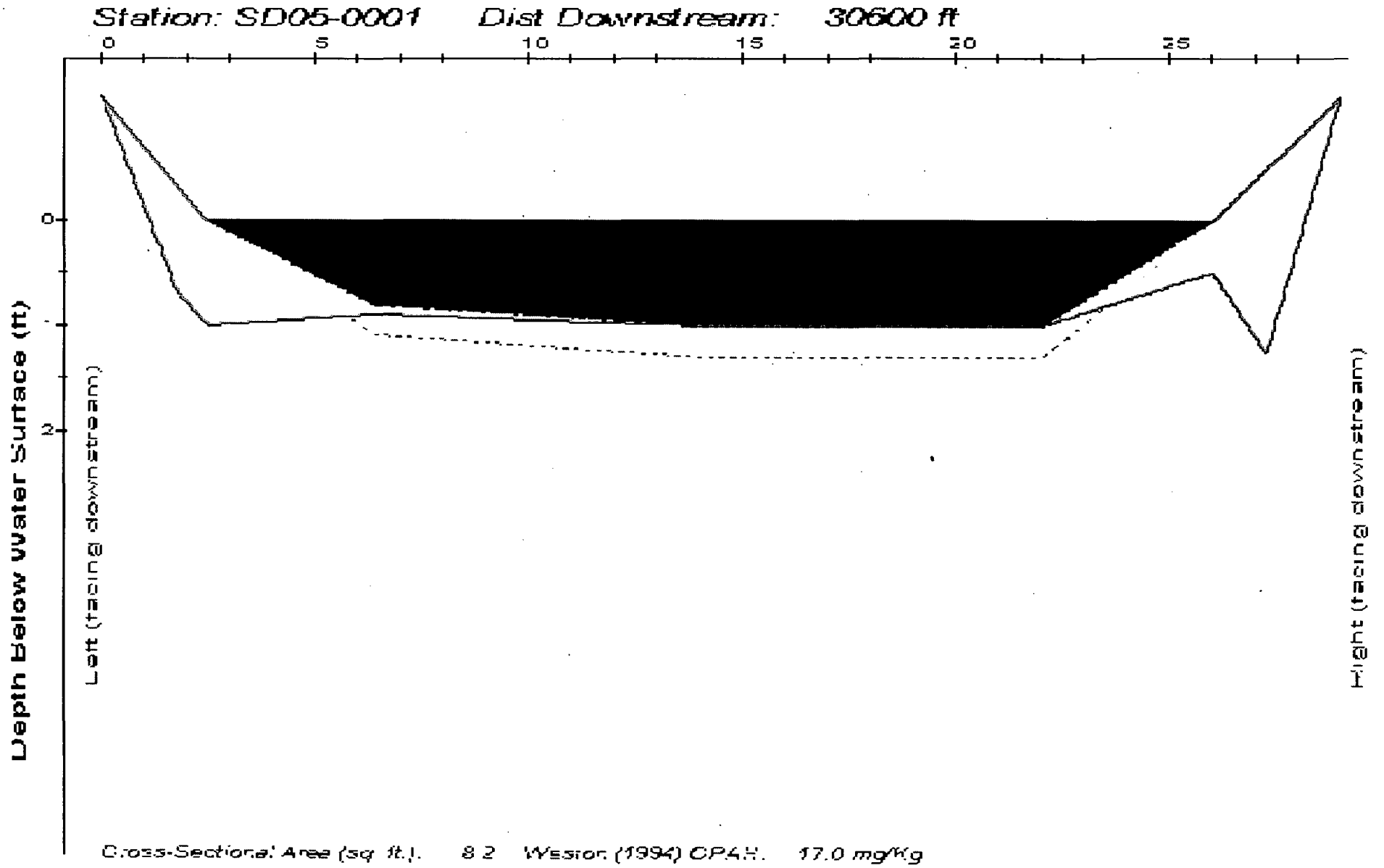



Station: SD05-0003
Dist Downstream: 30000 ft
0
5
10
15
20
25
0
2
3
4
5
Depth Below Water Surface (ft)
Left (facing downstream)
Right (facing downstream)
Cross-Sectional Area (sq. ft.): 67.0
Weston (1994) CPAH: 2.3 mg/Kg


Station: SD05-0003 Dist Downstream: 30000 ft
Sediment Depth (ft)
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
1.1
1.2
1.3
1.4
1.5
1.6
1.7
1.8
1.9
2.0
dark brown to grayish black poorly sorted sand to small gravel w/ trace debris w/ light hydrocarbon odor
gray sh black smeary silt w/ moderate hydrocarbon odor
C=AH 25.1 mg/kg Total PAH: 51.5 mg/Kg
black smeary silt w/ moderate hydrocarbon odor
C=AH 25.1 mg/kg Total PAH: 51.5 mg/Kg
gray sh black silt w/ light hydrocarbon odor
C=AH 25.1 mg/kg Total PAH: 51.5 mg/Kg
greenish gray clay w/ trace gravel w/ earthy odor
C=AH 25.1 mg/kg Total PAH: 51.5 mg/Kg
med um brown poorly sorted fine to coarse sand w/ trace gravel w/ gray green inclusion between 40 cm and 44 cm w/ earthy
light brown clay w/ earthy odor


Station: SD05-0002
Dist Downstream: 30300 ft
0
5
10
15
20
25
0
1
2
3
4
5
6
Depth Below Water Surface (ft)
Left (facing downstream)
Right (facing downstream)
Cross-Sectional Area (sq. ft.): 131.1
Weston (1954) CPAH: 12.0 mg/Kg


Station: SD05-0002 Dist Downstream: 30300 ft
Sediment Depth (ft)
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
1.1
1.2
1.3
1.4
1.5
1.6
1.7
1.8
1.9
2.0
black to dark brown silty sand w/ coarse leaf and woody debris w/ light hydrocarbon odor
gray sh black smeary silt w/ light hydrocarbon odor
med um brown clay w/ poorly sorted sand to gravel w/ earthy odor


Station: SD05-0001
Dist Downstream: 30600 ft
0
5
10
15
20
25
0
2
Depth Below Water Surface (ft)
Left (facing downstream)
Right (facing downstream)
Cross-Sectional Area (sq. ft.). 8.2 Wesion (1994) CPAH. 17.0 mg/Kg

Station: SD05-0001 Dist Downstream: 30600 ft

:.0 –

Sediment Depth (ft)