Cadmium and Zinc Concentrations in Sediment and Soil at American Ditch

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1 Executive Summary

Ohio EPA sampled sediments and soils along American Ditch on December 2, 2013, and December 3, 2013. The samples were analyzed for cadmium and zinc due to historical contamination from a former zinc smelting plant, ASARCO. The results were compared to ecological-toxicity based and residential standards to help generally determine the quantity of material which will require remediation.

In 12 of the 13 in-stream sample locations spaced over a 1.1 mile stretch of American Ditch, remediation would be necessary in at least a portion of the stream transect when sample results were compared with residential standards. A greater amount of material, coming from at least a portion of every transect sampled, would be subject to remediation when comparing analytical results with the ecological-toxicity based Probable Effects Concentration.

American Ditch transects having the lowest concentrations of cadmium and zinc corresponded to areas where ditch maintenance or other channel clearing activities are known to have recently occurred.

Sediment metals concentrations did not follow a simple longitudinal pattern of downstream dispersal, with some of the greatest extent of sediment contamination occurring within the middle portions of the survey area, nor was there a consistent relationship between sediment metals concentration and sediment depth from one stream transect to the next.

The sampling results indicate that this sampling event did not define the full rate and extent of contamination at seven sampling locations, therefore remediation plans would need to include additional sampling or incorporate a margin of safety for material removal and carrying out confirmatory sampling in those locations. Some samples collected from areas outside of the stream channel were found to contain elevated metals concentrations, and these locations may warrant follow-up investigation.

2 Introduction

This report outlines the findings of a 2013 sediment and soil sampling project carried out along American Ditch in Columbus, Ohio. This work was undertaken by the Ohio EPA Central District Office Division of Surface Water (DSW) and Division of Environmental Response and Revitalization (DERR). Previous sediment sampling performed in 1995 by Ohio EPA identified elevated concentrations of metals, including cadmium (Cd), mercury (Hg), lead (Pb), and zinc (Zn), as well as polyaromatic hydrocarbons (PAH) in American Ditch Sediment at Joyce Avenue, below ASARCO (Ohio EPA, 1995). Additional sediment sampling along the daylighted portion of American Ditch was performed in 2003 by Ohio EPA and SECOR working for ASARCO that again identified elevated concentrations of metals, particularly cadmium (Cd) and zinc (Zn), in American Ditch sediment. The source of these elevated metals concentrations was determined to be the ASARCO site, a former zinc smelter located near the origin of American Ditch.

The purpose of this new sampling event was to provide updated information regarding concentrations of cadmium and zinc in American Ditch sediments. The sampling plan was designed to determine the width, depth, and length of impacted sediment and provide a basis for remediation estimates. The results of the sampling were compared with standards to evaluate material that warrants removal. This report also identifies areas where additional sampling would further define impacted areas where the extent of contamination was not delineated. Several *in-situ* TCLP samples were collected to help evaluate whether impacted sediment, if removed, would need to be managed as a hazardous waste.

The following sections describe the project plan, sample collection procedures, and the analytical results from the sediment sampling work carried out in December 2013.

3 Sampling Locations

This sampling focused on the daylighted portion of American Ditch that flows east from Joyce Avenue for 0.6 mile then turns south and flows along Woodland Avenue for another 0.5 mile (see Figure 1 for an aerial overview). The downstream extent of this sampling effort concludes where American Ditch flows into a culvert just north of the intersection of Woodland Avenue and 5th Avenue. American Ditch ultimately joins with Alum Creek after flowing another mile within a culvert.

Sets of samples were collected at fifteen distinct locations, with thirteen of these set up as cross-sectional stream 'transects' (as outlined in Table 1 and Figure 2). Each transect was assigned a name, beginning at the downstream end of the project area with "SED13-1", "SED13-2" and so on continuing upstream to the transect nearest Joyce Avenue, denoted "SED13-13". Each sample collected within a transect was assigned a letter code which was used to indicate its general location within the transect. This is further described below, beginning with Section 4. A surface sediment sample (SED13-14, sample S) was also collected within a hydrologically connected stormwater basin which diverts flood flows away from American Ditch. This basin is located to the south and west of American Ditch; see Figure 4.

Labeled aerial photographs of smaller sections of American Ditch showing each transect in more detail are presented in Figure 3 through Figure 6. In addition, a surface sample (SED13- 7.5) was collected in an area of Evergreen Cemetery that was suspected to have high sediment metal concentrations based on information provided by the property owner. The property owner indicated that the area historically flooded and that impacts from flooding were presumed to have limited plant growth. The owner indicated that Ohio State University had collected soil samples and identified elevated metals concentrations in this area; however the analytical results of that study could not be readily located.

Transects were spaced at approximately 400' intervals. Where channel cleanout or other ditch maintenance was known to have occurred (see Figure 1), the placement of individual transects was adjusted during project planning in order to better define the extent and impact of channel maintenance activities. Transect placement was additionally directed by site visits when channel sediments were examined manually with a tile probe to determine the location of any depositional areas within each reach. Most of the length of American Ditch, particularly downstream of the American Addition neighborhood, is characterized by an incised channel with very low to no sinuosity and a lack of riffle-run-pool development.

On the morning of the first day of sampling, December 2, 2013, work began at the downstream end of American Ditch. Eight of thirteen transects (SED13-1 through -8) and the two additional surface sampling locations (SED13-7.5 and SED13-14) were sampled on the first day. Streamflow condition, thereby sediment transport, was low enough that moving in a strictly downstream to upstream direction was not necessary, therefore the Day 1 transects were visited in the order that afforded the most resource efficiency. On the second day of sampling, December 3, 2013, the remaining transects were sampled beginning at SED13-9 and moving upstream toward Joyce Avenue, finishing at SED13-13.

4 Data Collection Protocols

Sediment and soil sampling was conducted following the general guidelines set forth in Ohio EPA DERR and DSW sampling guidance (Ohio EPA, 2012a), (Ohio EPA, 2012b), and (Ohio EPA DERR).

During site reconnaissance on October 15, 2013, it had been observed that the majority of American Ditch was not easily accessible by truck mounted Geoprobe due to obstacles such as steep banks, guardrails and dense vegetation. Therefore, samples were collected using hand operated sampling equipment with the anticipation that further study could be necessitated if this sampling event did not adequately define the extent of contamination in excess of remedial action levels.

4.1 Sediment Sampling Methods

At each stream transect, field staff visually surveyed the immediate area to ensure each transect was generally representative of the nearby upstream and downstream channel. GPS location was recorded, photos were taken and a brief written description of each transect location was made. Field staff stretched a survey tape perpendicular to the flow path beginning slightly beyond the top of bank on the right edge of water to slightly beyond the top of bank on the left edge of water. This tape was not perfectly level with the water surface in every instance, and this introduced some uncertainty (+/- approx. 1-2') in the channel cross-sectional measurements. Field staff measured and documented each cross-sectional profile at 1' intervals in field notes using a telescoping rod and the survey tape. Field notes were taken indicating the tape reading at each edge of water and the locations from which samples along each stream bank were collected.

If spoil deposition from channel maintenance was documented or appeared to have occurred at a given transect location, additional sampling on the top of the bank was carried out (i.e. samples F, G, and H- see Figure 2 for relative sampling locations for each transect). Samples collected on the stream bank or depositional areas beyond the bank were at a depth of surface to 4" deep.

Sediment and soil samples were collected with several AMS stainless steel bucket augers with interchangeable auger heads and/or large steel sampling scoops depending upon conditions at specific transects and the depth of the sample collected.

When collecting wetted channel core samples, a 3.5' length of PVC pipe with a 4" inner diameter to tightly fit the auger head was pounded into the substrate as a casing to prevent sample cross-contamination within the wetted channel core samples. All core sample depths should be considered +/- 1" due to the nature of the sampling equipment and substrate conditions.

For every sample collected, field staff transferred the homogenized sample to a new, pre-labeled plastic 250 ml Nalgene bottle and stored it in a cooler on ice. The label indicated the date, transect ID and a letter code to indicate the location from within the transect where it was collected. Field staff recorded the survey tape measurements corresponding to each sampling location. The following sections describe

the protocols used to collect samples within each transect. Refer also to Figure 2, Profile of a Sampling Transect.

4.2 Sample Locations

4.2.1 Spatial composite at sediment depositional surface S (surface to -1”):

Using a large stainless steel scoop, the surface depositional areas of the normal base flow (non-runoff flow) wetted channel were sampled as illustrated in Figure 2. A homogenized composite sample was created, using a clean stainless steel bowl or pan, from two or three depositional locations at or adjacent to the transect tape.

4.2.2 Spatial composite sediment sample A (-1” to -7”):

Field staff installed the PVC casing within the normal base flow (non-runoff flow) wetted channel as illustrated in Figure 2. Using a soil auger, field staff collected a 6” sample and removed the top 1” of the overlying surface sediment. A spatial composite of two to three sub-samples was collected from a -1” to -7” depth along each transect.

4.2.3 Spatial composite sediment sample B (-7” to -13”):

Within the PVC casing, field staff removed the overlying surface and top 6” of sediment at two or three points, usually by collecting the overlying core as “sample A”, as described above, and decontaminating the auger head in between collection of core samples (see “3.3 Decontamination of Sampling Equipment”) to prevent the conveyance of surface-deposited contaminants into lower depths and vice versa. Sample B encompassed the -7” to -13” layer of sediment.

4.2.4 Spatial composite sediment sample E (-13” to -19”):

Where deep deposition of soft sediments was apparent and sample collection was feasible, field staff proceeded to install the PVC casing and collect a deeper stratified sediment sample and separate out a composite sample “E” in the same manner as “B” above, except in this case at a depth of -13” to -19”, to create spatial composite sediment sample “E”. In practice, collection of a composite core sample at this depth was only feasible at one location, SED13-7.

4.2.5 Discrete sediment core samples C, D (0” to -4”):

The locations of left and right bank samples were determined by first measuring the maximum height of the stream bank at each transect. Then a level plane was extended, using a handheld laser level and a telescoping survey rod, at one half of the maximum bank height. Field staff used a clean soil auger or a stainless steel scoop to collect a 0” to -4” soil core at each location.

4.2.6 Discrete soil core samples F, G, and H (0" to -4"):

Where records indicated historic channel maintenance (see Figure 7) or other potential reasons for placement of the chemicals of concern on the channel banks were identified, surface spoil depositional areas were sampled at the ends of the transect tape on top of the left and/or right bank. Sample identifier "G" was used to indicate a left top-of-bank sample and "F" was used to indicate a right top-of-bank sample.

Sample ID "H" was used to denote an additional sample located beyond those portions of the transect already listed, for instance an additional sample at SED13-11 and SED13-7.5 where temporary historic spoil deposition was considered probable. Field staff documented the exact location of these samples and used a clean soil auger or scoop for collection. Any additional sampling at depth or extending over a larger upland surface area at these locations was considered to be contingent on the surface sample results from this study and a potential topic of additional follow-up investigation.

4.3 Decontamination of sampling equipment:

All equipment used for sampling was decontaminated before reuse, as outlined in detail in the work plan (Ohio EPA, 2013). An equipment rinse blank sample was collected and the analytical results supported the effectiveness of this particular decontamination process in preventing cross contamination during sample collection, see Section 3.4.3 and 4.3 for more detail.

4.4 Chemical Analysis:

4.4.1 Cadmium and Zinc

Sediment and soil samples were packed on ice and delivered to Ohio EPA's Division of Environmental Services (DES) laboratory on the day following sample collection in accordance with the protocols of the Ohio EPA Field Sampling Handbook (Reference 6). Each sample was analyzed for cadmium and zinc single-element metal parameters using USEPA analytical methods SW846, 6020A and 6010B within the required holding time.

4.4.2 TCLP

Also, four sediment samples were analyzed for TCLP metals and volatile organic compounds. These parameters were recommended for analysis by the Solid Waste Authority of Central Ohio for potential acceptance of sediment waste at the Franklin County Landfill. Samples were collected from locations where previous sediment analytical results suggested that the highest concentrations may be encountered. The "A" sample from SED13-7 and SED13-9 and the "S" sample from SED13-12 and SED13-13 were split and a sample from each of the above locations was submitted for analysis at Microbac Laboratories, Marietta, Ohio. TCLP analysis was performed as an indicator of whether remediated sediment would require management as hazardous waste.

4.4.3 QA Samples:

Duplicate samples were collected at a rate of one for every ten samples (10%), and samples were analyzed in the same manner and for the same parameters as all other samples. In each case, the sample identified as “Duplicate A” was arbitrarily selected, prior to receiving analytical results, for use as sampling data. The use of data from “Duplicate B” in each case was limited to QA purposes, and these data are not discussed beyond this context in this report. See Results Section 4.3 and Table 2 for more detail.

One equipment rinse sample was collected after an instance of field decontamination had been performed. This was carried out by rinsing a decontaminated tray and spoon with reagent-grade water. The rinse water was then collected into a plastic surface water sampling container, preserved with HNO_3 and was analyzed for zinc and cadmium concentrations in a surface water matrix. See Results Section 4.3.

5 Results

5.1 Overview

Zinc and Cadmium were detected in stream sediments and bank soils throughout American Ditch in concentrations higher than background levels. Considering all 81 sediment and soil samples collected, cadmium concentrations ranged from 1.2 mg/kg to 195 mg/kg and zinc concentrations ranged from 135 mg/kg to 35300 mg/kg.

Averaging the analytical results of samples collected within the wetted channel (samples S, A, B, and E) at each transect, the highest levels of both cadmium and zinc were found at SED13-9 (123 average mg/kg Cd; 10993 average mg/kg Zn). In-stream cadmium was lowest at SED13-11 (13.40 mg/kg Cd; 1693 mg/kg Zn) and in-stream zinc was lowest at SED13-3 (26.13 mg/kg Cd; 825 mg/kg Zn).

5.2 Sediment Evaluation Criteria

The following sections describe benchmark concentrations that were used to describe the concentrations of cadmium and zinc measured in American Ditch in relation to ecological toxicity and the protection of human health.

5.2.1 Threshold Effect Concentration (Ecological): 0.99 mg/kg Cd and 121 mg/kg Zn

The Threshold Effect Concentration (TEC) is a consensus-based sediment quality guideline that defines a threshold concentration for ecological impact, below which any pollutant would not be expected to cause toxicity to sediment dwelling organisms (MacDonald, Ingersoll, & Berger, 2000). All stream sediment and soil samples collected within the project area contained zinc and cadmium in concentrations greater than TECs.

5.2.2 Probable Effect Concentration (Ecological): 4.98 mg/kg Cd and 459 mg/kg Zn

The Probable Effects Concentration (PEC) is a sediment quality guideline used to predict toxicity to sediment dwelling organisms based on *in situ* concentrations of sediment contaminants (MacDonald, Ingersoll, & Berger, 2000). Zinc and cadmium concentrations were each in excess of PEC levels at the same rate, 85% of samples collected (69 of 81), though not in an identical geographic extent. A stormwater basin inlet, SED13-14 was only sampling location not to exhibit at least one instance of Cd or Zn in excess of PEC levels.

All analytical results were discussed in the following sections relative to PEC guidelines regardless of the location from which the sample was collected and without regard to the distinctions that exist between soils and sediments. In practicality, and with regard to potential remediation activity, it may not be appropriate to judge the contaminant concentration of a non-sediment, soil sample (i.e., top of bank samples F, G, H) against PEC criteria.

5.2.3 Human Health Criteria: 35 mg/kg Cd and 11,500 mg/kg Zn

The residential human health standards used within this report are based upon the USEPA Region 9 Regional Screening Levels (RSL). Because there are two metals of concern in each sample, the standard for each metal is adjusted to one half of the RSL for that particular metal. This was denoted as the *RSL-0.5*. The RSL-0.5 for cadmium is the RSL of 70 ÷ 2, or 35 mg/kg. The RSL-0.5 for zinc is 23,000 ÷ 2, or 11,500 mg/kg.

Of all 81 samples, 33 (40%) contained cadmium in excess of the RSL-0.5 concentration, and four samples (5%) contained zinc in excess of the RSL-0.5 concentration[1]. All American Ditch transects except SED13-11 contained at least one sample with an exceedance of the RSL-0.5 and cadmium concentrations were the principal cause for an exceedance of the RSL-0.5 (see Table 3, Table 5, and Table 6 for details). The stormwater basin sample, SED13-14, also contained cadmium and zinc in concentrations lower than the RSL-0.5.

In seven transects there is uncertainty regarding the full physical extent of contamination (see Table 4 and Figure 8 through Figure 11). This is a result of metals concentrations, usually cadmium, in the deepest wetted channel sample, or in top of bank samples F or G, that were in excess of the above sediment evaluation criteria.

The aboveground portions of American Ditch can be organized into five generally uniform reach types, based on local differences in stream morphology, surrounding land use and recent channel maintenance history. The zinc and cadmium concentrations found at each stream transect were described within this context below, beginning at the headwaters and concluding at the downstream extent of the study area. Metals concentrations were compared to established ecological and human-health thresholds (PEC and RSL-0.5). Sample location letters listed after each transect name are formatted as follows if an exceedance was present in one or both metals: sample locations with either metal concentration greater than the PEC are denoted by "*"; sample locations with either metal concentration greater than the RSL-0.5 are denoted by underlining. By convention, the terms *left bank* and *right bank* assume the observer is looking in a downstream direction.

A brief discussion of the extent of material removal that would be necessary using the PEC and, separately, the RSL-0.5 follows the discussion of analytical results within each transect below. When applying the PEC to sediment removal estimations, only the stream channel samples (S, A, B, C, D, E) were taken into consideration and the top of bank samples F and G are excluded.

5.2.4 American Addition Reach (Transects SED13-13 through -9)

The portion of American Ditch that lies adjacent to the American Addition residential neighborhood, 2000' in length, flows east from Joyce Avenue to an area upstream of Evergreen Cemetery. This reach lies directly downstream of the former ASARCO property and an approximately 700' long segment of American Ditch within the ASARCO property that was previously sampled for sediment contaminants in

[1] When comparing to the full RSL values, 17/81 (20%) of Cd would exceed and 1/81 (1.2%) of Zn would exceed.

2012 by ARCADIS (ARCADIS, 2012). Residential properties and light commercial and industrial use border the stream in equal measure along the American Addition reach. Even so, this section of American Ditch has a comparatively dense riparian zone consisting of small trees and brush, ranging from approximately 10' to 30' wide in places, and it has an incised channel that ranged in places from four to seven feet across during sample collection. Some small stream meanders and minor in-channel depositional areas were apparent.

5.2.4.1 SED13-13 (S, A*, B*, C*, D*)*

The most upstream transect was located approximately 50' downstream of Joyce Avenue. This site was characterized by steep banks, dense thickets of *Lonicera* (honeysuckle) bushes and an accumulation of litter and road debris in and around the stream. Field staff noted an oily sheen on the water surface and a strong hydrocarbon-like odor when sediment cores were being extracted at this location and at the next transect downstream, SED13-12.

All zinc and cadmium samples collected here exceeded PEC thresholds. Cadmium at the stream surface, sample S, was in excess of the RSL-0.5 at 128 mg/kg. In underlying samples A and B, cadmium concentrations were lower, 29 and 34.8 mg/kg, respectively. Zinc was also more concentrated in the surface sample, at 10300 mg/kg. Samples A and B contained slightly less than half the concentration of zinc vs. the surface sample, at 4020 and 4860 mg/kg, respectively. Left and right bank samples had similar concentrations of zinc and cadmium. The left bank sample, C, had cadmium at 24.7 mg/kg and zinc at 3280 mg/kg. Cadmium and zinc in the right bank sample D were at 11.2 mg/kg and 2570 mg/kg, respectively.

- Channel remediation to PEC:
  - All sampling locations would require sediment removal
  - The vertical extent of contamination is not defined.
- Remediation to RSL-0.5:
  - Only the surface sample within the channel exceeded the standard.
  - However cadmium concentrations in the B sample (to 13" depth) are very close to the RSL-0.5 (34.8 mg/kg vs. the 35 mg/kg RSL-0.5 standard). Therefore, the entire wetted channel, to a depth of 13" would likely require removal.

5.2.4.2 SED13-12 (S, A*, B*, C*, D*, E*, G)*

This transect was upstream of a 150' section of stream where channel cleanout activities occurred in 1998 and 2007 (See Figure 6) and was located in approximately the same place as "SED-9", the uppermost sampling location from the previous Ohio EPA and SECOR studies of American Ditch sediments (Ohio EPA, 2010) and (SECOR, 2004). Back yards in a residential neighborhood lie adjacent to American Ditch to the south, or right edge of water, in this area. Substrates on the banks of this site included material with the physical appearance of clinker, and field staff collected soil samples on the top of the bank at the left and right edges of the channel. A collection of residential solid waste (mattress, etc.) was piled up on the top of the left bank, beyond sampling location G.

Zinc and cadmium concentrations increased with depth in the wetted channel composite samples. Concentrations of cadmium in excess of the RSL-0.5 were more widespread at this location with S, A, B, C and the top of right bank sample, F, ranging from 43.3 to 69.3 mg/kg. Zinc in sample C, 35300 mg/kg was also higher than the RSL-0.5 threshold and this sample contained the highest concentration of zinc found in this study area. Sample G was taken at the top of the left bank, about 20' from the center of the stream channel, and had some of the lowest concentrations of cadmium and zinc in the study area (2.93 mg/kg Cd; 220 mg/kg Zn), falling beneath both human health and PEC thresholds.

- Channel remediation to PEC:
  - The entire wetted channel, to a depth of at least 13", and banks would require removal.
  - The vertical and right bank extent of contamination is not defined.
- Remediation to RSL-0.5:
  - The entire wetted channel, to a depth of at least 13", and the left bank to sample C would require removal.
  - The vertical and right bank extent of cadmium concentration is not defined.

5.2.4.3 SED13-11 (S, A*, B, C, D*, F*, G)*

This transect was located within the area where stream clearing and sediment removal occurred, in 1998 and 2007. The channel cross-sectional relief was steeper at this transect than adjacent sampling locations. Artificial substrates consisting of rip-rap and gravel predominated at the top of the left bank; this presented a challenge when attempting to collect a sample of native soil at the G sampling location. Therefore sample G was taken at a lower point on the bank, relative to other transects, where soil reappeared as the dominant surface substrate.

No samples at this transect exceeded the RSL-0.5 for either metal. This transect had relatively low levels of contamination compared to all other transects sampled. Both left bank samples, G and C, were below PEC and RSL-0.5 levels with cadmium at 1.89 and 1.19 mg/kg, respectively and zinc at 351 and 162 mg/kg, respectively. Within the wetted channel (S, A, and B) both metals decreased in concentration with depth. Sample S (32 mg/kg Cd; 3950 mg/kg Zn) and A (6.2 mg/kg Cd; 827 mg/kg Zn) were in excess of PECs for both metals, but sample B was not (2 mg/kg Cd; 301 mg/kg Zn). Right bank samples D and F contained cadmium and zinc higher than PEC levels. Higher concentrations of zinc and cadmium were present in D (23.2 mg/kg Cd; 2900 mg/kg Zn) than at F (10.1 mg/kg Cd; 1210 mg/kg Zn).

- Channel remediation to PEC:
  - Sediment within the channel would need to be removed at least to a depth of 7", as well as the right bank up to sample D.
- Remediation to RSL-0.5:
  - No sediment or soil removal would be required at this transect.

5.2.4.4 SED13-10 (S, A*, B*, C, D*, F*, G)*

SED13-10 lies just downstream of the portion of American Ditch that had undergone recent stream clearing. Both steep banks at this transect were littered with asphalt, brick, gravel and glass although this was more pronounced on the left bank. Along this bank, the location of samples C and G, the exact transect location was entirely covered with asphalt therefore these sample were collected 5' upstream of the plane where the channel and right bank samples were collected. Substrates within the wetted channel offered more resistance to the auger than many other transects, and the hand auger failed to yield samples any deeper than 10".

Samples C and G on the left bank had low levels of zinc and cadmium, below PEC thresholds. Cadmium concentrations were 3.2 mg/kg in sample C and 1.69 mg/kg in sample G, zinc was 380 mg/kg in sample C and 211 mg/kg in sample G. The only sample in excess of the RSL-0.5 was cadmium in sample A, at 47.2 mg/kg. The highest concentration of zinc at this transect was also in the A sample, at 5610 mg/kg. Wetted channel samples S, B and right bank samples D and F all had metals concentrations greater than PEC levels, with cadmium ranging from 14.6 to 34.8 mg/kg and zinc ranging from 3120 to 5340 mg/kg.

- Channel remediation to PEC:
  - The wetted channel to a depth of at least 13" and the right bank would require removal.
  - The vertical extent of contamination is not defined.
- Remediation to RSL-0.5:
  - The wetted channel, at least to a depth of 7", would require removal.
  - However, similar to SED13-13, the deepest channel core sample B contains cadmium that approaches the RSL-0.5 (34.8 mg/kg vs. the 35 mg/kg RSL-0.5 standard). Therefore, the entire wetted channel, at least to a depth of 13" would likely require removal.

5.2.4.5 SED13-9 (S, A*, B*, C*, D*, H*)*

Transect SED13-9 lies at the downstream end of the American Addition Reach, approximately 300' upstream of a brief southward bend in the stream where it approaches Evergreen Cemetery. At SED13-9, American Ditch flows through a series of small log jams resulting in several pooled runs with small rills and riffles running overtop log jams. The channel is less incised in this location than the upstream transects. In addition to wetted channel samples and bank samples C and D, a sixth sample (H) was collected on top of a manmade berm on the left edge of water, 44' from the center of the channel.

All samples collected from this transect had cadmium and zinc concentrations greater than PEC levels. Soils on the left bank berm, sample location H, (10.8 mg/kg Cd and 1420 mg/kg Zn) did not exceed the RSL-0.5. All other samples at this transect had cadmium in excess of the RSL-0.5. Zinc exceeded the RSL in sample B, where the highest levels of both metals were found (172 mg/kg Cd; 15100 mg/kg Zn). In left and right bank samples and the wetted channel A and B samples, cadmium ranged from 85.1 to 107 mg/kg and zinc ranged from 7310 to 10000 mg/kg.

- Channel remediation to PEC:

    - Both banks and the wetted channel to a depth of at least 13” would require removal.
    - Vertical and lateral extent of contamination is not defined.
- Remediation to RSL-0.5:
    - Both banks and the wetted channel to a depth of at least 13” would require removal.
    - Vertical and lateral extent of contamination is not defined.

5.2.5 Evergreen Cemetery Reach (Transects SED13-8 and -7. Samples SED13-7.5 and -14)

This section of American Ditch, extending 1200’ along the southwestern and southern edges of Evergreen Cemetery, has undergone more stream clearing and more recent straightening than the upstream American Addition reach. At the upstream end of this reach, a 120’ length of American Ditch runs from north to south along the southwestern edge of Evergreen Cemetery. A slightly raised storm sewer inlet lies at the southern end of this segment, on the right edge of water, and diverts high stream flows through a culvert into a stormwater retention basin, located approximately 1000’ to the south-southwest at approximately the western terminus of Woodward Avenue (see Figure 4 and Figure 5).

5.2.5.1 SED13-8 (S, A*, B*, C*, D*, F*, G)*

This transect is situated within a section of American Ditch where stream clearing work occurred in 1999 and 2003-2004. This site lies approximately 15’ downstream of the stormwater basin inlet at an eastward bend in the channel. The left bank, where flow velocity would be lower than on the right bank, appears to be a depositional area of the channel.

Sample G, 14’ from the center of the channel on the top of the left bank, had the lowest metals concentrations at this transect, below PEC thresholds (2 mg/kg Cd; 270 mg/kg Zn). All other sample locations had metals in excess of PECs. Left bank sample C (44.3 mg/kg Cd; 2020 mg/kg Zn) and wetted surface sample S (68.6 mg/kg Cd; 6270 mg/kg Zn) had cadmium concentrations greater than the RSL-0.5. Metals concentrations decreased with depth, and the right bank samples had relatively low metals compared to the channel surface and left bank. At sampling locations A, B, D and F cadmium ranged from 7.98 to 25.6 mg/kg and zinc ranged from 620 to 2490 mg/kg.

- Channel remediation to PEC:
    - Both banks and the wetted channel to a depth of at least 13” would require removal.
    - Vertical and right bank lateral extent of contamination is not defined.
- Remediation to RSL-0.5:
    - Left bank sediments and at least the surface of the wetted channel would need to be removed.

5.2.5.2 SED13-7 (S, A*, B*, C*, D*, E*, F, G*)*

SED13-7 is in the same general location as “SED-7” from the previous Ohio EPA study and corresponds with an area known to have high historical sediment contamination. This transect lies downstream of

SED13-8 within the Evergreen Cemetery property. This portion of the stream, while lined by large trees, is characterized by a narrow unstable channel with collapsing and subsiding banks.

Cadmium and zinc were present in high concentrations at this location, with the exception of sample F (1.88 mg/kg Cd; 150 mg/kg Zn) collected at the top of the right bank approximately 20' from the center of the channel. The zinc maximum of 13900 mg/kg, in sample D, was higher than the RSL-0.5 concentration; sample D also had the highest cadmium concentration at 195 mg/kg. Cadmium in all sample locations, excepting sample F, was higher than the RSL-0.5. Softer sediments at depth allowed for sample E to be collected at a maximum depth of 18", and metals concentrations in sample E were 45.4 mg/kg Cd and 2490 mg/kg Zn. Overlying wetted channel samples ranged from 76.7 mg/kg to 123 mg/kg Cd and 5680 mg/kg to 7060 mg/kg Zn. Left bank sample C contained metals in similar concentrations to the wetted channel samples, with 102 mg/kg Cd and 6420 mg/kg Zn. Collected on the top of the left bank, nine feet from the center of the channel, sample G had cadmium in excess of the RSL-0.5 at 72.2 mg/kg and zinc at 3950 mg/kg.

- Channel remediation to PEC:
    - Both banks and the wetted channel to a depth of at least 13" would require removal.
    - Vertical and left bank extent of contamination is not defined.
- Remediation to RSL-0.5:
    - Both banks and the wetted channel to a depth of at least 13" would require removal.
    - Vertical and left bank extent of contamination was not defined.

5.2.5.3 SED13-7.5 (H)*

Communications with Evergreen Cemetery revealed that historic flood flows potentially generated sediment deposition outside the banks of the stream channel along this reach, therefore a soil sample was collected at a location situated in between transects SED13-7 and SED13-8, about 15' from the center of the channel on top of the left bank. Cadmium in this surface sample was higher than the RSL-0.5 threshold, at 55.7 mg/kg. Zinc was in excess of the PEC only, at 2510 mg/kg.

This event did not include additional sampling to evaluate the distribution of cadmium and zinc concentrations in the area of SED13-7.5(H).

Estimating removal of soil outside of the stream bank is outside the scope of this report.

5.2.5.4 SED13-14 (S)

A surface sample was collected within a city stormwater retention basin, 15' downstream of the intake culvert coming from American Ditch. A composite sample was made from surface samples collected 1-2' from the right and left edges of a concrete-lined channel which itself did not contain significant accumulation of sediment. Neither of the metals sampled was in excess of the PEC or RSL-0.5 (1.54 mg/kg Cd and 135 mg/kg Zn).

- Channel remediation to PEC:

- No action necessary. Due to a lack of sediment accumulation, no sample was collected within the channel itself, and surface samples collected adjacent to the concrete-lined channel were below PEC thresholds.

- Remediation to RSL-0.5:
  - No action necessary because analytical results were below the RSL-0.5.

5.2.6 Upper Woodland Avenue Reach (Transects SED13-6 and -5)

As American Ditch flows west to east along Evergreen Cemetery, it meets Woodland Avenue and turns southward at a 90-degree angle. This 840' reach comprises the north to south portion of American Ditch between this sharp bend and where it flows at the downstream end within a short culvert beneath Woodward Avenue. This reach underwent ditch maintenance at least once along its entire length and again, in a separate event, in a limited area nearer the Woodward Avenue culvert. Both of these stream clearing events occurred in 1994. Moving in a downstream direction, the stream channel along this reach increasingly had the appearance of a shallow linear wetland, with tall grasses and *Phragmites* growing within the wetted channel and the upper layers of channel sediment had a mucky consistency.

5.2.6.1 SED13-6 (S, A*, B*, C*, D*, F*)*

This transect was located at the upper third of this segment, roughly aligning with the downstream end of a small retention pond adjacent to American Ditch. The pond and the stream channel are separated by a span of 50', and there is not a direct surface connection between the two bodies of water, except possibly under flood conditions. At this transect and downstream at SED13-5, American Ditch has a steep left bank coming from the road down to the stream channel. On the opposite bank a gentle slope extends from the stream up to a large, open field extending westward from the top of the right bank.

Visually, the left bank sample appeared to have a substrate more consistent with materials related to road construction than stream sediment. Left bank sample C (9.98 mg/kg Cd; 979 mg/kg Zn) was lower in concentrations of both metals than the right bank sample D (37.5 mg/kg Cd; 2440 mg/kg Zn) or the wetted channel composite samples. Cadmium concentrations exceeded RSL-0.5 in the wetted channel samples and in right bank sample D. In the channel, cadmium decreased from 97.8 mg/kg Cd at the surface, 80.4 mg/kg Cd in sample A, to 35.9 mg/kg Cd in sample B. Zinc concentration in all samples at transect SED13-6 was higher than the PEC. In the stream channel, surface sample S was 6930 mg/kg, higher in sample A, 7110 mg/kg and 2750 mg/kg in sample B.

- Channel remediation to PEC:
  - The wetted channel to a depth of at least 13" and both banks would have to be removed.
  - Vertical and lateral extent of contamination is not defined.
- Remediation to RSL-0.5:
  - The wetted channel to at least 13" depth and the right bank to sample location D would require removal.
  - Vertical extent of contamination is not defined.

5.2.6.2 SED13-5 (S, A*, B*, D*, F*)*

This transect is located approx. 90' upstream of the Woodward Avenue culvert in a shallow depositional area. The left bank was reinforced with rip rap to the extent that the soils and sediments were inaccessible for sampling, therefore neither sample C nor G was collected.

Similar to SED13-6, the top of bank sample F had relatively low concentrations of cadmium, 20.8 mg/kg, and zinc, 1420 mg/kg, however all samples exceeded PECs. Right bank sample D had cadmium in excess of the RSL-0.5 (43.8 mg/kg Cd; 3390 mg/kg Zn). Within the stream channel, the highest concentrations of both cadmium and zinc were in the surface sample S, 150 mg/kg Cd and 15600 mg/kg Zn. Both of these concentrations exceed the cadmium and zinc RSL-0.5. Concentrations of both metals diminished with depth: sample A contained cadmium in excess of the RSL-0.5 at 49.6 mg/kg and zinc at 3320 mg/kg. Sample B metals were higher than PECs, but lower than the RSL-0.5 threshold (30.1 mg/kg Cd; 1510 mg/kg Zn).

- Channel remediation to PEC:
  - The wetted channel to a depth of at least 13" and right bank sediments require removal.
  - Vertical and right bank extent of contamination is not defined.
- Remediation to RSL-0.5:
  - The wetted channel to a depth of at least 7" and the right bank sediments require removal.

5.2.7 Middle Woodland Avenue Reach (Transects SED13-4 and -3)

This reach began at the Woodward Avenue culvert at its north end and flowed about 800' southward along Woodland Avenue, into a culvert crossing west to east beneath Woodland Ave. This reach differs from the adjacent reaches in the degree of recent ditch maintenance that appears to have occurred. The 1994 maintenance just north of Woodward Avenue extended into the upstream part of this reach, possibly including transect SED13-4. The City of Columbus has record of about 800' of ditch maintenance taking place in 2004 along this entire reach. At the right edge of water, along the western edge of the stream, the bank appeared to have been artificially shaped, especially in the downstream half of this reach, presumably by the abovementioned stream clearing activities. Sediment deposition within this reach appeared uniform within and at the margins of the active channel upon site recon.

5.2.7.1 SED13-4 (S, A*, B*, C, D*, F)*

Soils and sediments at this transect contained lower concentrations of metals compared to the transects in the upstream reach, with only one RSL-0.5 exceedance in sample B, the deepest wetted channel sample, with a cadmium concentration of 76.8 mg/kg and zinc at 1730 mg/kg. Surface sample S and A had cadmium concentrations at 9.14 and 11.2 mg/kg, respectively, and 1130 and 938 mg/kg, respectively. Left bank sample C had below-PEC concentrations of both metals, with 1.25 mg/kg Cd and 176 mg/kg Zn. Right bank sample D was above PEC thresholds in both metals (18 mg/kg Cd; 1270 mg/kg

Zn). Top of bank sample F was collected 13' from the center of the stream channel and was below PEC concentrations in both metals (1.15 mg/kg Cd and 145 mg/kg Zn).

- Channel remediation to PEC:
  - The wetted channel to a depth of at least 13" and the right bank sediments require removal.
  - Vertical extent of contamination is not defined.
- Remediation to RSL-0.5:
  - The wetted channel to a depth of at least 13" would require removal.
  - Vertical extent of contamination is not defined.

5.2.7.2 SED13-3 (S, A*, B*, C*, D*, F*)*

This transect is located about 20' upstream of where the stream channel briefly widens and then flows into a culvert crossing underneath Woodland Avenue. Just below the surface sediment layer, sampling equipment encountered a four inch thick layer of clay. Wetted channel samples at this location were low in both metals concentrations, relative to other transects, though most remained higher than PEC thresholds.

Right bank sample D was the only sampling location that had a higher concentration of cadmium than the RSL-0.5, 68.5 mg/kg Cd, and also had the highest concentration of zinc in this transect, 4060 mg/kg. Further up the right bank, sample F was collected 15' from the center of the channel and was in excess of the PEC for cadmium and zinc (19.2 mg/kg Cd; 1010 mg/kg Zn). Left bank sample C had concentrations in excess of the PEC, at 24 mg/kg Cd and 1220 mg/kg Zn.

- Channel remediation to PEC:
  - The wetted channel to a depth of at least 13" and both banks would require removal.
  - Vertical and lateral extent of contamination is not defined, although cadmium concentration decreased with depth in the wetted channel.
- Remediation to RSL-0.5:
  - Only the right bank, at sample location D, has cadmium concentrations that require removal.

5.2.8 Lower Woodland Avenue Reach (Transects SED13-2 and -1)

This reach was the downstream extent of the sampling effort, flowing from north to south for about 300' along the east side of Woodland Avenue adjacent the Yenkin-Majestic paint and resin manufacturing facility. This complex consists of several buildings situated just north of the intersection of 5th Avenue, Leonard Avenue and Woodland Avenue. The inlet catch basin to the storm sewer at the furthest downstream extent of this reach has been so excessively modified and recently lined with large rip rap that it was not considered suitable for inclusion in this study. The balance of this reach, upstream from the catch basin, has been historically straightened, channelized and stabilized using

riprap along the left bank, opposite Woodland Ave. Sediment deposition appears to occur primarily along the left and right margins of the active channel in a uniform pattern through the reach.

5.2.8.1 SED13-2 (S, A*, B*, C*, D*)*

SED13-2 is located at the upstream end of this reach, approximately 8-10' upstream of a stormwater discharge pipe coming from the Yenkin-Majestic property. *Typha* and tall grasses were growing within the stream channel along this area. Top of bank samples were not collected due to lack of evidence of sediment deposition on the top of the banks and the close proximity of a nearby building. The adjacent building on the Yenkin-Majestic property is about 1-2' beyond the left edge of the transect tape (approx. 23-24' on the transect measurement), and Woodland Avenue is approximately 15' from the right end of the transect.

All samples of cadmium and zinc were greater than PEC thresholds; however the only exceedance of the RSL-0.5 was for cadmium in the deepest wetted channel sample B (66.3 mg/kg Cd; 4200 mg/kg Zn). Metals concentrations increased with depth in the wetted channel: surface sample S had 8.42 mg/kg Cd and 1220 mg/kg Zn; sample B had 25.9 mg/kg Cd and 1640 mg/kg Zn. Left and right bank samples had very similar concentrations of both metals: left bank sample C had 13.8 mg/kg Cd and 1020 mg/kg Zn; right bank sample D had 17.5 mg/kg Cd and 1090 mg/kg Zn.

- Channel remediation to PEC:
    - The wetted channel to a depth of at least 13" and both banks would require removal.
    - The vertical and lateral extent of contamination was not defined.
- Remediation to RSL-0.5:
    - The wetted channel to a depth of at least 13" would require removal due to cadmium above the RSL-0.5.
    - The vertical extent of contamination was not defined.

5.2.8.2 SED13-1 (S, A*, B*, D*)*

SED13-1 is located at the downstream end of this reach and is the downstream-most transect within the project area as a whole. Downstream of this transect, American Ditch runs through a small culvert beneath an access driveway to the Yenkin-Majestic office then briefly daylights once again for a span of 50' before entering a culvert for the remainder of the distance to Alum Creek. The left bank, from the edge of the wetted channel upward was armored with large rip rap therefore sample collection was not feasible on that side of the channel.

Wetted channel samples increased in concentrations of both metals with depth: cadmium in surface sample S was lower than the PEC concentration (3.42 mg/kg Cd; 537 mg/kg Zn). All other cadmium and zinc were in excess of the PEC. Sample A had cadmium and zinc concentrations of 31.3 and 1450 mg/kg, respectively. Sample B had cadmium in excess of the RSL-0.5 at 107 mg/kg and zinc at 3710 mg/kg. Right bank sample D had a cadmium concentration of 21.8 mg/kg and zinc at 1050 mg/kg.

- Channel remediation to PEC:
    - The wetted channel to a depth of at least 13” and the right bank would require removal.
    - No left bank sample was taken.
    - The vertical and lateral extent of contamination was not determined.
- Remediation to RSL-0.5:
    - The deepest sample within the stream channel (13”) requires removal due to cadmium above the RSL-0.5.
    - The vertical extent of contamination was not defined.

5.3 TCLP, Duplicate and Equipment Rinse Blank Results

The results of the four TCLP samples are presented in Table 7. Barium was detected in each sample in a range of 0.619 mg/L to 0.734 mg/L. Cadmium was detected in the samples taken from SED13-7 and SED13-9 with results of 0.893 mg/L and 0.0668 mg/L, respectively. The regulatory concentration for a waste to be characteristically toxic for barium is 100 mg/L and for cadmium is 1.0 mg/L.

Nine duplicate samples were made from samples in the S, A and B zone of transects SED13-5 through SED13-7 and SED13-9 through SED13-12. Each duplicate sample was made by filling a second sample container from the same mixing pan from where its paired sample was collected. The relative percent differences for cadmium ranged from 11% to 34.3% while the zinc relative percent difference ranged from 0% to 40.3%. QA results are presented in detail in Table 2.

The effectiveness of decontamination procedures was checked by collecting a sample of water rinsed from sample collection equipment after the cleaning protocol had been carried out. Analytical results showed that no cadmium or zinc was present in the rinse sample above laboratory method detection limit concentrations. Detailed analytical reports for equipment blank samples, and all other samples collected, are appended to this report.

6 References

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7 Tables

Table 1. Summary of Sampling Plan

2013 Site ID	Old Site #	Location		Sample location								
				S	A	B	C	D	E	F	G	H
SED13-1	SED-3	DST	open section by Majestic upst of	✓	✓	✓	✓	✓				
SED13-2	SED-4	UPST	rip rap area	✓	✓	✓	✓	✓				
SED13-3	SED-5	DST	~500' apart; ditch maintenance	✓	✓	✓	✓	✓		✓		
SED13-4	--	UPST	has occurred here	✓	✓	✓	✓	✓		✓		
SED13-5	SED-6	Recent stream work, historic high conc.		✓	✓	✓	✓	✓	(✓)	✓	✓	
SED13-6	--	Within area of historic high conc.		✓	✓	✓	✓	✓	(✓)	✓	✓	
SED13-7	SED-7	Along cemetery, DST recent channel work		✓	✓	✓	✓	✓	(✓)	✓	✓	
SED13-7.5	--	In cemetery, 15' from channel on left bank										
SED13-8	--	Between cem. bridge and creek bend		✓	✓	✓	✓	✓		✓	✓	
SED13-9	--	DST end of American Addtn. reach		✓	✓	✓	✓	✓				
SED13-10		DST 2007 stream clearing		✓	✓	✓	✓	✓				
SED13-11	SED-8	Site of 2007 stream clearing		✓	✓	✓	✓	✓		✓	✓	✓
SED13-12	SED-9	400' DST Joyce outfalls, UPST 2007 clearing		✓	✓	✓	✓	✓				
SED13-13	--	50' downstream Joyce outfalls		✓	✓	✓	✓	✓	(✓)			
SED13-14	--	Stormwater basin inlet, Woodward Ave		✓	✓							✓

✓ = Included in original sampling plan; (✓) = Included in plan, if accessible; Shaded cells indicate samples actually collected

	Key	Depth (in)
Surface	Top inch of surface channel deposits, main flow channel composite or discrete	0-1
A	Cross sectional composite across main flow channel, 2 or 3 spots	1 – 6
B	Cross sectional composite across main flow channel, 2 or 3 spots	6 - 12
E	Cross sectional composite across main flow channel, 2 or 3 spots	12 - 18
C	Bank sample on LEW	0 – 4
D	Bank sample on REW	0 – 4
F	Potential spoil deposited area – upslope sample on REW	Surface
G	Potential spoil deposited area – upslope sample on LEW	Surface
H	Additional samples as needed, specify location and depth on sample label and field notes	Surface, Any

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Table 2. Relative differences between duplicate samples

		Cadmium	Cadmium		Zinc	Zinc	
Storet Station	**Site**	**Dup A**	**Dup B**	**Cd % Difference**	**Dup A**	**Dup B**	**Zn % Difference**
SED13-5	A	49.6	37.4	28.0%	3320	2620	23.6%
SED13-6	S	97.8	111	12.6%	6930	7970	14.0%
SED13-7	S	76.7	68.7	11.0%	5680	5680	0.0%
SED13-7	A	90	72.6	21.4%	7060	5380	27.0%
SED13-7	B	123	88.9	32.2%	6740	4480	40.3%
SED13-9	B	172	223	25.8%	15100	10600	35.0%
SED13-10	A	47.2	40.2	16.0%	5610	5370	4.4%
SED13-11	A	6.2	5.54	11.2%	827	785	5.2%
SED13-12	A	59.7	84.4	34.3%	5190	5140	1.0%

	Cadmium	Zinc
PEC	4.98	459
RSL * 0.5	35	11500

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Table 3. Transects sampling compared to standards

		% Exceed PEC		% Exceed 0.5*RSL	
Sample ID	Number of Samples (excluding duplicates)	Cadmium	Zinc	Cadmium	Zinc
SED13-1	4	**75%**	**100%**	**25%**	**0%**
SED13-2	5	**100%**	**100%**	**20%**	**0%**
SED13-3	6	**100%**	**83%**	**17%**	**0%**
SED13-4	6	**67%**	**67%**	**17%**	**0%**
SED13-5	5	**100%**	**100%**	**60%**	**20%**
SED13-6	6	**100%**	**100%**	**67%**	**0%**
SED13-7	8	**88%**	**88%**	**88%**	**13%**
SED13-7.5	1	**100%**	**100%**	**100%**	**0%**
SED13-8	7	**86%**	**86%**	**29%**	**0%**
SED13-9	6	**100%**	**100%**	**83%**	**17%**
SED13-10	7	**71%**	**71%**	**14%**	**0%**
SED13-11	7	**57%**	**57%**	**0%**	**0%**
SED13-12	7	**86%**	**86%**	**71%**	**14%**
SED13-13	5	**100%**	**100%**	**20%**	**0%**
SED13-14	1	**0%**	**0%**	**0%**	**0%**
Total	**81**	**85%**	**85%**	**41%**	**5%**

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Table 4. Extent of Contamination Using Residential (RSL-0.5) Standards

	Cadmium		Zinc	
Transect ID	Depth Extent Known	Lateral Extent Known	Depth Extent Known	Lateral Extent Known
SED13-1	No	Yes	Yes	Yes
SED13-2	No	Yes	Yes	Yes
SED13-3	Yes	Yes	Yes	Yes
SED13-4	No	Yes	Yes	Yes
SED13-5	Yes	Yes	Yes	Yes
SED13-6	No	Yes	Yes	Yes
SED13-7	No	No	Yes	Yes
SED13-8	Yes	Yes	Yes	Yes
SED13-9	No	No	No	Yes
SED13-10	Yes	Yes	Yes	Yes
SED13-11	Yes	Yes	Yes	Yes
SED13-12	No	No	Yes	Yes
SED13-13	Yes	Yes	Yes	Yes

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Table 5. Cadmium Sediment Concentrations (mg/kg)

		Far Left Bank	Left Edge	Wetted Channel	Wetted Channel	Wetted Channel	Wetted Channel	Right Edge	Far Ridge Bank
Storet Station	**H**	**G**	**C**	**S**	**A**	**B**	**E**	**D**	**F**
SED13-1				3.42	31.30	107.00		21.80	
SED13-2			13.80	8.42	25.90	66.30		17.50	
SED13-3			24.00	31.50	22.90	24.00		68.50	19.20
SED13-4			1.25	9.14	11.20	76.80		18.00	1.15
SED13-5				150.00	49.60	30.10		43.80	20.80
SED13-6			9.98	97.80	80.40	35.90		37.50	7.29
SED13-7		72.20	102.00	76.70	90.00	123.00	45.40	195.00	1.88
SED13-7.5	55.70								
SED13-8		2.00	44.30	68.60	25.60	20.20		23.00	7.98
SED13-9	10.80		107.00	105.00	92.60	172.00		85.10	
SED13-10		1.69	3.20	29.10	47.20	34.80		27.90	14.60
SED13-11		1.89	1.19	32.00	6.20	2.00		23.20	10.10
SED13-12		2.93	48.80	43.30	59.70	69.30		10.40	45.50
SED13-13			24.70	128.00	29.00	34.80		11.20	
SED13-14				1.54					

	Cadmium
PEC	4.98
RSL * 0.5	35

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Table 6. Zinc Sediment Concentrations (mg/kg)

	H	Far Left Bank	Left Edge	Wetted Channel	Wetted Channel	Wetted Channel	Wetted Channel	Right Edge	Far Ridge Bank
Storet Station	**H**	**G**	**C**	**S**	**A**	**B**	**E**	**D**	**F**
SED13-1				537	1450	3710		1050	
SED13-2			1020	1220	1640	4200		1090	
SED13-3			1220	1660	505	310		4060	1010
SED13-4			176	1130	938	1730		1270	145
SED13-5				15600	3320	1510		3390	1420
SED13-6			979	6930	7110	2750		2440	558
SED13-7		3950	6420	5680	7060	6740	2490	13900	150
SED13-7.5	2510								
SED13-8		270	2020	6270	2490	1270		1310	620
SED13-9	1420		7920	10000	7880	15100		7310	
SED13-10		211	380	5340	5610	3120		3770	3510
SED13-11		351	162	3950	827	301		2900	1210
SED13-12		220	35300	3650	5190	5380		1680	9610
SED13-13			3280	10300	4020	4860		2570	
SED13-14				110					

	Zinc
PEC	459
RSL * 0.5	11500

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Table 7. TCLP Results

Parameter	Units	SED13-12 “S”	SED13-13 “S”	SED13-7 “A”	SED13-9 “A”
1,1-Dichloroethene	ug/L	50	50	0	50
1,2-Dichloroethane	ug/L	50	50	50	50
Arsenic, TCLP	mg/L	1	1	1	1
Barium, TCLP	**mg/L**	**0.664**	**0.619**	**0.734**	**0.629**
Benzene	ug/L	50	50	50	50
Cadmium, TCLP	**mg/L**	0.1	0.1	**0.893**	**0.0668**
Carbon tetrachloride	ug/L	50	50	50	50
Chlorobenzene	ug/L	50	50	50	50
Chloroform	ug/L	50	50	50	50
Chromium, TCLP	mg/L	0.2	0.2	0.2	0.2
Lead, TCLP	mg/L	1	1	1	1
Mercury	mg/L	0.002	0.002	0.002	0.002
Methyl Ethyl Ketone	ug/L	100	100	100	100
Selenium, TCLP	mg/L	0.8	0.8	0.8	0.8
Silver, TCLP	mg/L	0.1	0.1	0.1	0.1
Tetrachloroethene	ug/L	50	50	50	50
Trichloroethene	ug/L	50	50	50	50
Vinyl chloride	ug/L	100	100	100	100

Note: Only highlighted cells were detected. The remaining results are the RDL.

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8 Figures

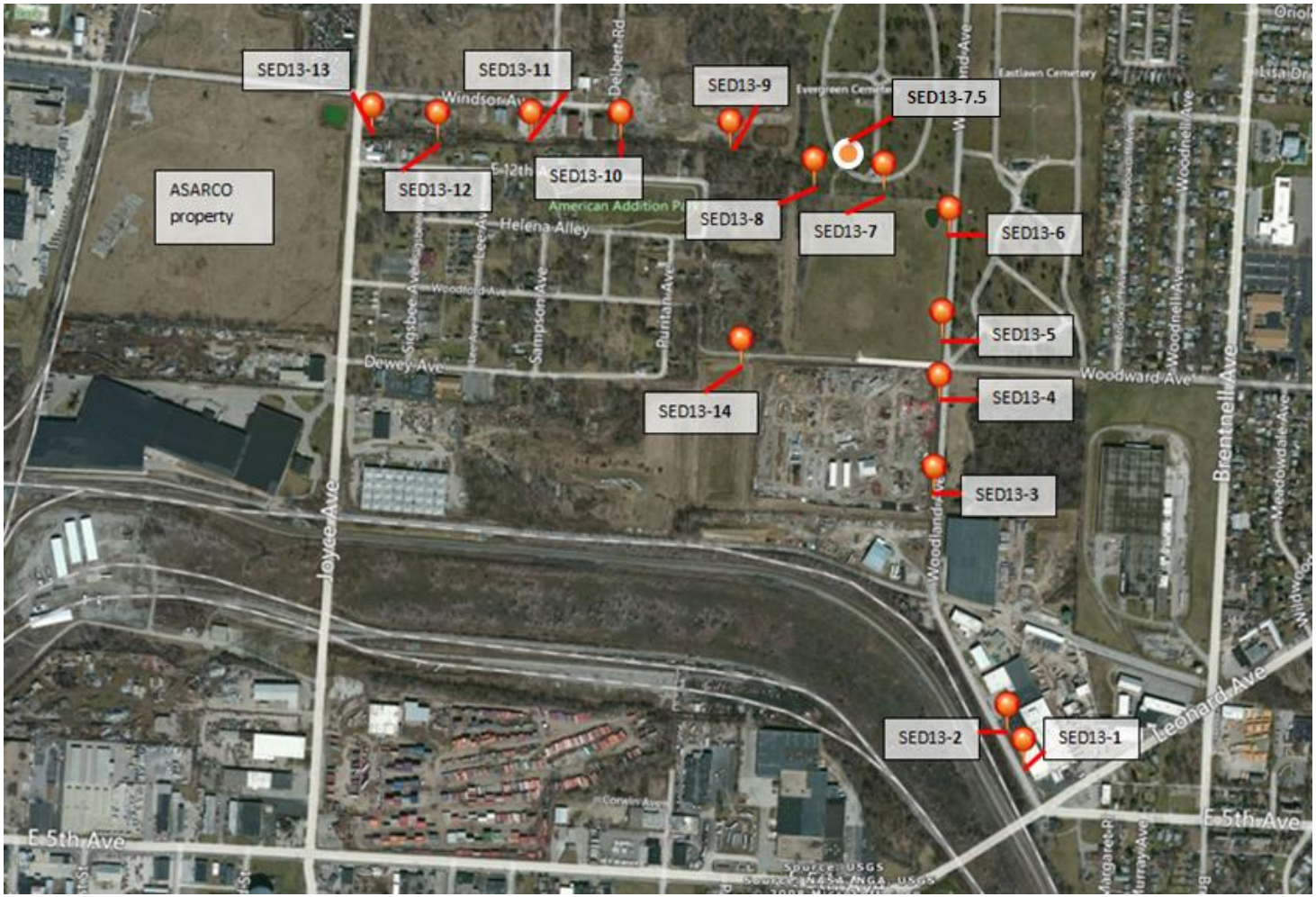

Figure 1. Aerial Overview of 2013 Sediment Sampling Transect Locations

Top of the Document

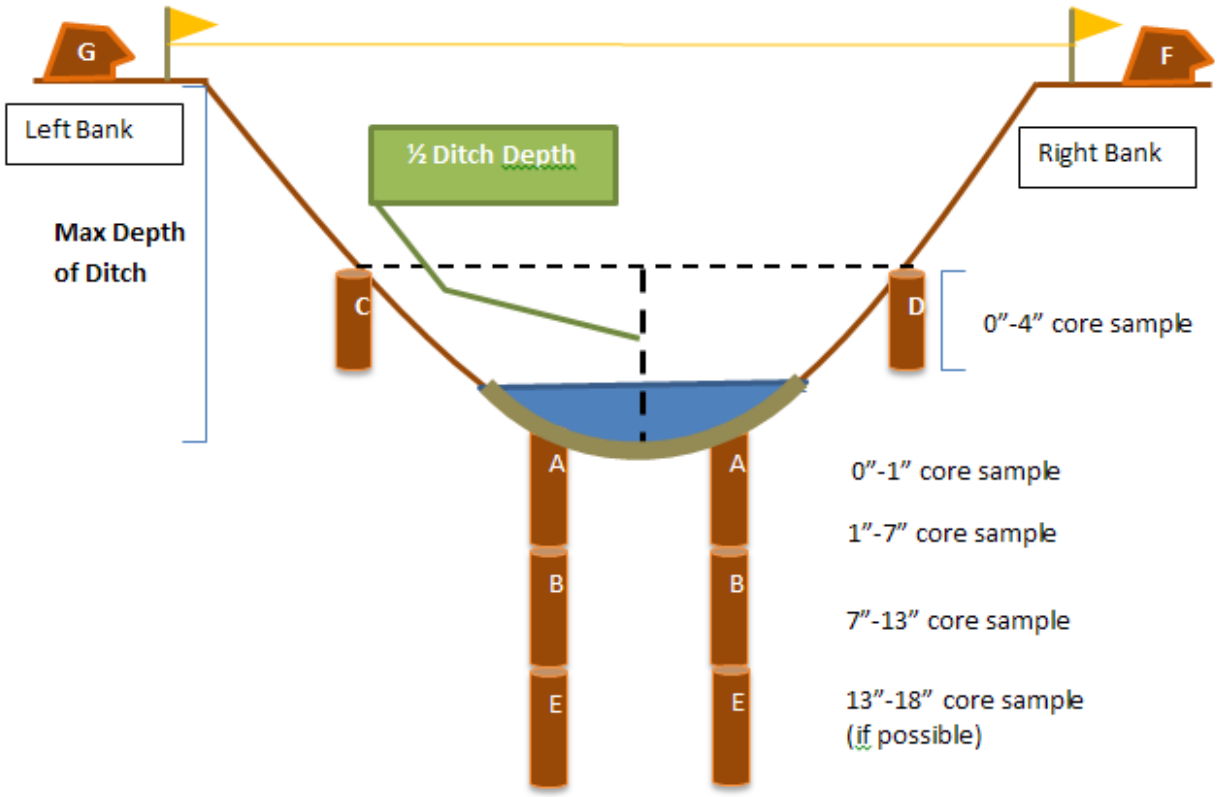

Figure 2. Profile of a Sampling Transect

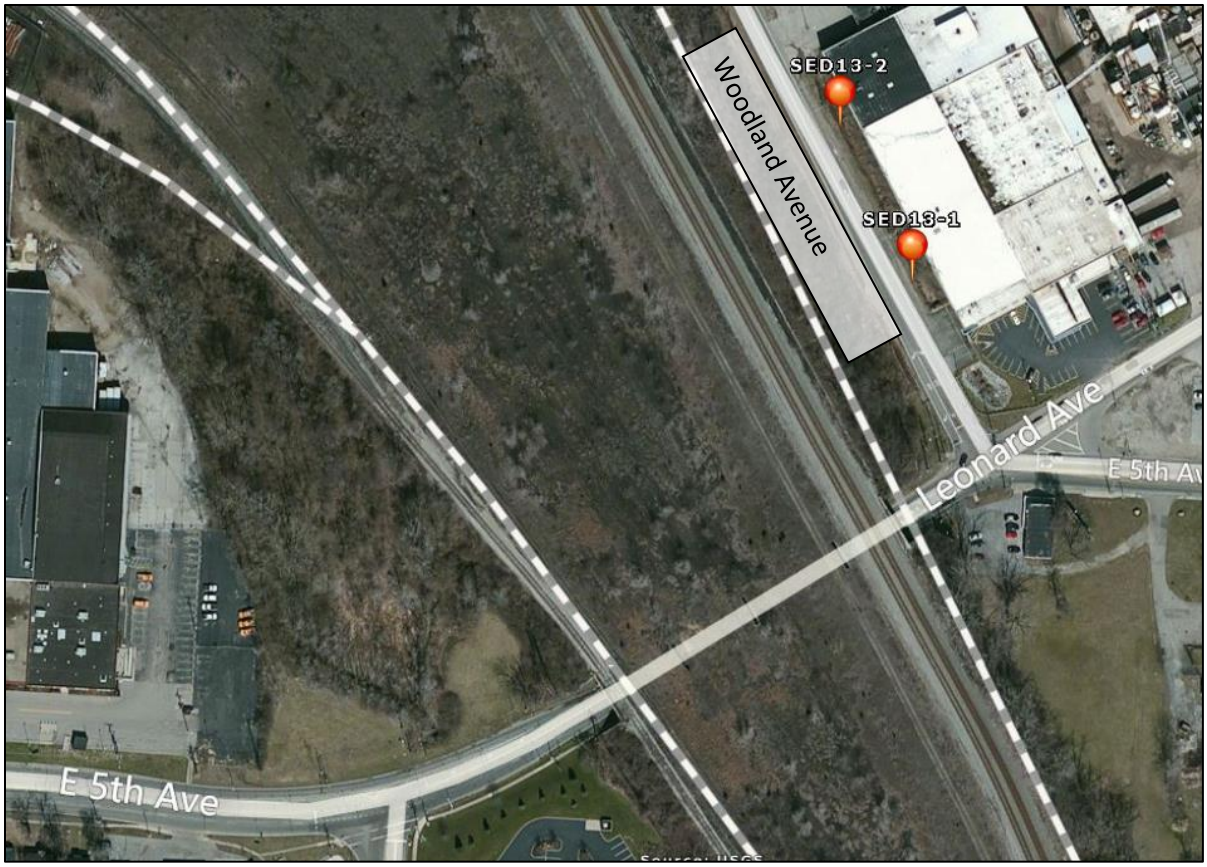

Figure 3. Map of Transects SED13-1 and SED13-2

Figure 4. Map of Transects SED13-3 through SED13-5 and SED13-14

Figure 5. Map of Transects SED13-6 through SED13-10

Figure 6. Map of Transects SED13-9 through SED13-13

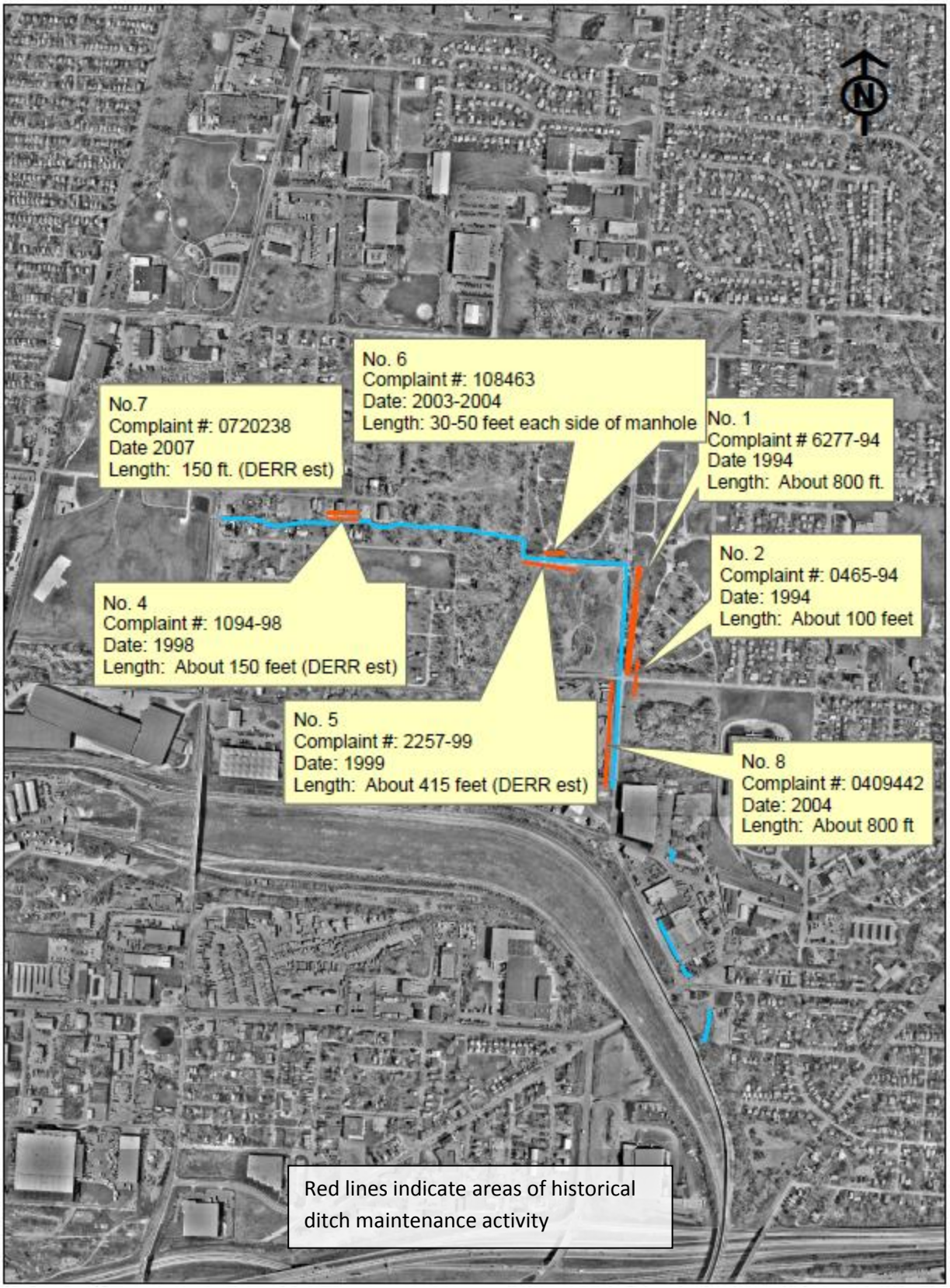

Figure 7. Documented Ditch Maintenance Performed by City of Columbus

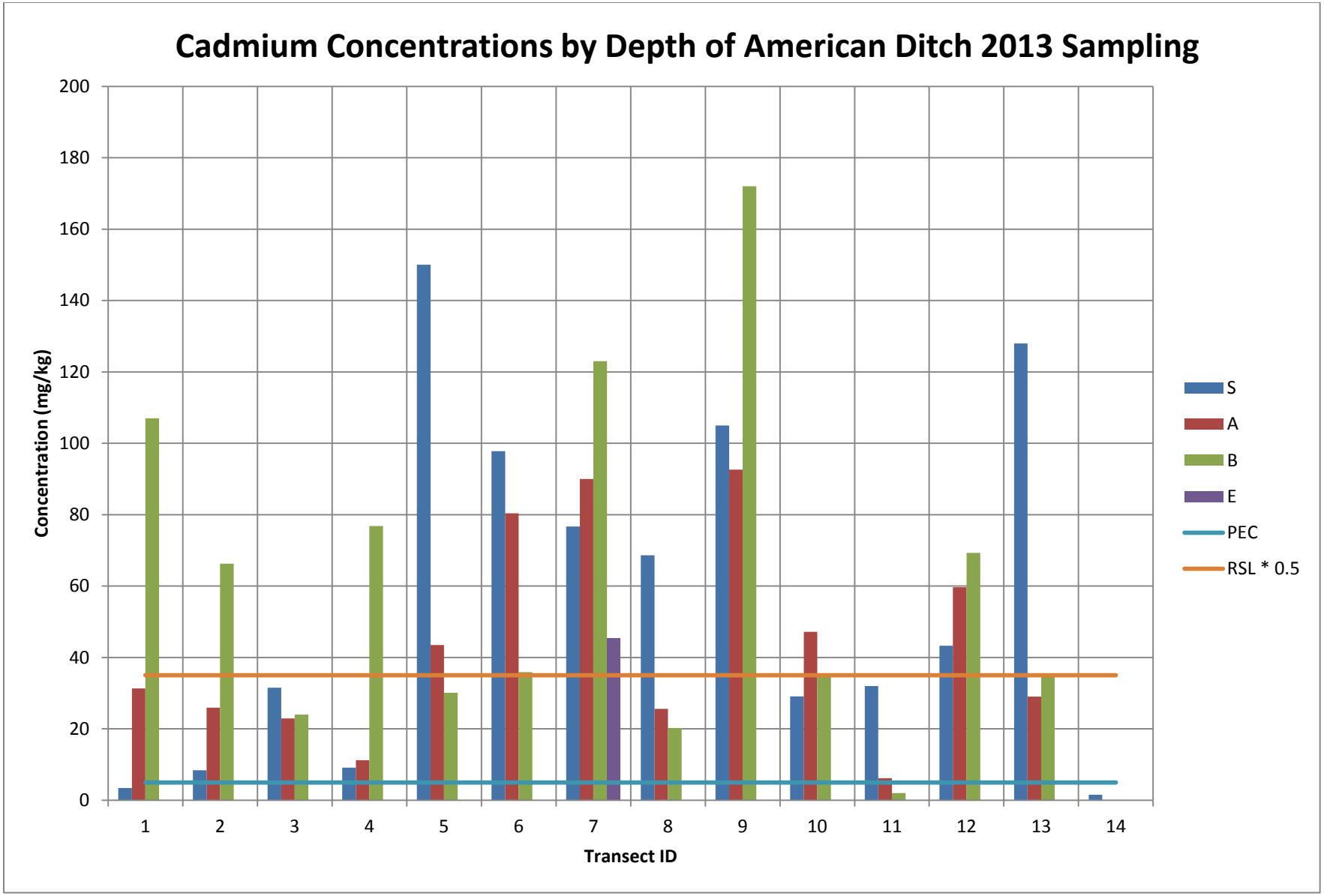

Figure 8. Cadmium Concentrations by Depth of American Ditch

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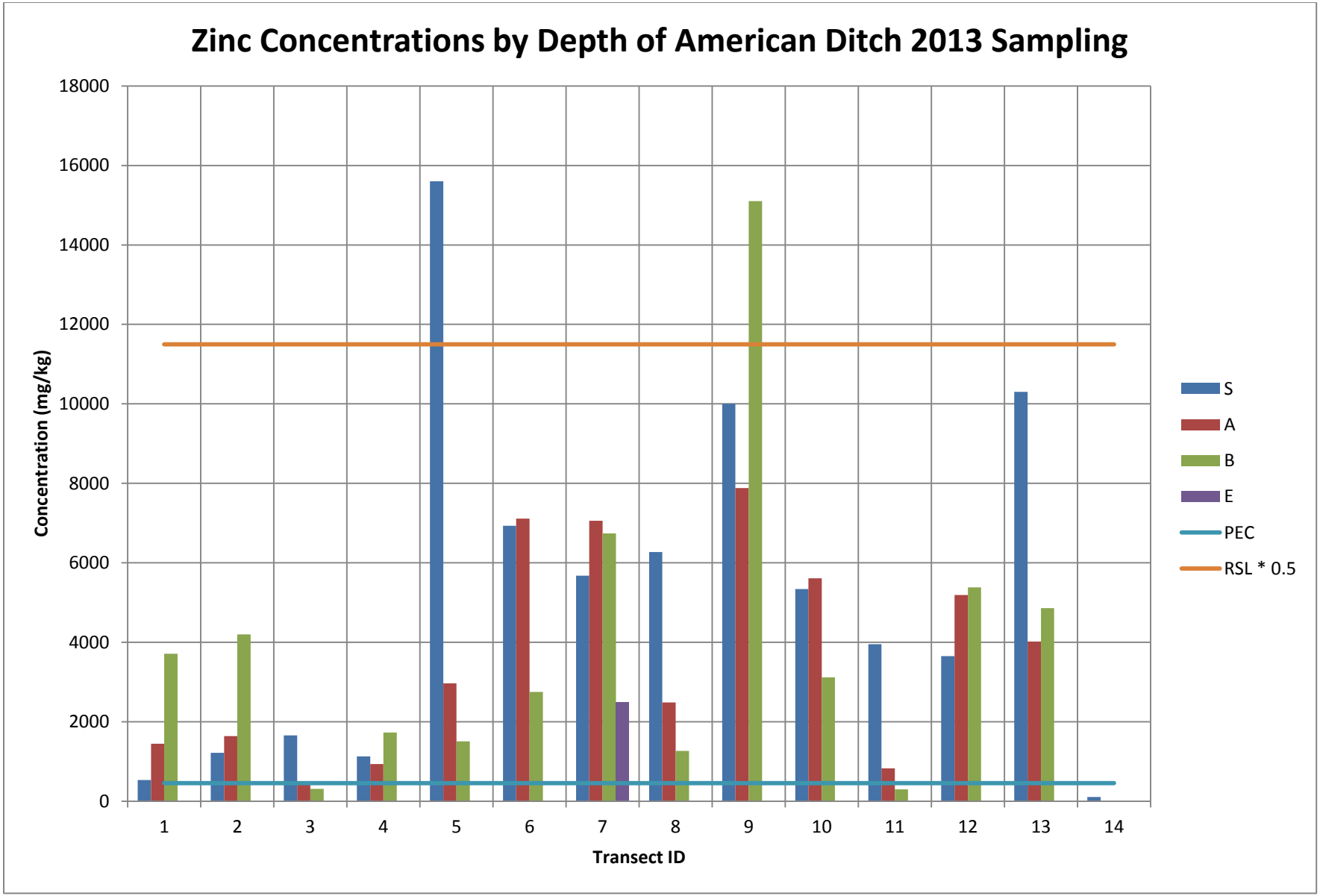

Figure 9. Zinc Concentrations by Depth of American Ditch

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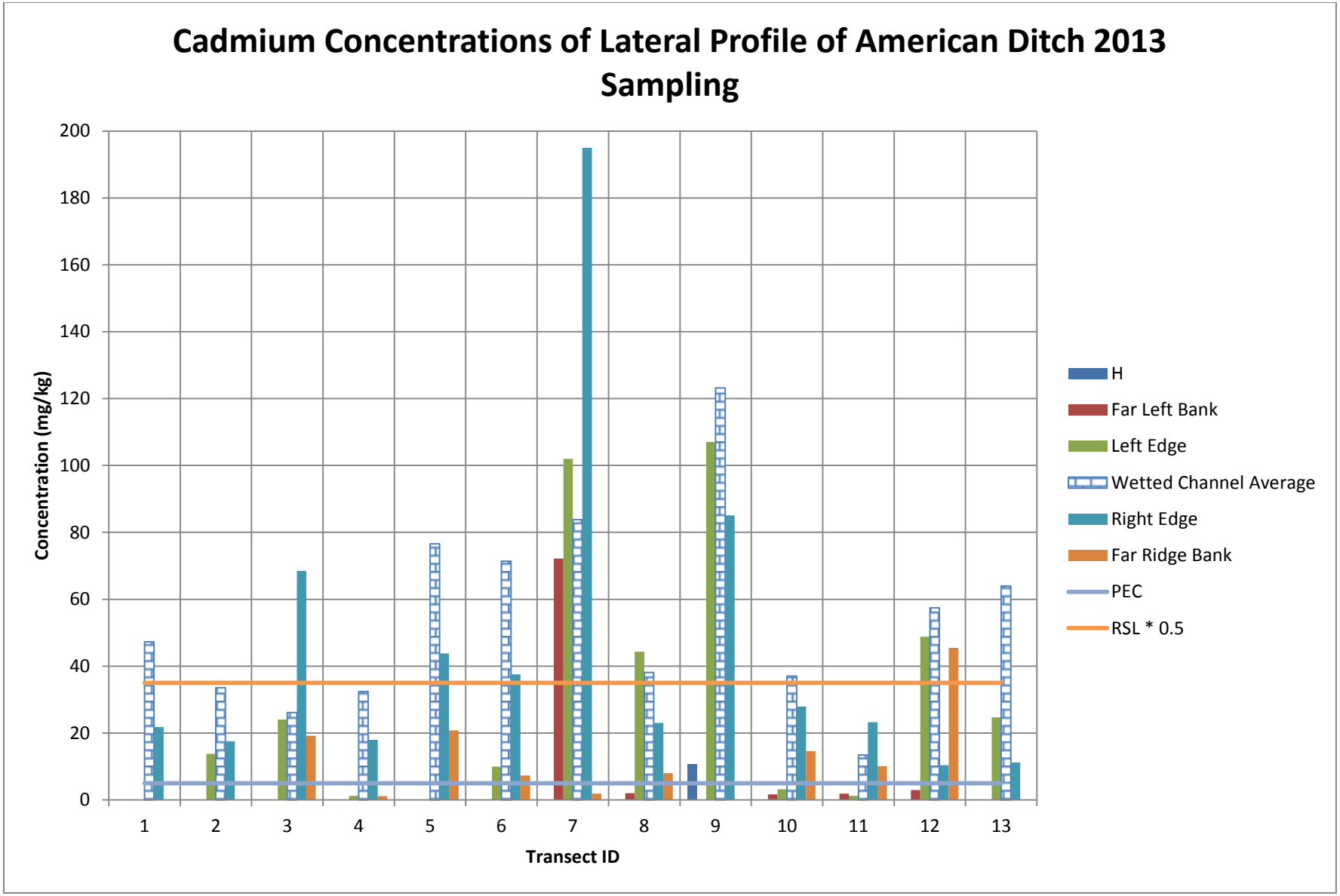

Figure 10. Cadmium Concentrations of Lateral Profile of American Ditch

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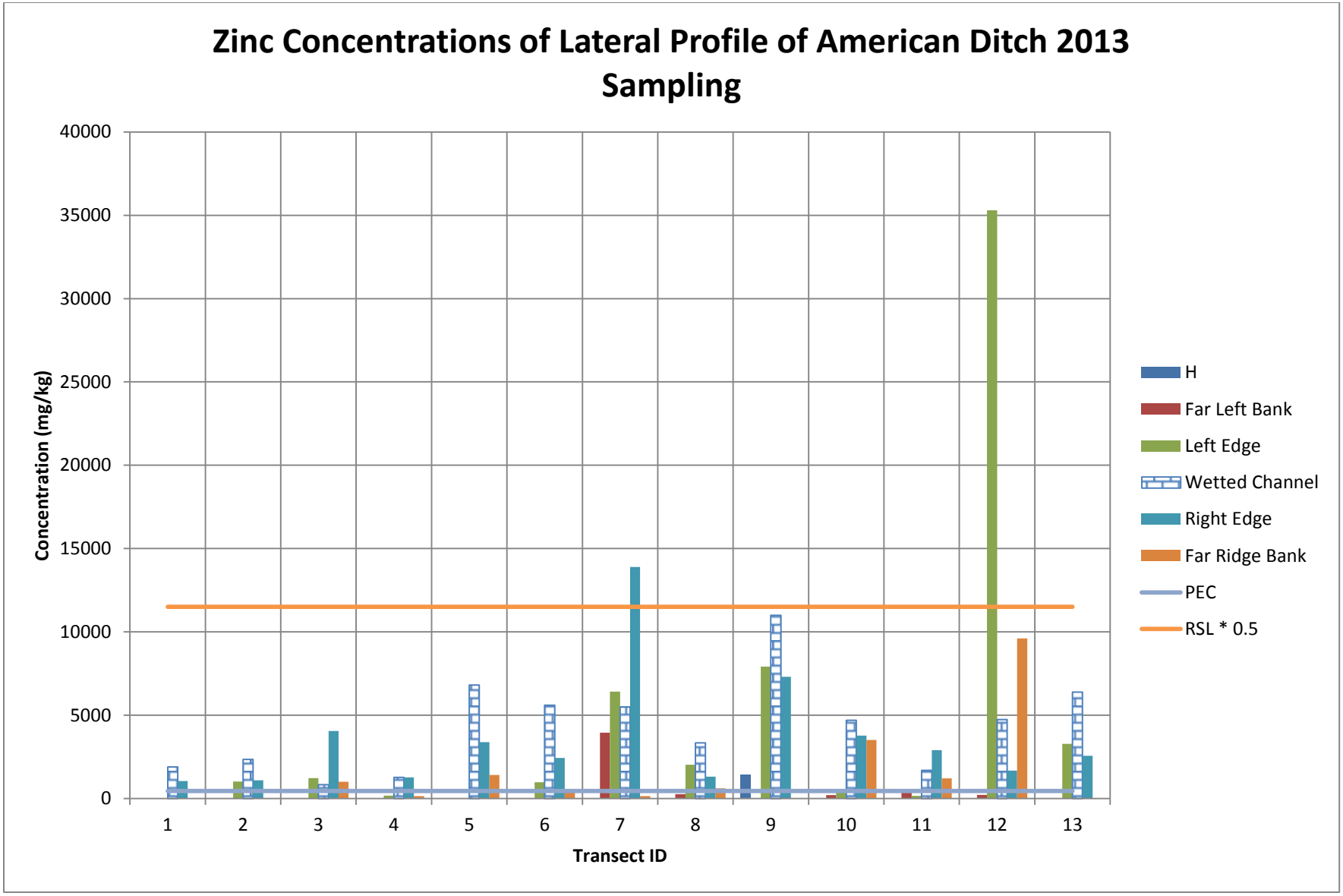

Figure 11. Zinc Concentrations of Lateral Profile of American Ditch

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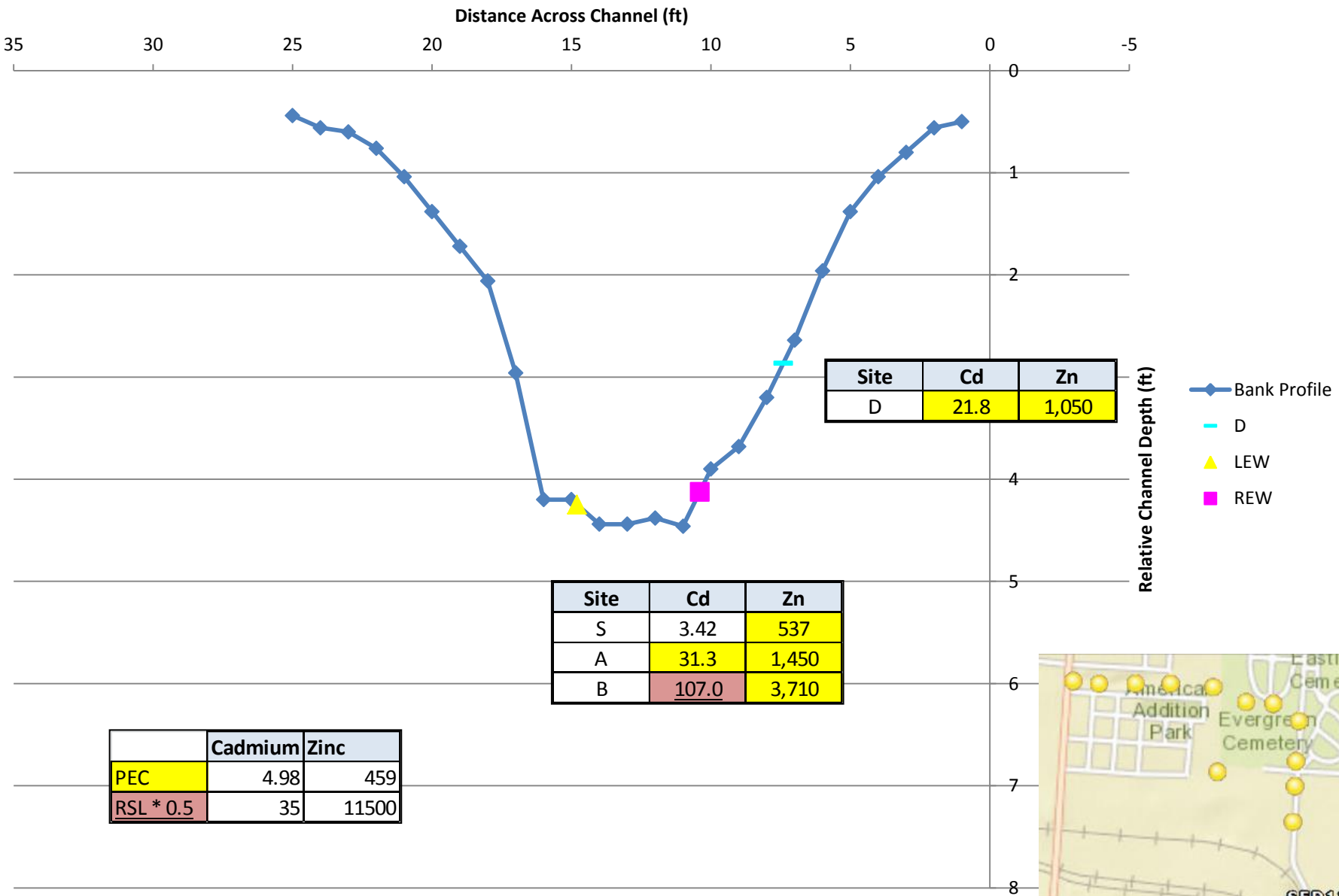
Appendix A

American Ditch Transect Profiles

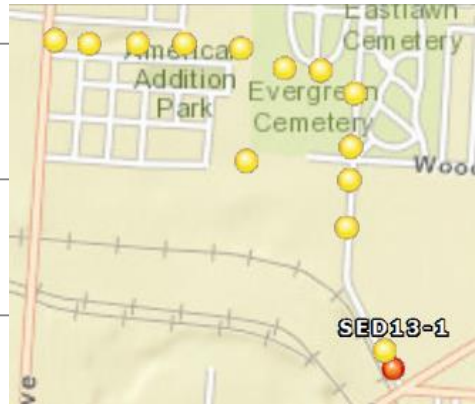
SED13-1 Bank Profile



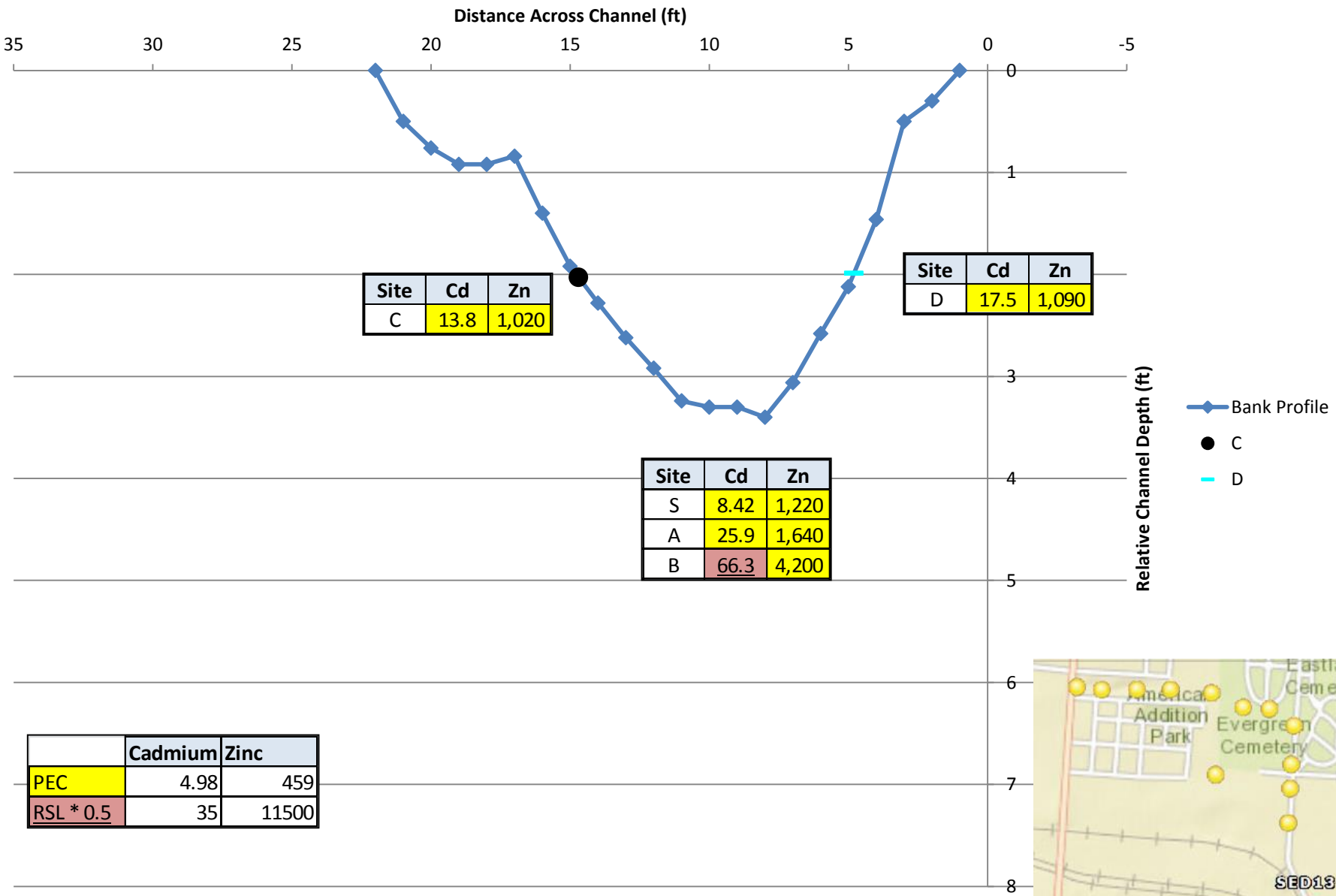
Site	Cd	Zn
D	21.8	1,050

Site	Cd	Zn
S	3.42	537
A	31.3	1,450
B	107.0	3,710

	Cadmium	Zinc
PEC	4.98	459
RSL * 0.5	35	11500



SED13-2 Bank Profile

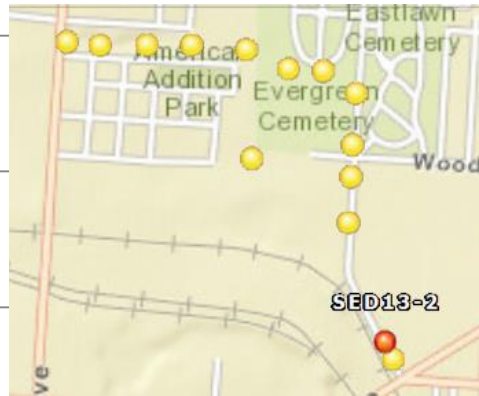


Site	Cd	Zn
C	13.8	1,020

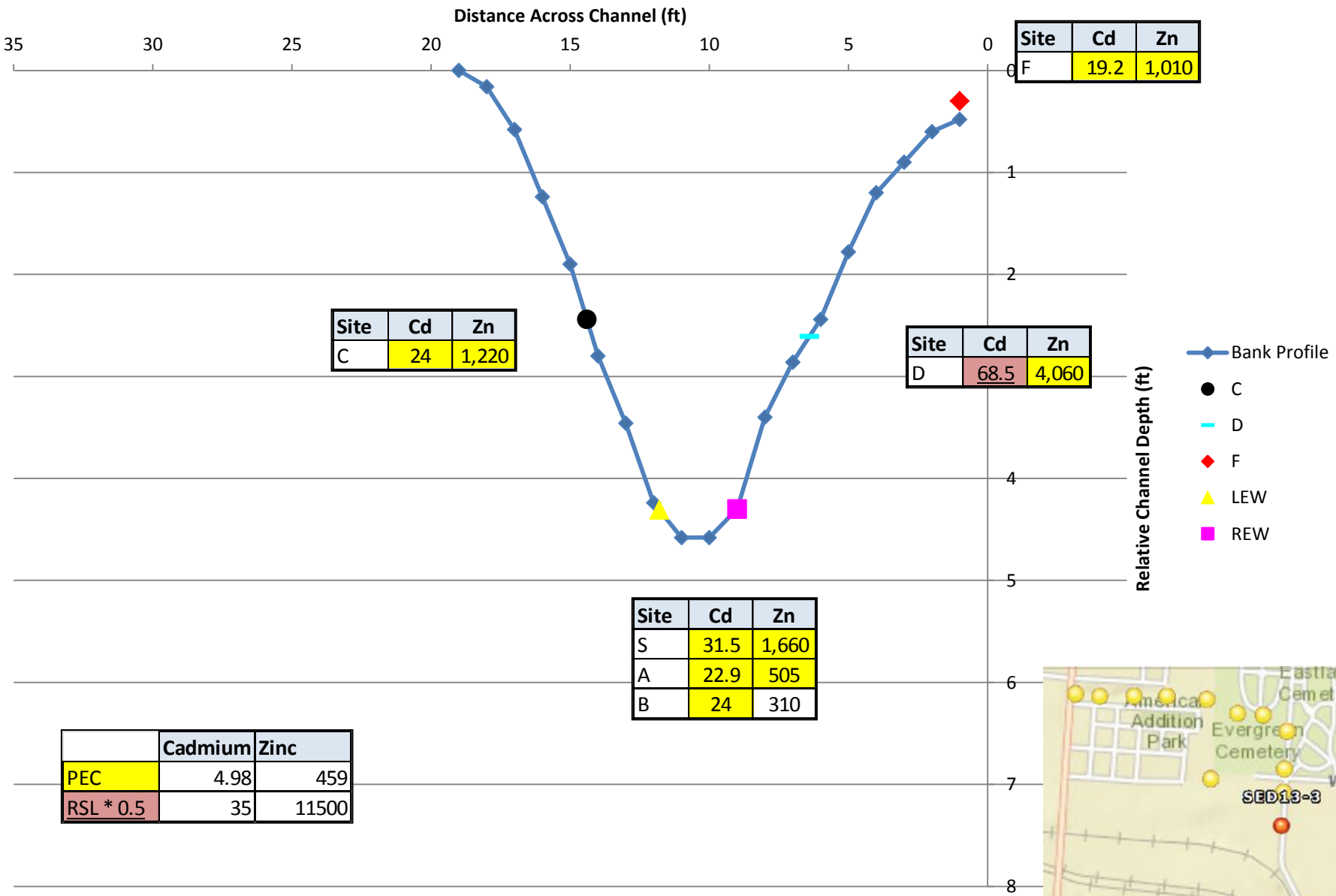
Site	Cd	Zn
D	17.5	1,090

Site	Cd	Zn
S	8.42	1,220
A	25.9	1,640
B	66.3	4,200

	Cadmium	Zinc
PEC	4.98	459
RSL * 0.5	35	11500



SED13-3 Bank Profile



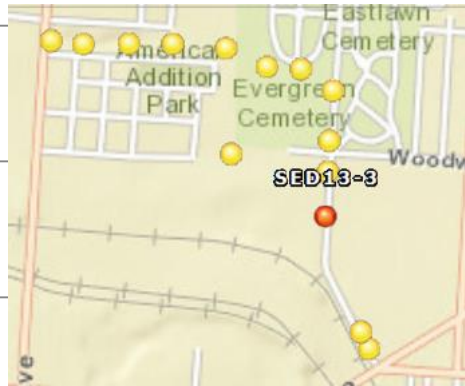
Site	Cd	Zn
F	19.2	1,010

Site	Cd	Zn
C	24	1,220

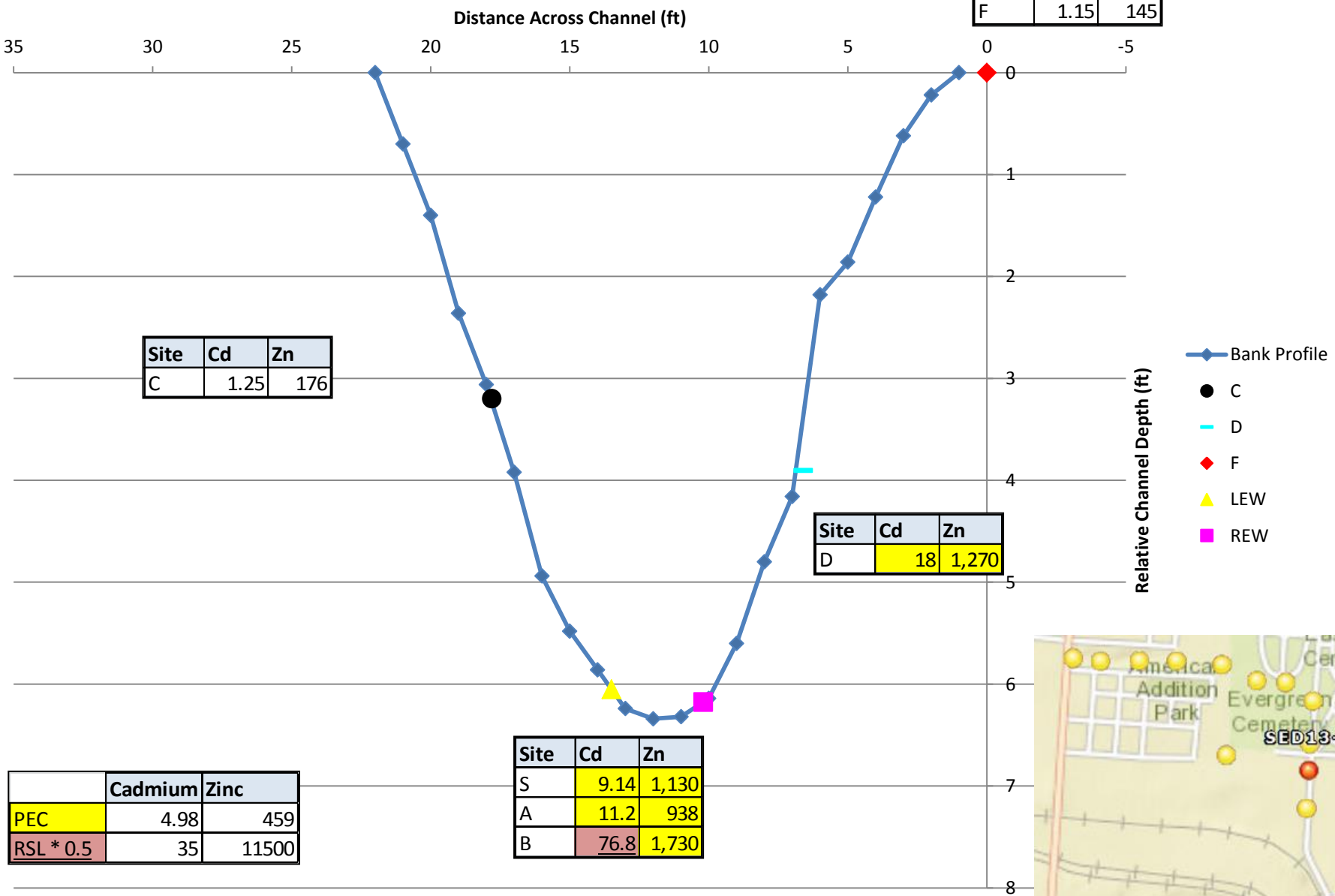
Site	Cd	Zn
D	68.5	4,060

Site	Cd	Zn
S	31.5	1,660
A	22.9	505
B	24	310

	Cadmium	Zinc
PEC	4.98	459
RSL * 0.5	35	11500



SED13-4 Bank Profile



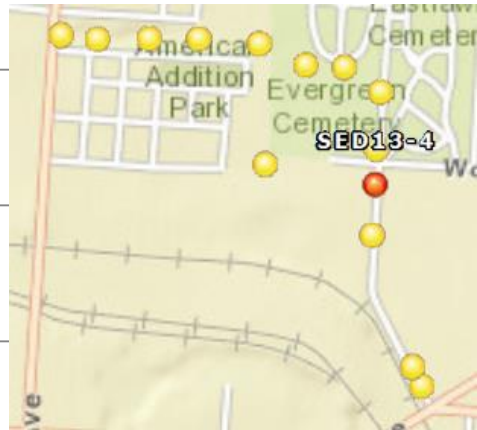
Site	Cd	Zn
F	1.15	145

Site	Cd	Zn
C	1.25	176

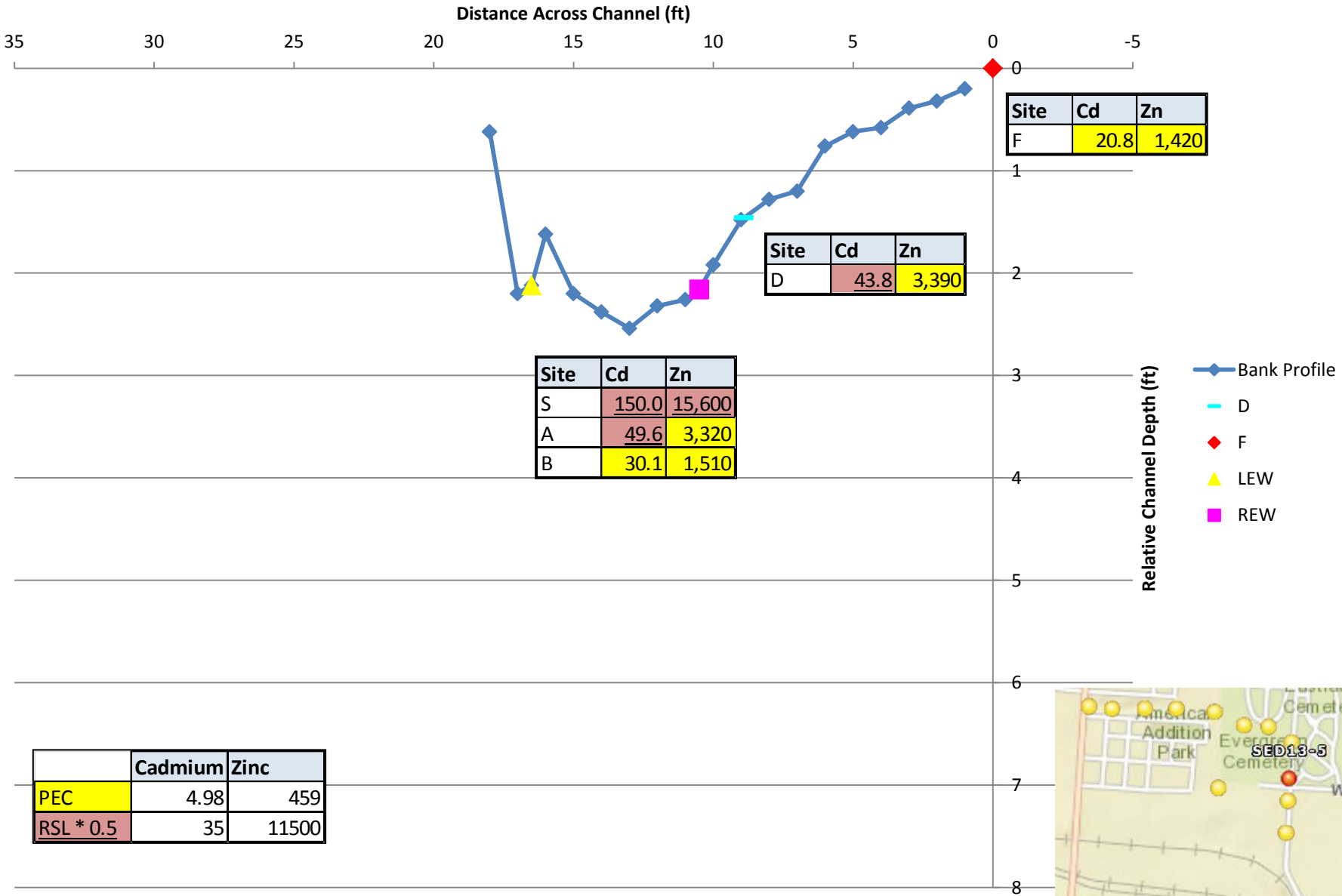
Site	Cd	Zn
D	18	1,270

Site	Cd	Zn
S	9.14	1,130
A	11.2	938
B	76.8	1,730

	Cadmium	Zinc
PEC	4.98	459
RSL * 0.5	35	11500



SED13-5 Bank Profile

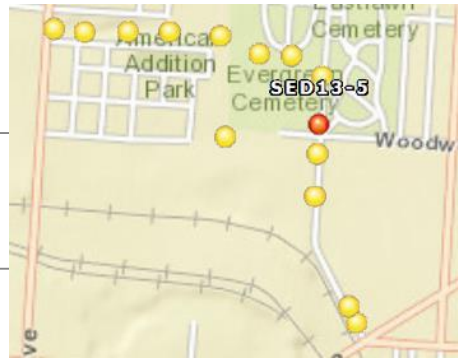


Site	Cd	Zn
F	20.8	1,420

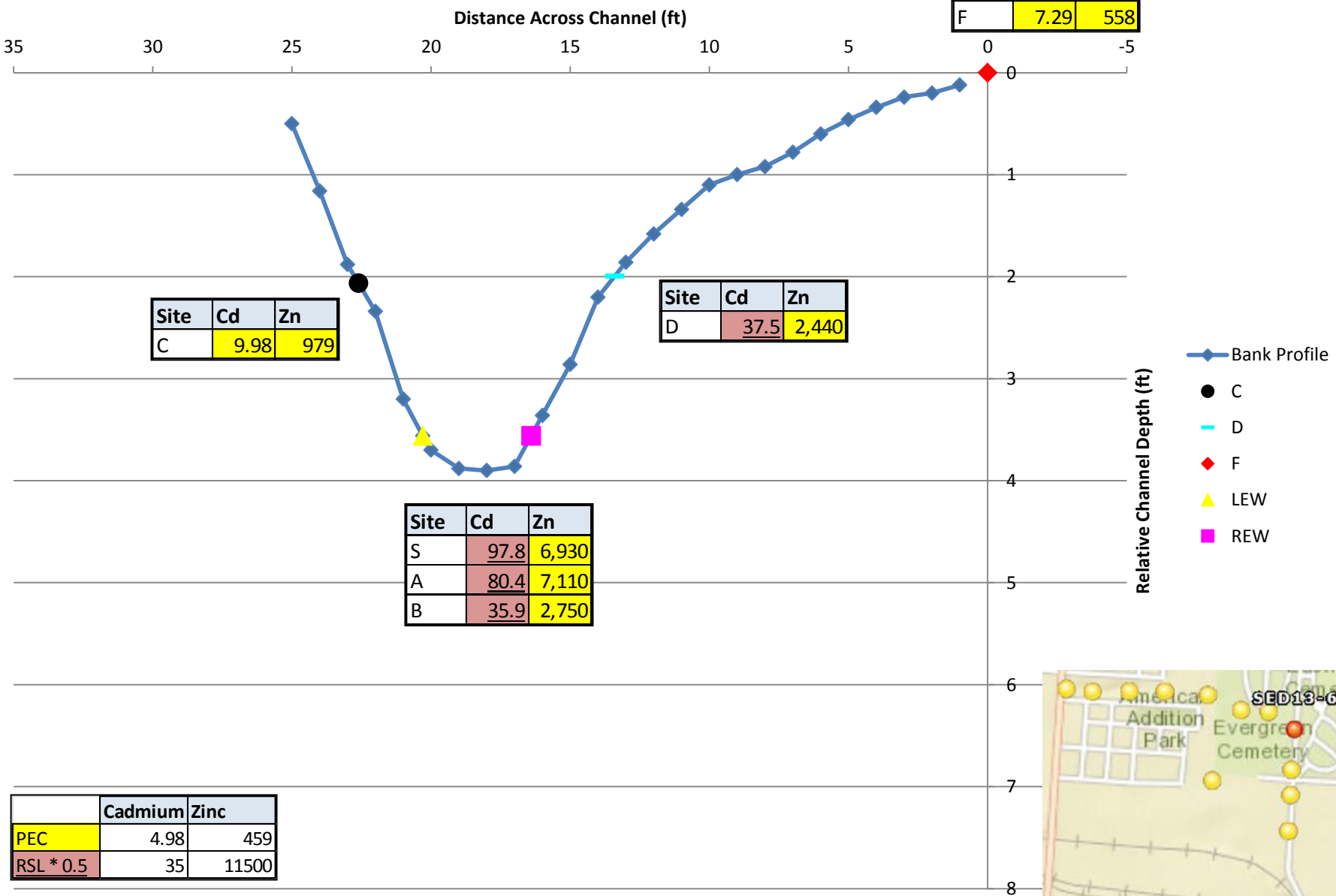
Site	Cd	Zn
D	43.8	3,390

Site	Cd	Zn
S	150.0	15,600
A	49.6	3,320
B	30.1	1,510

	Cadmium	Zinc
PEC	4.98	459
RSL * 0.5	35	11500



SED13-6 Bank Profile



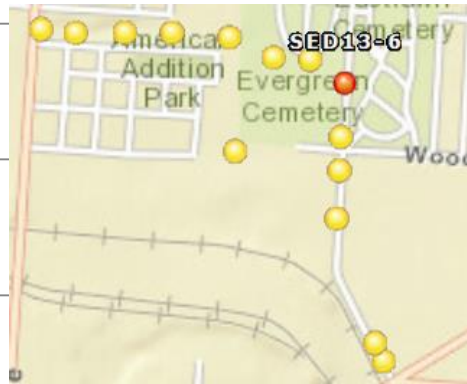
Site	Cd	Zn
F	7.29	558

Site	Cd	Zn
C	9.98	979

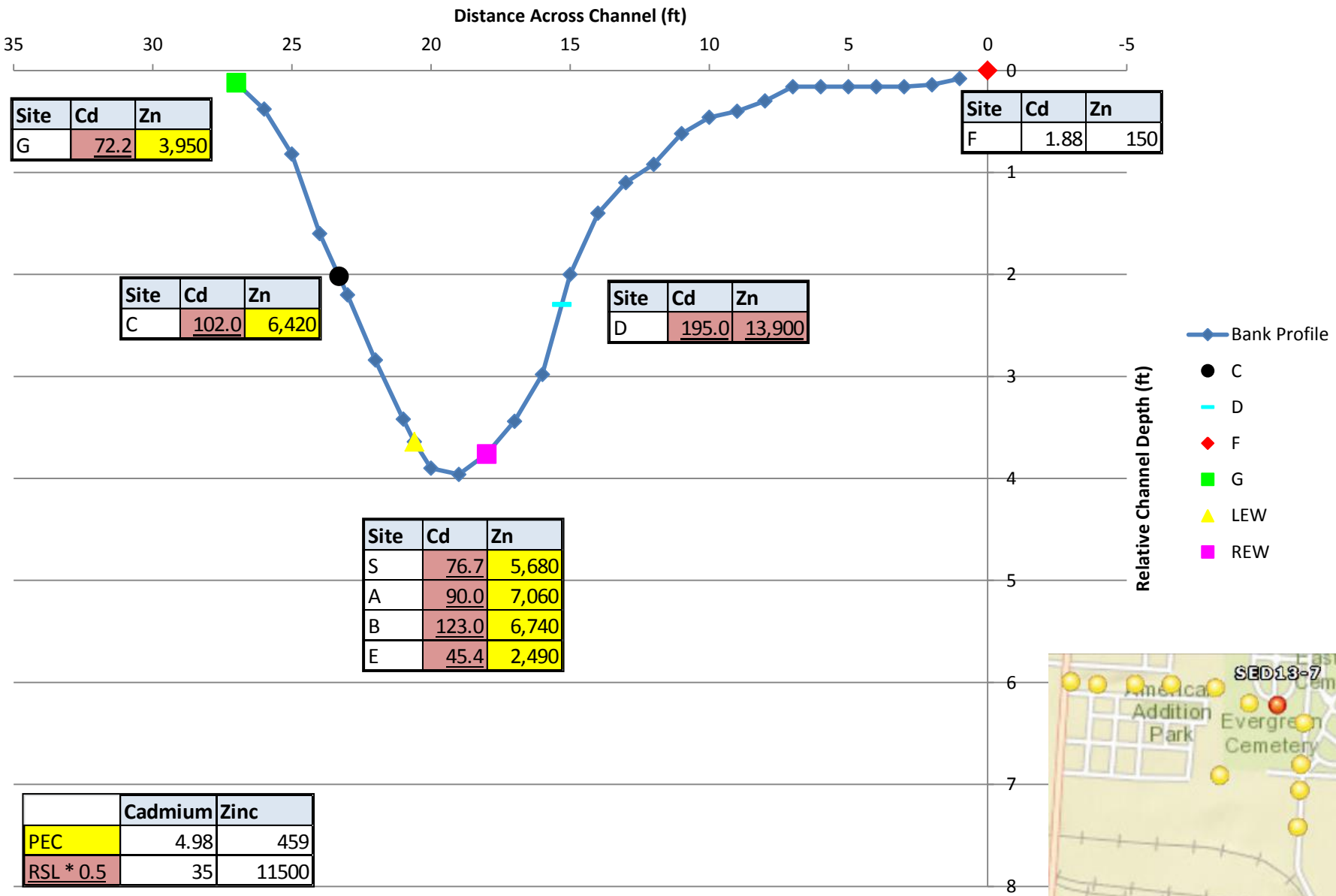
Site	Cd	Zn
D	37.5	2,440

Site	Cd	Zn
S	97.8	6,930
A	80.4	7,110
B	35.9	2,750

	Cadmium	Zinc
PEC	4.98	459
RSL * 0.5	35	11500



SED13-7 Bank Profile



Site	Cd	Zn
G	72.2	3,950

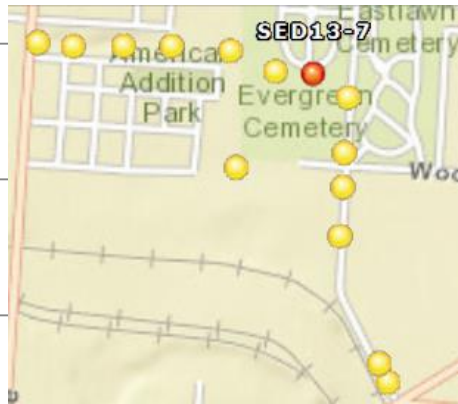
Site	Cd	Zn
F	1.88	150

Site	Cd	Zn
C	102.0	6,420

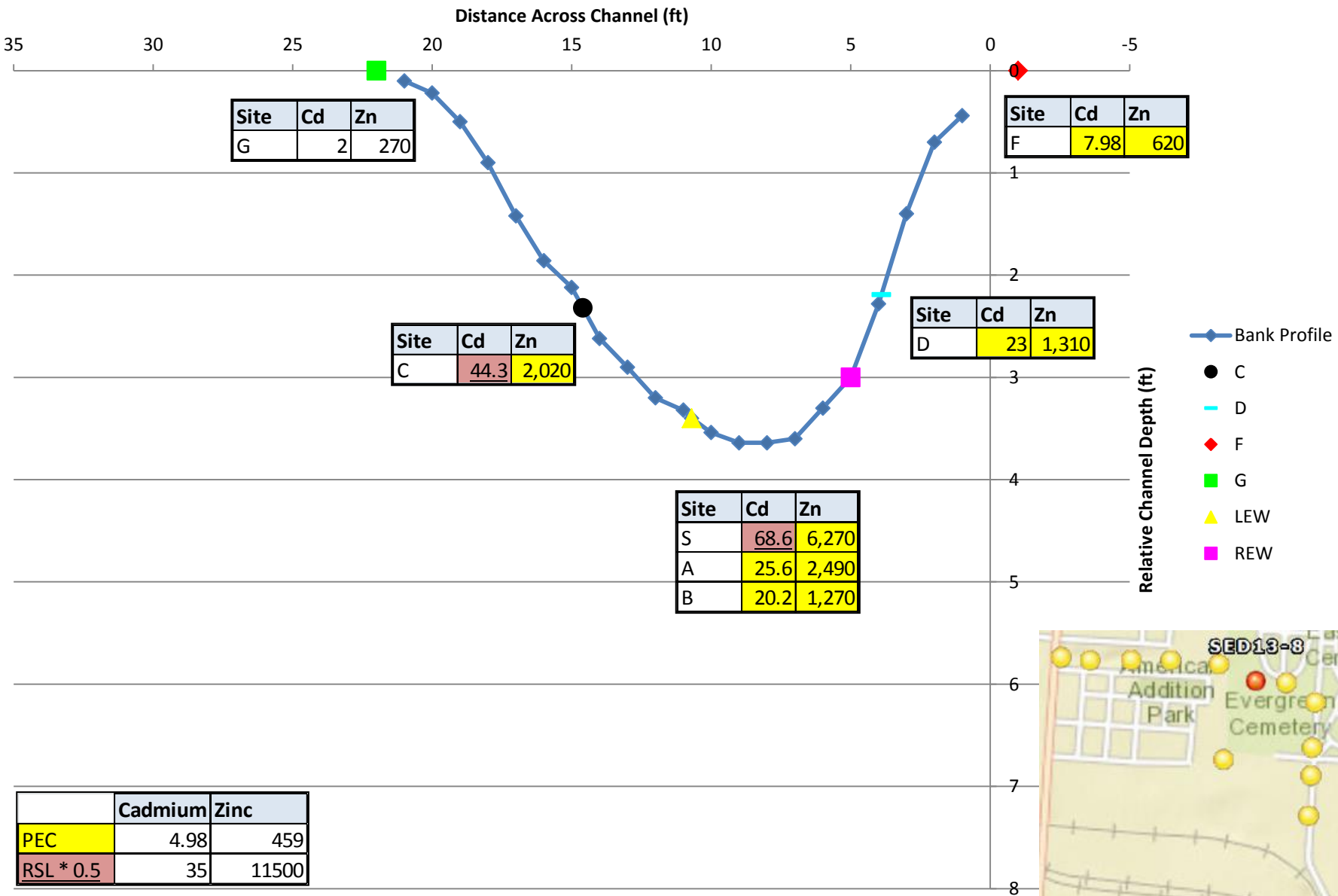
Site	Cd	Zn
D	195.0	13,900

Site	Cd	Zn
S	76.7	5,680
A	90.0	7,060
B	123.0	6,740
E	45.4	2,490

	Cadmium	Zinc
PEC	4.98	459
RSL * 0.5	35	11500



SED13-8 Bank Profile



Site	Cd	Zn
G	2	270

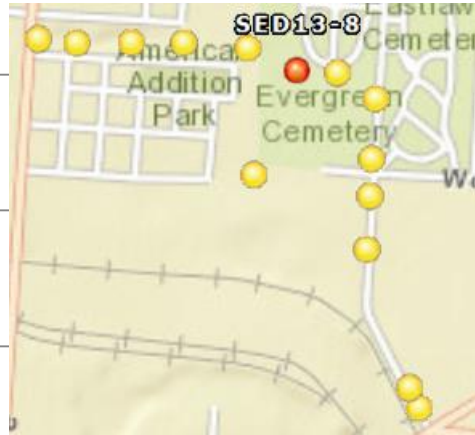
Site	Cd	Zn
F	7.98	620

Site	Cd	Zn
C	44.3	2,020

Site	Cd	Zn
D	23	1,310

Site	Cd	Zn
S	68.6	6,270
A	25.6	2,490
B	20.2	1,270

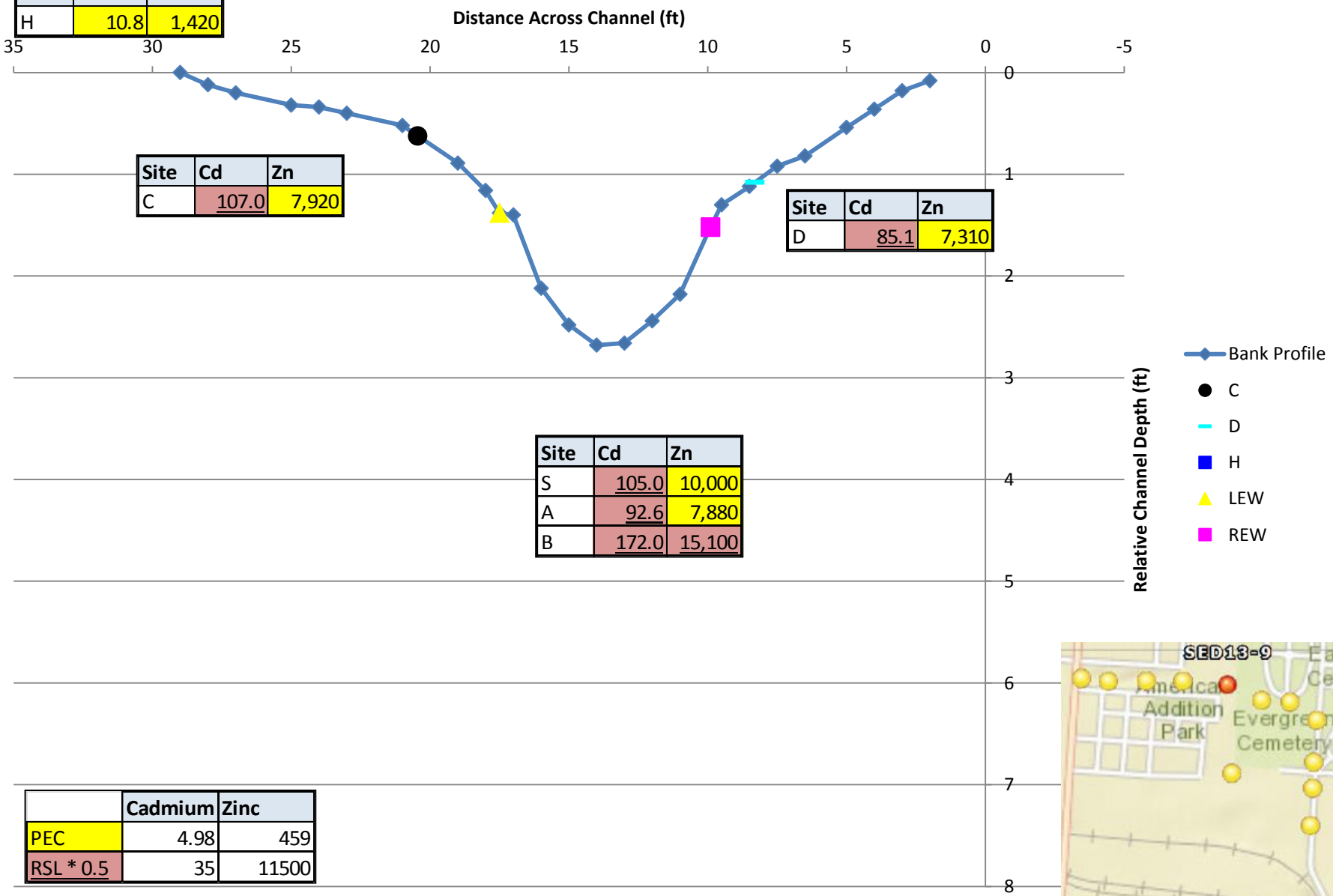
	Cadmium	Zinc
PEC	4.98	459
RSL * 0.5	35	11500



SED13-9 Bank Profile

Site H is located at x = 44'

Site	Cd	Zn
H	10.8	1,420

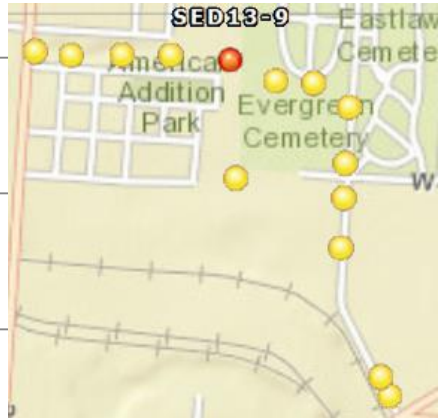


Site	Cd	Zn
C	107.0	7,920

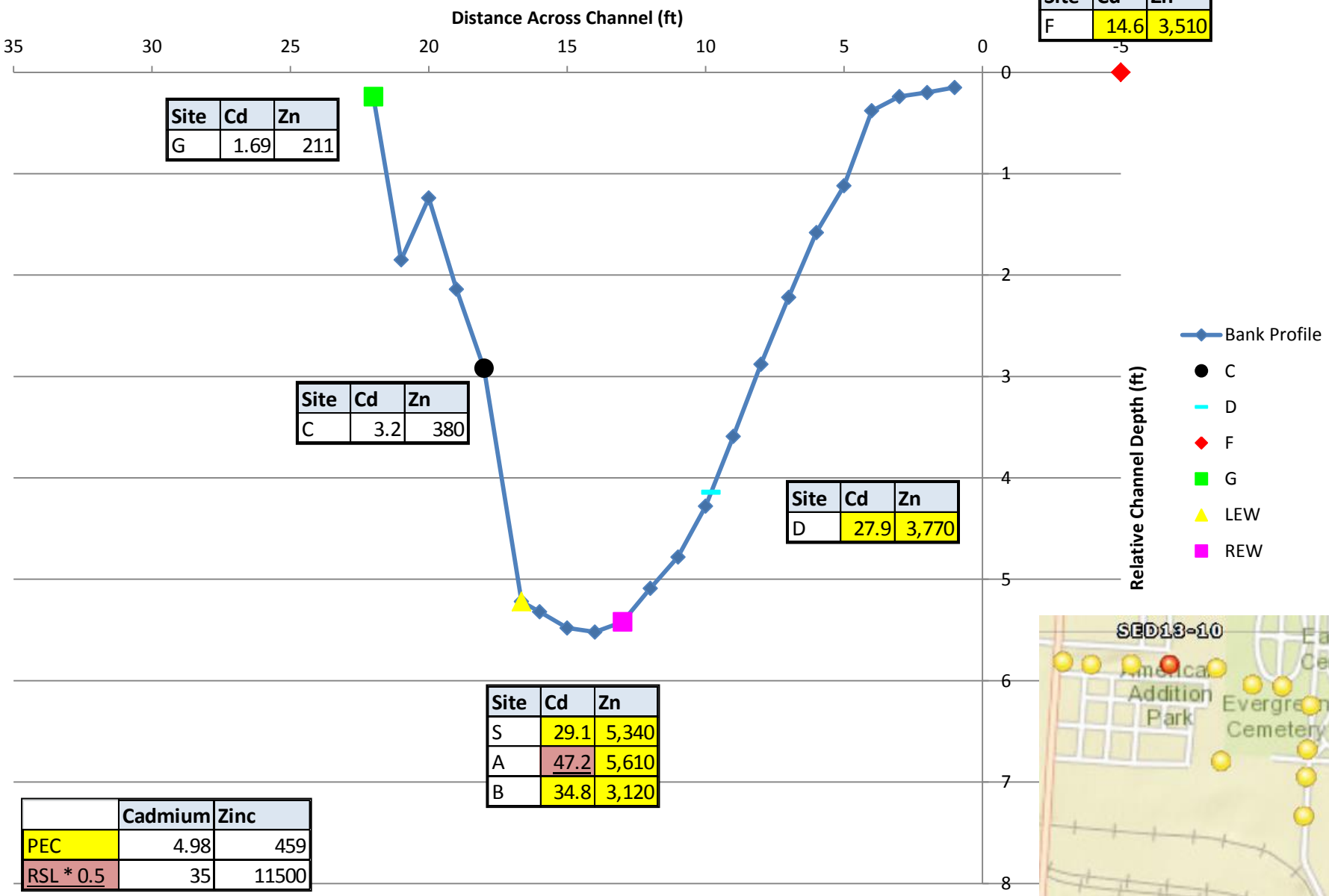
Site	Cd	Zn
D	85.1	7,310

Site	Cd	Zn
S	105.0	10,000
A	92.6	7,880
B	172.0	15,100

	Cadmium	Zinc
PEC	4.98	459
RSL * 0.5	35	11500



SED13-10 Bank Profile



Site	Cd	Zn
F	14.6	3,510

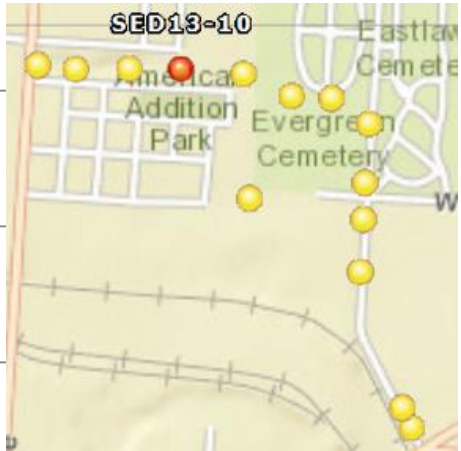
Site	Cd	Zn
G	1.69	211

Site	Cd	Zn
C	3.2	380

Site	Cd	Zn
D	27.9	3,770

Site	Cd	Zn
S	29.1	5,340
A	47.2	5,610
B	34.8	3,120

	Cadmium	Zinc
PEC	4.98	459
RSL * 0.5	35	11500



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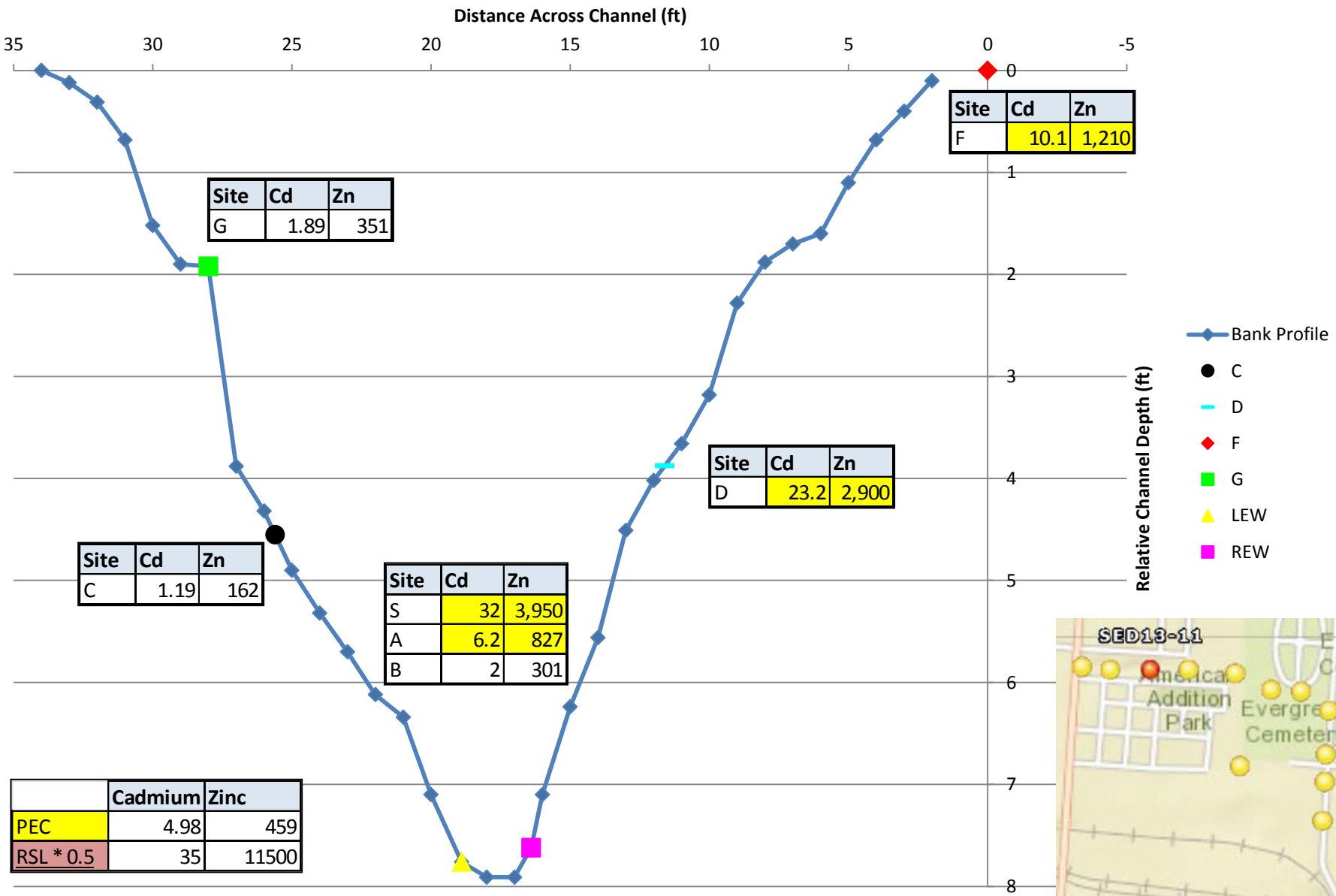


Site	Cd	Zn
F	10.1	1,210

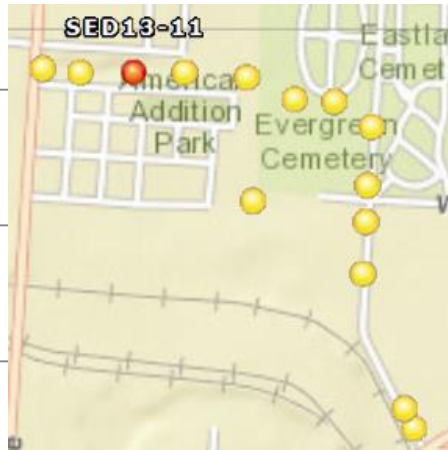
Site	Cd	Zn
G	1.89	351

Site	Cd	Zn
D	23.2	2,900

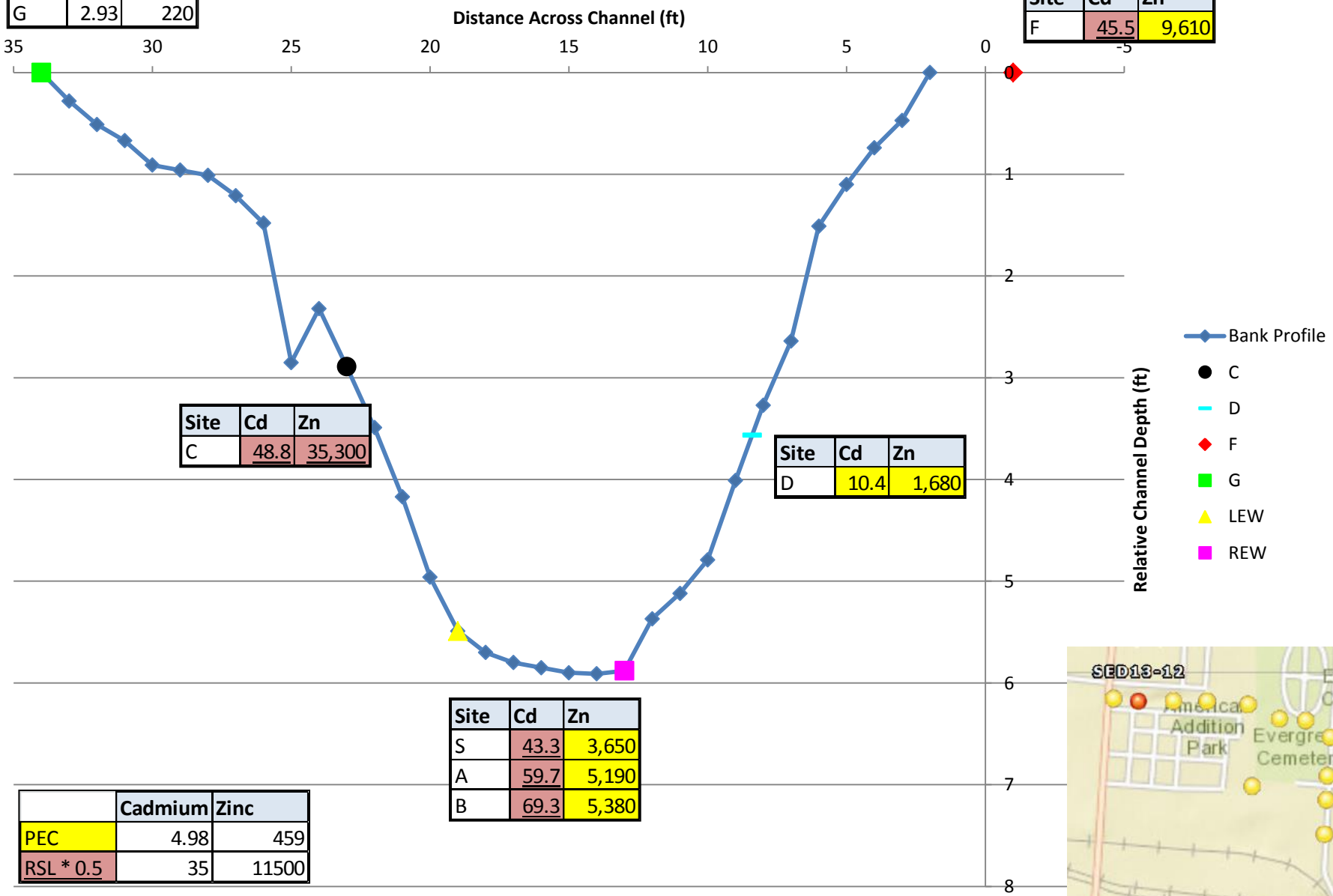
Site	Cd	Zn
C	1.19	162

Site	Cd	Zn
S	32	3,950
A	6.2	827
B	2	301

	Cadmium	Zinc
PEC	4.98	459
RSL * 0.5	35	11500



SED13-12 Bank Profile



Site	Cd	Zn
G	2.93	220

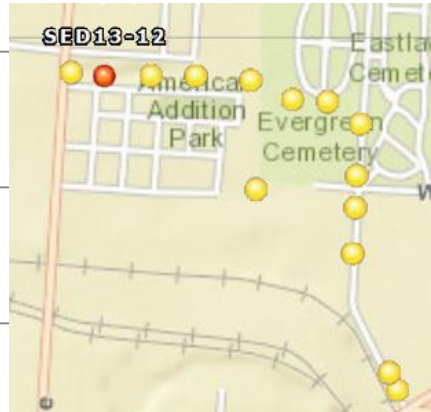
Site	Cd	Zn
F	45.5	9,610

Site	Cd	Zn
C	48.8	35,300

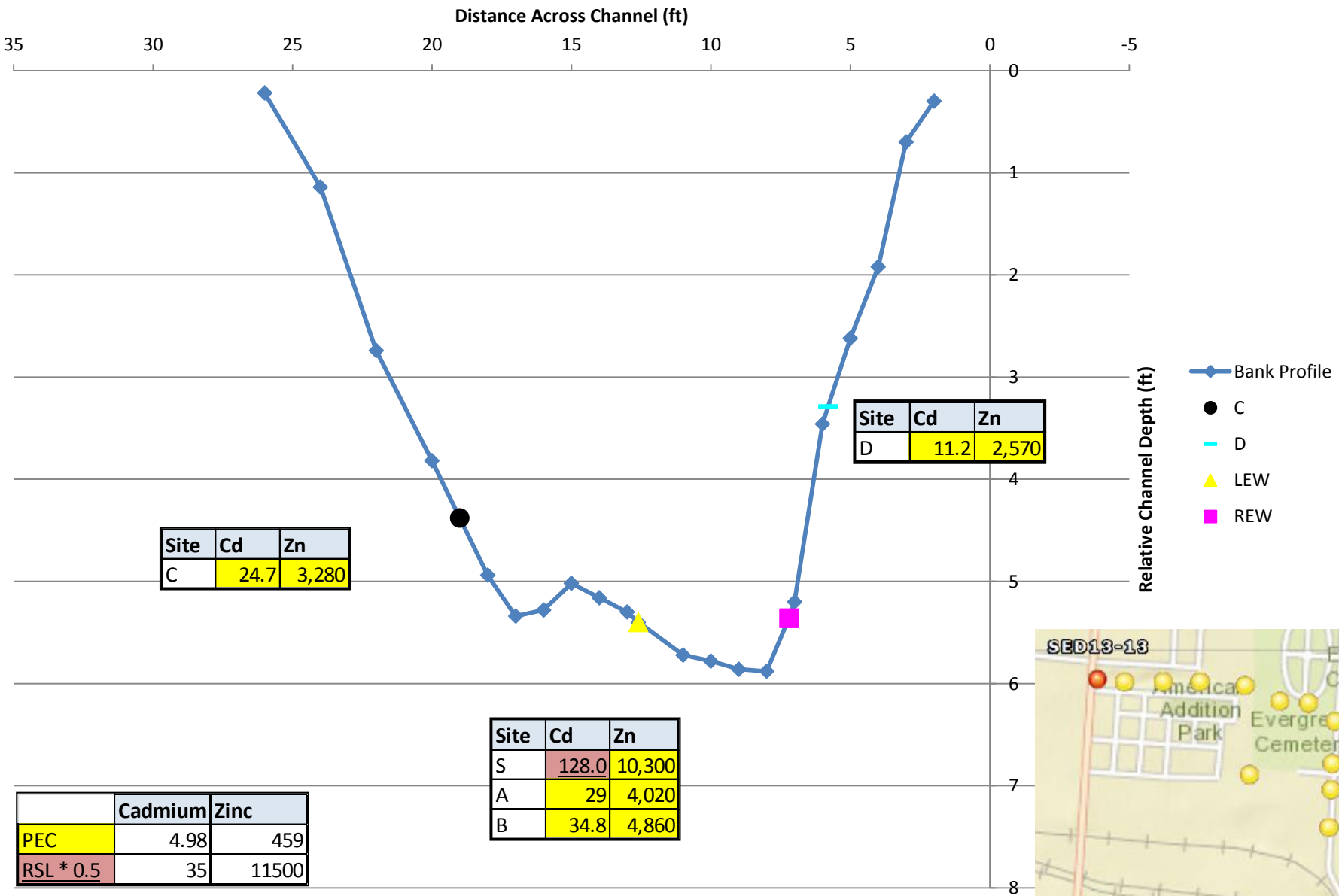
Site	Cd	Zn
D	10.4	1,680

Site	Cd	Zn
S	43.3	3,650
A	59.7	5,190
B	69.3	5,380

	Cadmium	Zinc
PEC	4.98	459
RSL * 0.5	35	11500



SED13-13 Bank Profile

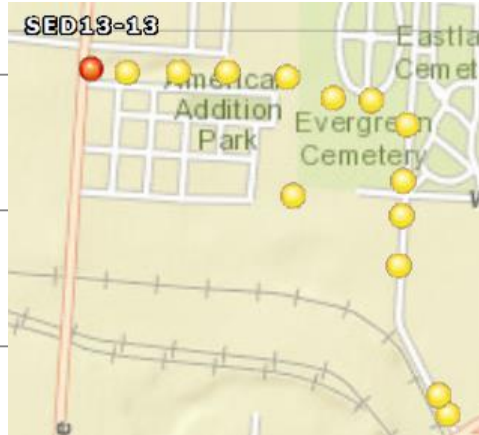


Site	Cd	Zn
D	11.2	2,570

Site	Cd	Zn
C	24.7	3,280

Site	Cd	Zn
S	128.0	10,300
A	29	4,020
B	34.8	4,860

	Cadmium	Zinc
PEC	4.98	459
RSL * 0.5	35	11500



Appendix B

Ohio EPA DES Sediment Sampling Reports

OhioEPA Division of Environmental Services

Laboratory Inorganic Analysis Data Report

Sample	161023				
Date Received	12/04/2013 9:58 AM	**Matrix**	SED	**Collected by**	SAAS, ERIC
	Begin	**End**		**Sample Type**	SURVEY
Date Collected			12/02/2013 8:10 AM	**Station ID**	302451
Program	CDO-DSW			**Customer ID**	
Client	DSW			**External ID**	
OEPA Division	DSW				
Location	AMERICAN DITCH SED13-1				

Analysis	Parameter	Storet	Result	RL	Units	Date	Qualifier
% Solids_SED	% Solids	P70318	43.3		%	12/04/2013	
ICPMS_SED	Cadmium	P1027	3.42	0.163	mg/kg	12/20/2013	
ICP_SED	Zinc	P1092	537	16.3	mg/kg	12/19/2013	

Field Comments S

Lab Comments

QC / Sample Comments

Approved By VDESHMUKH **On** 12/27/2013

OhioEPA Division of Environmental Services

Laboratory Inorganic Analysis Data Report

Sample	161024				
Date Received	12/04/2013 9:58 AM	**Matrix**	SED	**Collected by**	SAAS, ERIC
	Begin	**End**		**Sample Type**	SURVEY
Date Collected			12/02/2013 8:10 AM	**Station ID**	302451
Program	CDO-DSW			**Customer ID**	
Client	DSW			**External ID**	
OEPA Division	DSW				
Location	AMERICAN DITCH SED13-1				

Analysis	Parameter	Storet	Result	RL	Units	Date	Qualifier
% Solids_SED	% Solids	P70318	39.9		%	12/04/2013	
ICPMS_SED	Cadmium	P1027	31.3	1.68	mg/kg	12/20/2013	
ICP_SED	Zinc	P1092	1450	16.8	mg/kg	12/19/2013	

Field Comments A

Lab Comments

QC / Sample Comments

Approved By VDESHMUKH **On** 12/27/2013

OhioEPA Division of Environmental Services

Laboratory Inorganic Analysis Data Report

Sample	161025				
Date Received	12/04/2013 9:58 AM	**Matrix**	SED	**Collected by**	SAAS, ERIC
	Begin	**End**		**Sample Type**	SURVEY
Date Collected			12/02/2013 8:10 AM	**Station ID**	302451
Program	CDO-DSW			**Customer ID**	
Client	DSW			**External ID**	
OEPA Division	DSW				
Location	AMERICAN DITCH SED13-1				

Analysis	Parameter	Storet	Result	RL	Units	Date	Qualifier
% Solids_SED	% Solids	P70318	53.5		%	12/04/2013	
ICPMS_SED	Cadmium	P1027	107	13.9	mg/kg	12/20/2013	
ICP_SED	Zinc	P1092	3710	27.7	mg/kg	12/19/2013	

Field Comments B

Lab Comments

QC / Sample Comments

Approved By VDESHMUKH **On** 12/27/2013

OhioEPA Division of Environmental Services

Laboratory Inorganic Analysis Data Report

Sample	161026				
Date Received	12/04/2013 9:58 AM	**Matrix**	SED	**Collected by**	SAAS, ERIC
	Begin	**End**		**Sample Type**	SURVEY
Date Collected			12/02/2013 8:10 AM	**Station ID**	302451
Program	CDO-DSW			**Customer ID**	
Client	DSW			**External ID**	
OEPA Division	DSW				
Location	AMERICAN DITCH SED13-1				

Analysis	Parameter	Storet	Result	RL	Units	Date	Qualifier
% Solids_SED	% Solids	P70318	75.9		%	12/04/2013	
ICPMS_SED	Cadmium	P1027	21.8	1.04	mg/kg	12/20/2013	
ICP_SED	Zinc	P1092	1050	10.4	mg/kg	12/19/2013	

Field Comments D

Lab Comments

QC / Sample Comments

Approved By VDESHMUKH **On** 12/27/2013

OhioEPA Division of Environmental Services

Laboratory Inorganic Analysis Data Report

Sample	161027				
Date Received	12/04/2013 10:08 AM	**Matrix**	SED	**Collected by**	SAAS, ERIC
	Begin	**End**		**Sample Type**	SURVEY
Date Collected			12/02/2013 9:05 AM	**Station ID**	302452
Program	CDO-DSW			**Customer ID**	
Client	DSW			**External ID**	
OEPA Division	DSW				
Location	AMERICAN DITCH SED13-2				

Analysis	Parameter	Storet	Result	RL	Units	Date	Qualifier
% Solids_SED	% Solids	P70318	44.0		%	12/04/2013	
ICPMS_SED	Cadmium	P1027	8.42	0.813	mg/kg	12/20/2013	
ICP_SED	Zinc	P1092	1220	16.3	mg/kg	12/19/2013	

Field Comments S

Lab Comments

QC / Sample Comments

Approved By VDESHMUKH **On** 12/27/2013

OhioEPA Division of Environmental Services

Laboratory Inorganic Analysis Data Report

Sample	161028				
Date Received	12/04/2013 10:08 AM	**Matrix**	SED	**Collected by**	SAAS, ERIC
	Begin	**End**		**Sample Type**	SURVEY
Date Collected			12/02/2013 9:05 AM	**Station ID**	302452
Program	CDO-DSW			**Customer ID**	
Client	DSW			**External ID**	
OEPA Division	DSW				
Location	AMERICAN DITCH SED13-2				

Analysis	Parameter	Storet	Result	RL	Units	Date	Qualifier
% Solids_SED	% Solids	P70318	47.4		%	12/04/2013	
ICPMS_SED	Cadmium	P1027	25.9	1.54	mg/kg	12/20/2013	
ICP_SED	Zinc	P1092	1640	15.4	mg/kg	12/19/2013	

Field Comments A

Lab Comments

QC / Sample Comments

Approved By VDESHMUKH **On** 12/27/2013

OhioEPA Division of Environmental Services

Laboratory Inorganic Analysis Data Report

Sample	161029				
Date Received	12/04/2013 10:08 AM	**Matrix**	SED	**Collected by**	SAAS, ERIC
	Begin	**End**		**Sample Type**	SURVEY
Date Collected			12/02/2013 9:05 AM	**Station ID**	302452
Program	CDO-DSW			**Customer ID**	
Client	DSW			**External ID**	
OEPA Division	DSW				
Location	AMERICAN DITCH SED13-2				

Analysis	Parameter	Storet	Result	RL	Units	Date	Qualifier
% Solids_SED	% Solids	P70318	57.4		%	12/04/2013	
ICPMS_SED	Cadmium	P1027	66.3	11.8	mg/kg	12/20/2013	
ICP_SED	Zinc	P1092	4200	23.7	mg/kg	12/19/2013	

Field Comments B

Lab Comments

QC / Sample Comments

Approved By VDESHMUKH **On** 12/27/2013

OhioEPA Division of Environmental Services

Laboratory Inorganic Analysis Data Report

Sample	161030				
Date Received	12/04/2013 10:08 AM	**Matrix**	SED	**Collected by**	SAAS, ERIC
	Begin	**End**		**Sample Type**	SURVEY
Date Collected			12/02/2013 9:05 AM	**Station ID**	302452
Program	CDO-DSW			**Customer ID**	
Client	DSW			**External ID**	
OEPA Division	DSW				
Location	AMERICAN DITCH SED13-2				

Analysis	Parameter	Storet	Result	RL	Units	Date	Qualifier
% Solids_SED	% Solids	P70318	74.1		%	12/04/2013	
ICPMS_SED	Cadmium	P1027	13.8	1.01	mg/kg	01/16/2014	
ICP_SED	Zinc	P1092	1020	10.1	mg/kg	01/13/2014	

Field Comments C

Lab Comments

QC / Sample Comments

Approved By VDESHMUKH **On** 01/29/2014

OhioEPA Division of Environmental Services

Laboratory Inorganic Analysis Data Report

Sample	161031				
Date Received	12/04/2013 10:08 AM	**Matrix**	SED	**Collected by**	SAAS, ERIC
	Begin	**End**		**Sample Type**	SURVEY
Date Collected			12/02/2013 9:05 AM	**Station ID**	302452
Program	CDO-DSW			**Customer ID**	
Client	DSW			**External ID**	
OEPA Division	DSW				
Location	AMERICAN DITCH SED13-2				

Analysis	Parameter	Storet	Result	RL	Units	Date	Qualifier
% Solids_SED	% Solids	P70318	76.3		%	12/04/2013	
ICPMS_SED	Cadmium	P1027	17.5	0.857	mg/kg	01/16/2014	
ICP_SED	Zinc	P1092	1090	8.6	mg/kg	01/13/2014	

Field Comments D

Lab Comments

QC / Sample Comments

Approved By VDESHMUKH **On** 01/29/2014

OhioEPA Division of Environmental Services

Laboratory Inorganic Analysis Data Report

Sample	161032				
Date Received	12/04/2013 10:15 AM	**Matrix**	SED	**Collected by**	SAAS, ERIC
	Begin	**End**		**Sample Type**	SURVEY
Date Collected			12/02/2013 11:30 AM	**Station ID**	302453
Program	CDO-DSW			**Customer ID**	
Client	DSW			**External ID**	
OEPA Division	DSW				
Location	AMERICAN DITCH SED13-3				

Analysis	Parameter	Storet	Result	RL	Units	Date	Qualifier
% Solids_SED	% Solids	P70318	38.2		%	12/04/2013	
ICPMS_SED	Cadmium	P1027	31.5	1.96	mg/kg	01/16/2014	
ICP_SED	Zinc	P1092	1660	19.6	mg/kg	01/13/2014	

Field Comments S

Lab Comments

QC / Sample Comments

Approved By VDESHMUKH **On** 01/29/2014

OhioEPA Division of Environmental Services

Laboratory Inorganic Analysis Data Report

Sample	161033				
Date Received	12/04/2013 10:15 AM	**Matrix**	SED	**Collected by**	SAAS, ERIC
	Begin	**End**		**Sample Type**	SURVEY
Date Collected			12/02/2013 11:30 AM	**Station ID**	302453
Program	CDO-DSW			**Customer ID**	
Client	DSW			**External ID**	
OEPA Division	DSW				
Location	AMERICAN DITCH SED13-3				

Analysis	Parameter	Storet	Result	RL	Units	Date	Qualifier
% Solids_SED	% Solids	P70318	71.7		%	12/04/2013	
ICPMS_SED	Cadmium	P1027	22.9	0.991	mg/kg	01/16/2014	
ICP_SED	Zinc	P1092	505	9.9	mg/kg	01/13/2014	

Field Comments A

Lab Comments

QC / Sample Comments

Approved By VDESHMUKH **On** 01/29/2014

OhioEPA Division of Environmental Services

Laboratory Inorganic Analysis Data Report

Sample	161034				
Date Received	12/04/2013 10:15 AM	**Matrix**	SED	**Collected by**	SAAS, ERIC
	Begin	**End**		**Sample Type**	SURVEY
Date Collected			12/02/2013 11:30 AM	**Station ID**	302453
Program	CDO-DSW			**Customer ID**	
Client	DSW			**External ID**	
OEPA Division	DSW				
Location	AMERICAN DITCH SED13-3				

Analysis	Parameter	Storet	Result	RL	Units	Date	Qualifier
% Solids_SED	% Solids	P70318	75.2		%	12/04/2013	
ICPMS_SED	Cadmium	P1027	24.0	9.58	mg/kg	01/16/2014	J
ICP_SED	Zinc	P1092	310	9.6	mg/kg	01/13/2014	J

Field Comments B

Lab Comments

QC / Sample Comments Zn, Cd estimated due to poor correlation between lab duplicates.

Approved By VDESHMUKH **On** 01/29/2014

OhioEPA Division of Environmental Services

Laboratory Inorganic Analysis Data Report

Sample	161035				
Date Received	12/04/2013 10:15 AM	**Matrix**	SED	**Collected by**	SAAS, ERIC
	Begin	**End**		**Sample Type**	SURVEY
Date Collected			12/02/2013 11:30 AM	**Station ID**	302453
Program	CDO-DSW			**Customer ID**	
Client	DSW			**External ID**	
OEPA Division	DSW				
Location	AMERICAN DITCH SED13-3				

Analysis	Parameter	Storet	Result	RL	Units	Date	Qualifier
% Solids_SED	% Solids	P70318	86.0		%	12/04/2013	
ICPMS_SED	Cadmium	P1027	24.0	8.13	mg/kg	01/16/2014	
ICP_SED	Zinc	P1092	1220	8.1	mg/kg	01/13/2014	

Field Comments C

Lab Comments

QC / Sample Comments

Approved By VDESHMUKH **On** 01/29/2014

OhioEPA Division of Environmental Services

Laboratory Inorganic Analysis Data Report

Sample	161036				
Date Received	12/04/2013 10:15 AM	**Matrix**	SED	**Collected by**	SAAS, ERIC
	Begin	**End**		**Sample Type**	SURVEY
Date Collected			12/02/2013 11:30 AM	**Station ID**	302453
Program	CDO-DSW			**Customer ID**	
Client	DSW			**External ID**	
OEPA Division	DSW				
Location	AMERICAN DITCH SED13-3				

Analysis	Parameter	Storet	Result	RL	Units	Date	Qualifier
% Solids_SED	% Solids	P70318	81.2		%	12/04/2013	
ICPMS_SED	Cadmium	P1027	68.5	7.92	mg/kg	01/16/2014	
ICP_SED	Zinc	P1092	4060	79.2	mg/kg	01/13/2014	

Field Comments D

Lab Comments

QC / Sample Comments

Approved By VDESHMUKH **On** 01/29/2014

OhioEPA Division of Environmental Services

Laboratory Inorganic Analysis Data Report

Sample	161037				
Date Received	12/04/2013 10:15 AM	**Matrix**	SED	**Collected by**	SAAS, ERIC
	Begin	**End**		**Sample Type**	SURVEY
Date Collected			12/02/2013 11:30 AM	**Station ID**	302453
Program	CDO-DSW			**Customer ID**	
Client	DSW			**External ID**	
OEPA Division	DSW				
Location	AMERICAN DITCH SED13-3				

Analysis	Parameter	Storet	Result	RL	Units	Date	Qualifier
% Solids_SED	% Solids	P70318	82.5		%	12/04/2013	
ICPMS_SED	Cadmium	P1027	19.2	0.938	mg/kg	01/16/2014	
ICP_SED	Zinc	P1092	1010	9.4	mg/kg	01/13/2014	

Field Comments F

Lab Comments

QC / Sample Comments

Approved By VDESHMUKH **On** 01/29/2014

OhioEPA Division of Environmental Services

Laboratory Inorganic Analysis Data Report

Sample	161038				
Date Received	12/04/2013 10:21 AM	**Matrix**	SED	**Collected by**	SAAS, ERIC
	Begin	**End**		**Sample Type**	SURVEY
Date Collected			12/02/2013 10:20 AM	**Station ID**	302454
Program	CDO-DSW			**Customer ID**	
Client	DSW			**External ID**	
OEPA Division	DSW				
Location	AMERICAN DITCH SED13-4				

Analysis	Parameter	Storet	Result	RL	Units	Date	Qualifier
% Solids_SED	% Solids	P70318	37.0		%	12/04/2013	
ICPMS_SED	Cadmium	P1027	9.14	1.78	mg/kg	01/16/2014	
ICP_SED	Zinc	P1092	1130	17.8	mg/kg	01/13/2014	

Field Comments S

Lab Comments

QC / Sample Comments

Approved By VDESHMUKH **On** 01/29/2014

OhioEPA Division of Environmental Services

Laboratory Inorganic Analysis Data Report

Sample	161039				
Date Received	12/04/2013 10:21 AM	**Matrix**	SED	**Collected by**	SAAS, ERIC
	Begin	**End**		**Sample Type**	SURVEY
Date Collected			12/02/2013 10:20 AM	**Station ID**	302454
Program	CDO-DSW			**Customer ID**	
Client	DSW			**External ID**	
OEPA Division	DSW				
Location	AMERICAN DITCH SED13-4				

Analysis	Parameter	Storet	Result	RL	Units	Date	Qualifier
% Solids_SED	% Solids	P70318	75.7		%	12/04/2013	
ICPMS_SED	Cadmium	P1027	11.2	0.982	mg/kg	01/16/2014	
ICP_SED	Zinc	P1092	938	9.8	mg/kg	01/13/2014	

Field Comments A

Lab Comments

QC / Sample Comments

Approved By VDESHMUKH **On** 01/29/2014

OhioEPA Division of Environmental Services

Laboratory Inorganic Analysis Data Report

Sample	161040				
Date Received	12/04/2013 10:21 AM	**Matrix**	SED	**Collected by**	SAAS, ERIC
	Begin	**End**		**Sample Type**	SURVEY
Date Collected			12/02/2013 10:20 AM	**Station ID**	302454
Program	CDO-DSW			**Customer ID**	
Client	DSW			**External ID**	
OEPA Division	DSW				
Location	AMERICAN DITCH SED13-4				

Analysis	Parameter	Storet	Result	RL	Units	Date	Qualifier
% Solids_SED	% Solids	P70318	78.2		%	12/04/2013	
ICPMS_SED	Cadmium	P1027	76.8	9.97	mg/kg	01/16/2014	
ICP_SED	Zinc	P1092	1730	10	mg/kg	01/13/2014	

Field Comments B

Lab Comments

QC / Sample Comments

Approved By VDESHMUKH **On** 01/29/2014

OhioEPA Division of Environmental Services

Laboratory Inorganic Analysis Data Report

Sample	161041				
Date Received	12/04/2013 10:21 AM	**Matrix**	SED	**Collected by**	SAAS, ERIC
	Begin	**End**		**Sample Type**	SURVEY
Date Collected			12/02/2013 10:20 AM	**Station ID**	302454
Program	CDO-DSW			**Customer ID**	
Client	DSW			**External ID**	
OEPA Division	DSW				
Location	AMERICAN DITCH SED13-4				

Analysis	Parameter	Storet	Result	RL	Units	Date	Qualifier
% Solids_SED	% Solids	P70318	84.1		%	12/04/2013	
ICPMS_SED	Cadmium	P1027	1.25	0.092	mg/kg	01/16/2014	
ICP_SED	Zinc	P1092	176	9.2	mg/kg	01/13/2014	

Field Comments C

Lab Comments

QC / Sample Comments

Approved By VDESHMUKH **On** 01/29/2014

OhioEPA Division of Environmental Services

Laboratory Inorganic Analysis Data Report

Sample	161042				
Date Received	12/04/2013 10:21 AM	**Matrix**	SED	**Collected by**	SAAS, ERIC
	Begin	**End**		**Sample Type**	SURVEY
Date Collected			12/02/2013 10:20 AM	**Station ID**	302454
Program	CDO-DSW			**Customer ID**	
Client	DSW			**External ID**	
OEPA Division	DSW				
Location	AMERICAN DITCH SED13-4				

Analysis	Parameter	Storet	Result	RL	Units	Date	Qualifier
% Solids_SED	% Solids	P70318	79.5		%	12/04/2013	
ICPMS_SED	Cadmium	P1027	18.0	0.958	mg/kg	01/16/2014	
ICP_SED	Zinc	P1092	1270	9.6	mg/kg	01/13/2014	

Field Comments D

Lab Comments

QC / Sample Comments

Approved By VDESHMUKH **On** 01/29/2014

OhioEPA Division of Environmental Services

Laboratory Inorganic Analysis Data Report

Sample	161043				
Date Received	12/04/2013 10:21 AM	**Matrix**	SED	**Collected by**	SAAS, ERIC
	Begin	**End**		**Sample Type**	SURVEY
Date Collected			12/02/2013 10:20 AM	**Station ID**	302454
Program	CDO-DSW			**Customer ID**	
Client	DSW			**External ID**	
OEPA Division	DSW				
Location	AMERICAN DITCH SED13-4				

Analysis	Parameter	Storet	Result	RL	Units	Date	Qualifier
% Solids_SED	% Solids	P70318	75.4		%	12/09/2013	
ICPMS_SED	Cadmium	P1027	1.15	0.088	mg/kg	01/16/2014	
ICP_SED	Zinc	P1092	145	8.8	mg/kg	01/13/2014	

Field Comments F

Lab Comments

QC / Sample Comments

Approved By VDESHMUKH **On** 01/29/2014

OhioEPA Division of Environmental Services

Laboratory Inorganic Analysis Data Report

Sample	161044				
Date Received	12/04/2013 10:27 AM	**Matrix**	SED	**Collected by**	SAAS, ERIC
	Begin	**End**		**Sample Type**	SURVEY
Date Collected			12/02/2013 4:10 PM	**Station ID**	302455
Program	CDO-DSW			**Customer ID**	
Client	DSW			**External ID**	
OEPA Division	DSW				
Location	AMERICAN DITCH SED13-5				

Analysis	Parameter	Storet	Result	RL	Units	Date	Qualifier
% Solids_SED	% Solids	P70318	15.6		%	12/04/2013	
ICPMS_SED	Cadmium	P1027	150	50.9	mg/kg	01/16/2014	
ICP_SED	Zinc	P1092	15600	509	mg/kg	01/13/2014	

Field Comments S

Lab Comments

QC / Sample Comments

Approved By VDESHMUKH **On** 01/29/2014

OhioEPA Division of Environmental Services

Laboratory Inorganic Analysis Data Report

Sample	161045				
Date Received	12/04/2013 10:27 AM	**Matrix**	SED	**Collected by**	SAAS, ERIC
	Begin	**End**		**Sample Type**	SURVEY
Date Collected			12/02/2013 4:10 PM	**Station ID**	302455
Program	CDO-DSW			**Customer ID**	
Client	DSW			**External ID**	
OEPA Division	DSW				
Location	AMERICAN DITCH SED13-5				

Analysis	Parameter	Storet	Result	RL	Units	Date	Qualifier
% Solids_SED	% Solids	P70318	51.5		%	12/04/2013	
ICPMS_SED	Cadmium	P1027	49.6	13.6	mg/kg	01/16/2014	
ICP_SED	Zinc	P1092	3320	13.6	mg/kg	01/13/2014	

Field Comments A (dup A)

Lab Comments

QC / Sample Comments

Approved By VDESHMUKH **On** 01/29/2014

OhioEPA Division of Environmental Services

Laboratory Inorganic Analysis Data Report

Sample	161046				
Date Received	12/04/2013 10:27 AM	**Matrix**	SED	**Collected by**	SAAS, ERIC
	Begin	**End**		**Sample Type**	SURVEY
Date Collected			12/02/2013 4:10 PM	**Station ID**	302455
Program	CDO-DSW			**Customer ID**	
Client	DSW			**External ID**	
OEPA Division	DSW				
Location	AMERICAN DITCH SED13-5				

Analysis	Parameter	Storet	Result	RL	Units	Date	Qualifier
% Solids_SED	% Solids	P70318	59.7		%	12/04/2013	
ICPMS_SED	Cadmium	P1027	37.4	12.5	mg/kg	01/16/2014	
ICP_SED	Zinc	P1092	2620	12.5	mg/kg	01/13/2014	

Field Comments A (dup B)

Lab Comments

QC / Sample Comments

Approved By VDESHMUKH **On** 01/29/2014

OhioEPA Division of Environmental Services

Laboratory Inorganic Analysis Data Report

Sample	161047				
Date Received	12/04/2013 10:27 AM	**Matrix**	SED	**Collected by**	SAAS, ERIC
	Begin	**End**		**Sample Type**	SURVEY
Date Collected			12/02/2013 4:10 PM	**Station ID**	302455
Program	CDO-DSW			**Customer ID**	
Client	DSW			**External ID**	
OEPA Division	DSW				
Location	AMERICAN DITCH SED13-5				

Analysis	Parameter	Storet	Result	RL	Units	Date	Qualifier
% Solids_SED	% Solids	P70318	64.5		%	12/04/2013	
ICPMS_SED	Cadmium	P1027	30.1	2.44	mg/kg	01/17/2014	
ICP_SED	Zinc	P1092	1510	12.2	mg/kg	01/15/2014	

Field Comments B

Lab Comments

QC / Sample Comments

Approved By VDESHMUKH **On** 01/29/2014

OhioEPA Division of Environmental Services

Laboratory Inorganic Analysis Data Report

Sample	161048				
Date Received	12/04/2013 10:27 AM	**Matrix**	SED	**Collected by**	SAAS, ERIC
	Begin	**End**		**Sample Type**	SURVEY
Date Collected			12/02/2013 4:10 PM	**Station ID**	302455
Program	CDO-DSW			**Customer ID**	
Client	DSW			**External ID**	
OEPA Division	DSW				
Location	AMERICAN DITCH SED13-5				

Analysis	Parameter	Storet	Result	RL	Units	Date	Qualifier
% Solids_SED	% Solids	P70318	54.8		%	12/04/2013	
ICPMS_SED	Cadmium	P1027	43.8	2.82	mg/kg	01/17/2014	
ICP_SED	Zinc	P1092	3390	14.1	mg/kg	01/15/2014	

Field Comments D

Lab Comments

QC / Sample Comments

Approved By VDESHMUKH **On** 01/29/2014

OhioEPA Division of Environmental Services

Laboratory Inorganic Analysis Data Report

Sample	161049				
Date Received	12/04/2013 10:27 AM	**Matrix**	SED	**Collected by**	SAAS, ERIC
	Begin	**End**		**Sample Type**	SURVEY
Date Collected			12/02/2013 4:10 PM	**Station ID**	302455
Program	CDO-DSW			**Customer ID**	
Client	DSW			**External ID**	
OEPA Division	DSW				
Location	AMERICAN DITCH SED13-5				

Analysis	Parameter	Storet	Result	RL	Units	Date	Qualifier
% Solids_SED	% Solids	P70318	72.3		%	12/04/2013	
ICPMS_SED	Cadmium	P1027	20.8	1.05	mg/kg	01/17/2014	
ICP_SED	Zinc	P1092	1420	10.5	mg/kg	01/15/2014	

Field Comments F

Lab Comments

QC / Sample Comments

Approved By VDESHMUKH **On** 01/29/2014

OhioEPA Division of Environmental Services

Laboratory Inorganic Analysis Data Report

Sample	161050				
Date Received	12/04/2013 10:37 AM	**Matrix**	SED	**Collected by**	SAAS, ERIC
	Begin	**End**		**Sample Type**	SURVEY
Date Collected			12/02/2013 3:00 PM	**Station ID**	302456
Program	CDO-DSW			**Customer ID**	
Client	DSW			**External ID**	
OEPA Division	DSW				
Location	AMERICAN DITCH SED13-6 DUP A				

Analysis	Parameter	Storet	Result	RL	Units	Date	Qualifier
% Solids_SED	% Solids	P70318	31.1		%	12/04/2013	
ICPMS_SED	Cadmium	P1027	97.8	4.54	mg/kg	01/17/2014	
ICP_SED	Zinc	P1092	6930	227	mg/kg	01/15/2014	

Field Comments S (dup A)

Lab Comments

QC / Sample Comments

Approved By VDESHMUKH **On** 01/29/2014

OhioEPA Division of Environmental Services

Laboratory Inorganic Analysis Data Report

Sample	161051				
Date Received	12/04/2013 10:37 AM	**Matrix**	SED	**Collected by**	SAAS, ERIC
	Begin	**End**		**Sample Type**	SURVEY
Date Collected			12/02/2013 3:00 PM	**Station ID**	302456
Program	CDO-DSW			**Customer ID**	
Client	DSW			**External ID**	
OEPA Division	DSW				
Location	AMERICAN DITCH SED13-6 DUP B				

Analysis	Parameter	Storet	Result	RL	Units	Date	Qualifier
% Solids_SED	% Solids	P70318	23.3		%	12/04/2013	
ICPMS_SED	Cadmium	P1027	111	6.68	mg/kg	01/17/2014	
ICP_SED	Zinc	P1092	7970	33.4	mg/kg	01/15/2014	

Field Comments S (dup B)

Lab Comments

QC / Sample Comments

Approved By VDESHMUKH **On** 01/29/2014

OhioEPA Division of Environmental Services

Laboratory Inorganic Analysis Data Report

Sample	161052				
Date Received	12/04/2013 10:37 AM	**Matrix**	SED	**Collected by**	SAAS, ERIC
	Begin	**End**		**Sample Type**	SURVEY
Date Collected			12/02/2013 3:00 PM	**Station ID**	302456
Program	CDO-DSW			**Customer ID**	
Client	DSW			**External ID**	
OEPA Division	DSW				
Location	AMERICAN DITCH SED13-6				

Analysis	Parameter	Storet	Result	RL	Units	Date	Qualifier
% Solids_SED	% Solids	P70318	32.0		%	12/04/2013	
ICPMS_SED	Cadmium	P1027	80.4	4.96	mg/kg	01/17/2014	
ICP_SED	Zinc	P1092	7110	248	mg/kg	01/15/2014	

Field Comments A

Lab Comments

QC / Sample Comments

Approved By VDESHMUKH **On** 01/29/2014

OhioEPA Division of Environmental Services

Laboratory Inorganic Analysis Data Report

Sample	161053				
Date Received	12/04/2013 10:37 AM	**Matrix**	SED	**Collected by**	SAAS, ERIC
	Begin	**End**		**Sample Type**	SURVEY
Date Collected			12/02/2013 3:00 PM	**Station ID**	302456
Program	CDO-DSW			**Customer ID**	
Client	DSW			**External ID**	
OEPA Division	DSW				
Location	AMERICAN DITCH SED13-6				

Analysis	Parameter	Storet	Result	RL	Units	Date	Qualifier
% Solids_SED	% Solids	P70318	70.3		%	12/04/2013	
ICPMS_SED	Cadmium	P1027	35.9	2.2	mg/kg	01/17/2014	
ICP_SED	Zinc	P1092	2750	11	mg/kg	01/15/2014	

Field Comments B

Lab Comments

QC / Sample Comments

Approved By VDESHMUKH **On** 01/29/2014

OhioEPA Division of Environmental Services

Laboratory Inorganic Analysis Data Report

Sample	161054				
Date Received	12/04/2013 10:37 AM	**Matrix**	SED	**Collected by**	SAAS, ERIC
	Begin	**End**		**Sample Type**	SURVEY
Date Collected			12/02/2013 3:00 PM	**Station ID**	302456
Program	CDO-DSW			**Customer ID**	
Client	DSW			**External ID**	
OEPA Division	DSW				
Location	AMERICAN DITCH SED13-6				

Analysis	Parameter	Storet	Result	RL	Units	Date	Qualifier
% Solids_SED	% Solids	P70318	86.1		%	12/04/2013	
ICPMS_SED	Cadmium	P1027	9.98	0.907	mg/kg	01/17/2014	
ICP_SED	Zinc	P1092	979	9.1	mg/kg	01/15/2014	

Field Comments C

Lab Comments

QC / Sample Comments

Approved By VDESHMUKH **On** 01/29/2014

OhioEPA Division of Environmental Services

Laboratory Inorganic Analysis Data Report

Sample	161055				
Date Received	12/04/2013 10:37 AM	**Matrix**	SED	**Collected by**	SAAS, ERIC
	Begin	**End**		**Sample Type**	SURVEY
Date Collected			12/02/2013 3:00 PM	**Station ID**	302456
Program	CDO-DSW			**Customer ID**	
Client	DSW			**External ID**	
OEPA Division	DSW				
Location	AMERICAN DITCH SED13-6				

Analysis	Parameter	Storet	Result	RL	Units	Date	Qualifier
% Solids_SED	% Solids	P70318	76.9		%	12/04/2013	
ICPMS_SED	Cadmium	P1027	37.5	2	mg/kg	01/17/2014	
ICP_SED	Zinc	P1092	2440	10	mg/kg	01/15/2014	

Field Comments D

Lab Comments

QC / Sample Comments

Approved By VDESHMUKH **On** 01/29/2014

OhioEPA Division of Environmental Services

Laboratory Inorganic Analysis Data Report

Sample	161056				
Date Received	12/04/2013 10:37 AM	**Matrix**	SED	**Collected by**	SAAS, ERIC
	Begin	**End**		**Sample Type**	SURVEY
Date Collected			12/02/2013 3:00 PM	**Station ID**	302456
Program	CDO-DSW			**Customer ID**	
Client	DSW			**External ID**	
OEPA Division	DSW				
Location	AMERICAN DITCH SED13-6				

Analysis	Parameter	Storet	Result	RL	Units	Date	Qualifier
% Solids_SED	% Solids	P70318	56.6		%	12/04/2013	
ICPMS_SED	Cadmium	P1027	7.29	1.37	mg/kg	01/17/2014	
ICP_SED	Zinc	P1092	558	13.7	mg/kg	01/15/2014	

Field Comments F

Lab Comments

QC / Sample Comments

Approved By VDESHMUKH **On** 01/29/2014

OhioEPA Division of Environmental Services

Laboratory Inorganic Analysis Data Report

Sample	161057				
Date Received	12/04/2013 10:45 AM	**Matrix**	SED	**Collected by**	SAAS, ERIC
	Begin	**End**		**Sample Type**	SURVEY
Date Collected			12/02/2013 2:00 PM	**Station ID**	302457
Program	CDO-DSW			**Customer ID**	
Client	DSW			**External ID**	
OEPA Division	DSW				
Location	AMERICAN DITCH SED13-7 DUP A				

Analysis	Parameter	Storet	Result	RL	Units	Date	Qualifier
% Solids_SED	% Solids	P70318	42.4		%	12/04/2013	
ICPMS_SED	Cadmium	P1027	76.7	17.8	mg/kg	01/17/2014	J
ICP_SED	Zinc	P1092	5680	178	mg/kg	01/15/2014	

Field Comments S (dup A)

Lab Comments

QC / Sample Comments Cd estimated due to poor correlation between lab duplicates.

Approved By VDESHMUKH **On** 01/29/2014

OhioEPA Division of Environmental Services

Laboratory Inorganic Analysis Data Report

Sample	161058				
Date Received	12/04/2013 10:45 AM	**Matrix**	SED	**Collected by**	SAAS, ERIC
	Begin	**End**		**Sample Type**	SURVEY
Date Collected			12/02/2013 2:00 PM	**Station ID**	302457
Program	CDO-DSW			**Customer ID**	
Client	DSW			**External ID**	
OEPA Division	DSW				
Location	AMERICAN DITCH SED13-7 DUP B				

Analysis	Parameter	Storet	Result	RL	Units	Date	Qualifier
% Solids_SED	% Solids	P70318	43.8		%	12/04/2013	
ICPMS_SED	Cadmium	P1027	68.7	3.3	mg/kg	01/17/2014	
ICP_SED	Zinc	P1092	5680	165	mg/kg	01/15/2014	

Field Comments S (dup B)

Lab Comments

QC / Sample Comments

Approved By VDESHMUKH **On** 01/29/2014

OhioEPA Division of Environmental Services

Laboratory Inorganic Analysis Data Report

Sample	161059				
Date Received	12/04/2013 10:45 AM	**Matrix**	SED	**Collected by**	SAAS, ERIC
	Begin	**End**		**Sample Type**	SURVEY
Date Collected			12/02/2013 2:00 PM	**Station ID**	302457
Program	CDO-DSW			**Customer ID**	
Client	DSW			**External ID**	
OEPA Division	DSW				
Location	AMERICAN DITCH SED13-7 DUP A				

Analysis	Parameter	Storet	Result	RL	Units	Date	Qualifier
% Solids_SED	% Solids	P70318	61.8		%	12/04/2013	
ICPMS_SED	Cadmium	P1027	90.0	12.2	mg/kg	01/17/2014	
ICP_SED	Zinc	P1092	7060	122	mg/kg	01/15/2014	

Field Comments A (dup A)

Lab Comments

QC / Sample Comments

Approved By VDESHMUKH **On** 01/29/2014

OhioEPA Division of Environmental Services

Laboratory Inorganic Analysis Data Report

Sample	161060				
Date Received	12/04/2013 10:45 AM	**Matrix**	SED	**Collected by**	SAAS, ERIC
	Begin	**End**		**Sample Type**	SURVEY
Date Collected			12/02/2013 2:00 PM	**Station ID**	302457
Program	CDO-DSW			**Customer ID**	
Client	DSW			**External ID**	
OEPA Division	DSW				
Location	AMERICAN DITCH SED13-7 DUP B				

Analysis	Parameter	Storet	Result	RL	Units	Date	Qualifier
% Solids_SED	% Solids	P70318	64.9		%	12/04/2013	
ICPMS_SED	Cadmium	P1027	72.6	11.2	mg/kg	01/17/2014	
ICP_SED	Zinc	P1092	5380	112	mg/kg	01/15/2014	

Field Comments A (dup B)

Lab Comments

QC / Sample Comments

Approved By VDESHMUKH **On** 01/29/2014

OhioEPA Division of Environmental Services

Laboratory Inorganic Analysis Data Report

Sample	161061				
Date Received	12/04/2013 10:45 AM	**Matrix**	SED	**Collected by**	SAAS, ERIC
	Begin	**End**		**Sample Type**	SURVEY
Date Collected			12/02/2013 2:00 PM	**Station ID**	302457
Program	CDO-DSW			**Customer ID**	
Client	DSW			**External ID**	
OEPA Division	DSW				
Location	AMERICAN DITCH SED13-7 DUP A				

Analysis	Parameter	Storet	Result	RL	Units	Date	Qualifier
% Solids_SED	% Solids	P70318	71.9		%	12/04/2013	
ICPMS_SED	Cadmium	P1027	123	11	mg/kg	01/17/2014	
ICP_SED	Zinc	P1092	6740	110	mg/kg	01/15/2014	

Field Comments B (dup A)

Lab Comments

QC / Sample Comments

Approved By VDESHMUKH **On** 01/29/2014

OhioEPA Division of Environmental Services

Laboratory Inorganic Analysis Data Report

Sample	161062				
Date Received	12/04/2013 10:45 AM	**Matrix**	SED	**Collected by**	SAAS, ERIC
	Begin	**End**		**Sample Type**	SURVEY
Date Collected			12/02/2013 2:00 PM	**Station ID**	302457
Program	CDO-DSW			**Customer ID**	
Client	DSW			**External ID**	
OEPA Division	DSW				
Location	AMERICAN DITCH SED13-7 DUP B				

Analysis	Parameter	Storet	Result	RL	Units	Date	Qualifier
% Solids_SED	% Solids	P70318	80.3		%	12/04/2013	
ICPMS_SED	Cadmium	P1027	88.9	9.83	mg/kg	01/17/2014	
ICP_SED	Zinc	P1092	4480	98.3	mg/kg	01/15/2014	

Field Comments B (dup B)

Lab Comments

QC / Sample Comments

Approved By VDESHMUKH **On** 01/29/2014

OhioEPA Division of Environmental Services

Laboratory Inorganic Analysis Data Report

Sample	161063				
Date Received	12/04/2013 10:45 AM	**Matrix**	SED	**Collected by**	SAAS, ERIC
	Begin	**End**		**Sample Type**	SURVEY
Date Collected			12/02/2013 2:00 PM	**Station ID**	302457
Program	CDO-DSW			**Customer ID**	
Client	DSW			**External ID**	
OEPA Division	DSW				
Location	AMERICAN DITCH SED13-7				

Analysis	Parameter	Storet	Result	RL	Units	Date	Qualifier
% Solids_SED	% Solids	P70318	78.0		%	12/04/2013	
ICPMS_SED	Cadmium	P1027	102	9.69	mg/kg	01/17/2014	
ICP_SED	Zinc	P1092	6420	96.9	mg/kg	01/15/2014	

Field Comments C

Lab Comments

QC / Sample Comments

Approved By VDESHMUKH **On** 01/29/2014

OhioEPA Division of Environmental Services

Laboratory Inorganic Analysis Data Report

Sample	161064				
Date Received	12/04/2013 10:45 AM	**Matrix**	SED	**Collected by**	SAAS, ERIC
	Begin	**End**		**Sample Type**	SURVEY
Date Collected			12/02/2013 2:00 PM	**Station ID**	302457
Program	CDO-DSW			**Customer ID**	
Client	DSW			**External ID**	
OEPA Division	DSW				
Location	AMERICAN DITCH SED13-7				

Analysis	Parameter	Storet	Result	RL	Units	Date	Qualifier
% Solids_SED	% Solids	P70318	73.4		%	12/04/2013	
ICPMS_SED	Cadmium	P1027	195	9.84	mg/kg	01/17/2014	
ICP_SED	Zinc	P1092	13900	98.4	mg/kg	01/15/2014	

Field Comments D

Lab Comments

QC / Sample Comments

Approved By VDESHMUKH **On** 01/29/2014

OhioEPA Division of Environmental Services

Laboratory Inorganic Analysis Data Report

Sample	161065				
Date Received	12/04/2013 10:45 AM	**Matrix**	SED	**Collected by**	SAAS, ERIC
	Begin	**End**		**Sample Type**	SURVEY
Date Collected			12/02/2013 2:00 PM	**Station ID**	302457
Program	CDO-DSW			**Customer ID**	
Client	DSW			**External ID**	
OEPA Division	DSW				
Location	AMERICAN DITCH SED13-7				

Analysis	Parameter	Storet	Result	RL	Units	Date	Qualifier
% Solids_SED	% Solids	P70318	73.2		%	12/04/2013	
ICPMS_SED	Cadmium	P1027	45.4	10.8	mg/kg	01/17/2014	
ICP_SED	Zinc	P1092	2490	10.8	mg/kg	01/15/2014	

Field Comments E

Lab Comments

QC / Sample Comments

Approved By VDESHMUKH **On** 01/29/2014

OhioEPA Division of Environmental Services

Laboratory Inorganic Analysis Data Report

Sample	161066				
Date Received	12/04/2013 10:45 AM	**Matrix**	SED	**Collected by**	SAAS, ERIC
	Begin	**End**		**Sample Type**	SURVEY
Date Collected			12/02/2013 2:00 PM	**Station ID**	302457
Program	CDO-DSW			**Customer ID**	
Client	DSW			**External ID**	
OEPA Division	DSW				
Location	AMERICAN DITCH SED13-7				

Analysis	Parameter	Storet	Result	RL	Units	Date	Qualifier
% Solids_SED	% Solids	P70318	83.1		%	12/04/2013	
ICPMS_SED	Cadmium	P1027	1.88	0.094	mg/kg	01/17/2014	
ICP_SED	Zinc	P1092	150	9.4	mg/kg	01/15/2014	

Field Comments F

Lab Comments

QC / Sample Comments

Approved By VDESHMUKH **On** 01/29/2014

OhioEPA Division of Environmental Services

Laboratory Inorganic Analysis Data Report

Sample	161067				
Date Received	12/04/2013 10:45 AM	**Matrix**	SED	**Collected by**	SAAS, ERIC
	Begin	**End**		**Sample Type**	SURVEY
Date Collected			12/02/2013 2:00 PM	**Station ID**	302457
Program	CDO-DSW			**Customer ID**	
Client	DSW			**External ID**	
OEPA Division	DSW				
Location	AMERICAN DITCH SED13-7				

Analysis	Parameter	Storet	Result	RL	Units	Date	Qualifier
% Solids_SED	% Solids	P70318	78.0		%	12/04/2013	
ICPMS_SED	Cadmium	P1027	72.2	9.96	mg/kg	01/21/2014	
ICP_SED	Zinc	P1092	3950	99.6	mg/kg	01/22/2014	

Field Comments G

Lab Comments

QC / Sample Comments

Approved By VDESHMUKH **On** 01/29/2014

OhioEPA Division of Environmental Services

Laboratory Inorganic Analysis Data Report

Sample	161068				
Date Received	12/04/2013 10:59 AM	**Matrix**	SED	**Collected by**	SAAS, ERIC
	Begin	**End**		**Sample Type**	SURVEY
Date Collected			12/02/2013 12:55 PM	**Station ID**	302458
Program	CDO-DSW			**Customer ID**	
Client	DSW			**External ID**	
OEPA Division	DSW				
Location	AMERICAN DITCH SED13-8				

Analysis	Parameter	Storet	Result	RL	Units	Date	Qualifier
% Solids_SED	% Solids	P70318	44.1		%	12/04/2013	
ICPMS_SED	Cadmium	P1027	68.6	3.56	mg/kg	01/21/2014	
ICP_SED	Zinc	P1092	6270	178	mg/kg	01/22/2014	

Field Comments S

Lab Comments

QC / Sample Comments

Approved By VDESHMUKH **On** 01/29/2014

OhioEPA Division of Environmental Services

Laboratory Inorganic Analysis Data Report

Sample	161069				
Date Received	12/04/2013 10:59 AM	**Matrix**	SED	**Collected by**	SAAS, ERIC
	Begin	**End**		**Sample Type**	SURVEY
Date Collected			12/02/2013 12:55 PM	**Station ID**	302458
Program	CDO-DSW			**Customer ID**	
Client	DSW			**External ID**	
OEPA Division	DSW				
Location	AMERICAN DITCH SED13-8				

Analysis	Parameter	Storet	Result	RL	Units	Date	Qualifier
% Solids_SED	% Solids	P70318	69.3		%	12/04/2013	
ICPMS_SED	Cadmium	P1027	25.6	1.09	mg/kg	01/21/2014	
ICP_SED	Zinc	P1092	2490	10.9	mg/kg	01/22/2014	

Field Comments A

Lab Comments

QC / Sample Comments

Approved By VDESHMUKH **On** 01/29/2014

OhioEPA Division of Environmental Services

Laboratory Inorganic Analysis Data Report

Sample	161070				
Date Received	12/04/2013 10:59 AM	**Matrix**	SED	**Collected by**	SAAS, ERIC
	Begin	**End**		**Sample Type**	SURVEY
Date Collected			12/02/2013 12:55 PM	**Station ID**	302458
Program	CDO-DSW			**Customer ID**	
Client	DSW			**External ID**	
OEPA Division	DSW				
Location	AMERICAN DITCH SED13-8				

Analysis	Parameter	Storet	Result	RL	Units	Date	Qualifier
% Solids_SED	% Solids	P70318	74.6		%	12/04/2013	
ICPMS_SED	Cadmium	P1027	20.2	1.05	mg/kg	01/21/2014	
ICP_SED	Zinc	P1092	1270	10.5	mg/kg	01/22/2014	

Field Comments B

Lab Comments

QC / Sample Comments

Approved By VDESHMUKH **On** 01/29/2014

OhioEPA Division of Environmental Services

Laboratory Inorganic Analysis Data Report

Sample	161071				
Date Received	12/04/2013 10:59 AM	**Matrix**	SED	**Collected by**	SAAS, ERIC
	Begin	**End**		**Sample Type**	SURVEY
Date Collected			12/02/2013 12:55 PM	**Station ID**	302458
Program	CDO-DSW			**Customer ID**	
Client	DSW			**External ID**	
OEPA Division	DSW				
Location	AMERICAN DITCH SED13-8				

Analysis	Parameter	Storet	Result	RL	Units	Date	Qualifier
% Solids_SED	% Solids	P70318	74.6		%	12/04/2013	
ICPMS_SED	Cadmium	P1027	44.3	2.09	mg/kg	01/21/2014	
ICP_SED	Zinc	P1092	2020	10.5	mg/kg	01/22/2014	

Field Comments C

Lab Comments

QC / Sample Comments

Approved By VDESHMUKH **On** 01/29/2014

OhioEPA Division of Environmental Services

Laboratory Inorganic Analysis Data Report

Sample	161072				
Date Received	12/04/2013 10:59 AM	**Matrix**	SED	**Collected by**	SAAS, ERIC
	Begin	**End**		**Sample Type**	SURVEY
Date Collected			12/02/2013 12:55 PM	**Station ID**	302458
Program	CDO-DSW			**Customer ID**	
Client	DSW			**External ID**	
OEPA Division	DSW				
Location	AMERICAN DITCH SED13-8				

Analysis	Parameter	Storet	Result	RL	Units	Date	Qualifier
% Solids_SED	% Solids	P70318	77.7		%	12/04/2013	
ICPMS_SED	Cadmium	P1027	23.0	1.02	mg/kg	01/21/2014	
ICP_SED	Zinc	P1092	1310	10.2	mg/kg	01/22/2014	

Field Comments D

Lab Comments

QC / Sample Comments

Approved By VDESHMUKH **On** 01/29/2014

OhioEPA Division of Environmental Services

Laboratory Inorganic Analysis Data Report

Sample	161073				
Date Received	12/04/2013 10:59 AM	**Matrix**	SED	**Collected by**	SAAS, ERIC
	Begin	**End**		**Sample Type**	SURVEY
Date Collected			12/02/2013 12:55 PM	**Station ID**	302458
Program	CDO-DSW			**Customer ID**	
Client	DSW			**External ID**	
OEPA Division	DSW				
Location	AMERICAN DITCH SED13-8				

Analysis	Parameter	Storet	Result	RL	Units	Date	Qualifier
% Solids_SED	% Solids	P70318	79.5		%	12/04/2013	
ICPMS_SED	Cadmium	P1027	7.98	0.964	mg/kg	01/21/2014	
ICP_SED	Zinc	P1092	620	9.6	mg/kg	01/22/2014	

Field Comments F

Lab Comments

QC / Sample Comments

Approved By VDESHMUKH **On** 01/29/2014

OhioEPA Division of Environmental Services

Laboratory Inorganic Analysis Data Report

Sample	161074				
Date Received	12/04/2013 10:59 AM	**Matrix**	SED	**Collected by**	SAAS, ERIC
	Begin	**End**		**Sample Type**	SURVEY
Date Collected			12/02/2013 12:55 PM	**Station ID**	302458
Program	CDO-DSW			**Customer ID**	
Client	DSW			**External ID**	
OEPA Division	DSW				
Location	AMERICAN DITCH SED13-8				

Analysis	Parameter	Storet	Result	RL	Units	Date	Qualifier
% Solids_SED	% Solids	P70318	81.1		%	12/04/2013	
ICPMS_SED	Cadmium	P1027	2.00	0.925	mg/kg	01/21/2014	
ICP_SED	Zinc	P1092	270	9.3	mg/kg	01/22/2014	

Field Comments G

Lab Comments

QC / Sample Comments

Approved By VDESHMUKH **On** 01/29/2014

OhioEPA Division of Environmental Services

Laboratory Inorganic Analysis Data Report

Sample	161075				
Date Received	12/04/2013 11:06 AM	**Matrix**	SED	**Collected by**	SAAS, ERIC
	Begin	**End**		**Sample Type**	SURVEY
Date Collected			12/02/2013 9:30 AM	**Station ID**	302459
Program	CDO-DSW			**Customer ID**	
Client	DSW			**External ID**	
OEPA Division	DSW				
Location	AMERICAN DITCH SED13-9				

Analysis	Parameter	Storet	Result	RL	Units	Date	Qualifier
% Solids_SED	% Solids	P70318	35.1		%	12/04/2013	
ICPMS_SED	Cadmium	P1027	105	4.28	mg/kg	01/21/2014	
ICP_SED	Zinc	P1092	10000	214	mg/kg	01/22/2014	

Field Comments S

Lab Comments

QC / Sample Comments

Approved By VDESHMUKH **On** 01/29/2014

OhioEPA Division of Environmental Services

Laboratory Inorganic Analysis Data Report

Sample	161076				
Date Received	12/04/2013 11:06 AM	**Matrix**	SED	**Collected by**	SAAS, ERIC
	Begin	**End**		**Sample Type**	SURVEY
Date Collected			12/02/2013 9:30 AM	**Station ID**	302459
Program	CDO-DSW			**Customer ID**	
Client	DSW			**External ID**	
OEPA Division	DSW				
Location	AMERICAN DITCH SED13-9				

Analysis	Parameter	Storet	Result	RL	Units	Date	Qualifier
% Solids_SED	% Solids	P70318	47.5		%	12/04/2013	
ICPMS_SED	Cadmium	P1027	92.6	15.8	mg/kg	01/21/2014	
ICP_SED	Zinc	P1092	7880	158	mg/kg	01/22/2014	

Field Comments A

Lab Comments

QC / Sample Comments

Approved By VDESHMUKH **On** 01/29/2014

OhioEPA Division of Environmental Services

Laboratory Inorganic Analysis Data Report

Sample	161077				
Date Received	12/04/2013 11:06 AM	**Matrix**	SED	**Collected by**	SAAS, ERIC
	Begin	**End**		**Sample Type**	SURVEY
Date Collected			12/02/2013 9:30 AM	**Station ID**	302459
Program	CDO-DSW			**Customer ID**	
Client	DSW			**External ID**	
OEPA Division	DSW				
Location	AMERICAN DITCH SED13-9 DUP A				

Analysis	Parameter	Storet	Result	RL	Units	Date	Qualifier
% Solids_SED	% Solids	P70318	56.8		%	12/04/2013	
ICPMS_SED	Cadmium	P1027	172	12.8	mg/kg	02/12/2014	
ICP_SED	Zinc	P1092	15100	128	mg/kg	01/22/2014	

Field Comments B (dup A)

Lab Comments

QC / Sample Comments

Approved By VDESHMUKH **On** 02/19/2014

OhioEPA Division of Environmental Services

Laboratory Inorganic Analysis Data Report

Sample	161078				
Date Received	12/04/2013 11:06 AM	**Matrix**	SED	**Collected by**	SAAS, ERIC
	Begin	**End**		**Sample Type**	SURVEY
Date Collected			12/02/2013 9:30 AM	**Station ID**	302459
Program	CDO-DSW			**Customer ID**	
Client	DSW			**External ID**	
OEPA Division	DSW				
Location	AMERICAN DITCH SED13-9 DUP B				

Analysis	Parameter	Storet	Result	RL	Units	Date	Qualifier
% Solids_SED	% Solids	P70318	58.2		%	12/04/2013	
ICPMS_SED	Cadmium	P1027	223	12.9	mg/kg	02/12/2014	
ICP_SED	Zinc	P1092	10600	124	mg/kg	01/22/2014	

Field Comments B (dup B)

Lab Comments

QC / Sample Comments

Approved By VDESHMUKH **On** 02/19/2014

OhioEPA Division of Environmental Services

Laboratory Inorganic Analysis Data Report

Sample	161079				
Date Received	12/04/2013 11:06 AM	**Matrix**	SED	**Collected by**	SAAS, ERIC
	Begin	**End**		**Sample Type**	SURVEY
Date Collected			12/02/2013 9:30 AM	**Station ID**	302459
Program	CDO-DSW			**Customer ID**	
Client	DSW			**External ID**	
OEPA Division	DSW				
Location	AMERICAN DITCH SED13-9				

Analysis	Parameter	Storet	Result	RL	Units	Date	Qualifier
% Solids_SED	% Solids	P70318	65.6		%	12/04/2013	
ICPMS_SED	Cadmium	P1027	107	11.7	mg/kg	01/21/2014	
ICP_SED	Zinc	P1092	7920	117	mg/kg	01/22/2014	

Field Comments C

Lab Comments

QC / Sample Comments

Approved By VDESHMUKH **On** 01/29/2014

OhioEPA Division of Environmental Services

Laboratory Inorganic Analysis Data Report

Sample	161080				
Date Received	12/04/2013 11:06 AM	**Matrix**	SED	**Collected by**	SAAS, ERIC
	Begin	**End**		**Sample Type**	SURVEY
Date Collected			12/02/2013 9:30 AM	**Station ID**	302459
Program	CDO-DSW			**Customer ID**	
Client	DSW			**External ID**	
OEPA Division	DSW				
Location	AMERICAN DITCH SED13-9				

Analysis	Parameter	Storet	Result	RL	Units	Date	Qualifier
% Solids_SED	% Solids	P70318	57.4		%	12/04/2013	
ICPMS_SED	Cadmium	P1027	85.1	13.5	mg/kg	01/21/2014	
ICP_SED	Zinc	P1092	7310	135	mg/kg	01/22/2014	

Field Comments D

Lab Comments

QC / Sample Comments

Approved By VDESHMUKH **On** 01/29/2014

OhioEPA Division of Environmental Services

Laboratory Inorganic Analysis Data Report

Sample	161081				
Date Received	12/04/2013 11:06 AM	**Matrix**	SED	**Collected by**	SAAS, ERIC
	Begin	**End**		**Sample Type**	SURVEY
Date Collected			12/02/2013 9:30 AM	**Station ID**	302459
Program	CDO-DSW			**Customer ID**	
Client	DSW			**External ID**	
OEPA Division	DSW				
Location	AMERICAN DITCH SED13-9				

Analysis	Parameter	Storet	Result	RL	Units	Date	Qualifier
% Solids_SED	% Solids	P70318	71.7		%	12/04/2013	
ICPMS_SED	Cadmium	P1027	10.8	1.09	mg/kg	01/21/2014	
ICP_SED	Zinc	P1092	1420	10.9	mg/kg	01/22/2014	

Field Comments H

Lab Comments

QC / Sample Comments

Approved By VDESHMUKH **On** 01/29/2014

OhioEPA Division of Environmental Services

Laboratory Inorganic Analysis Data Report

Sample	161082				
Date Received	12/04/2013 11:12 AM	**Matrix**	SED	**Collected by**	SAAS, ERIC
	Begin	**End**		**Sample Type**	SURVEY
Date Collected			12/02/2013 5:00 PM	**Station ID**	302464
Program	CDO-DSW			**Customer ID**	
Client	DSW			**External ID**	
OEPA Division	DSW				
Location	AMERICAN DITCH SED13-14				

Analysis	Parameter	Storet	Result	RL	Units	Date	Qualifier
% Solids_SED	% Solids	P70318	85.3		%	12/04/2013	
ICPMS_SED	Cadmium	P1027	1.54	0.911	mg/kg	01/21/2014	
ICP_SED	Zinc	P1092	135	9.1	mg/kg	01/22/2014	

Field Comments S

Lab Comments

QC / Sample Comments

Approved By VDESHMUKH **On** 01/29/2014

OhioEPA Division of Environmental Services

Laboratory Inorganic Analysis Data Report

Sample	161083				
Date Received	12/04/2013 11:17 AM	**Matrix**	SED	**Collected by**	SAAS, ERIC
	Begin	**End**		**Sample Type**	SURVEY
Date Collected			12/03/2013 2:30 PM	**Station ID**	
Program	CDO-DSW			**Customer ID**	
Client	DSW			**External ID**	
OEPA Division	DSW				
Location	AMERICAN DITCH SED13-7.5				

Analysis	Parameter	Storet	Result	RL	Units	Date	Qualifier
% Solids_SED	% Solids	P70318	78.5		%	12/04/2013	
ICPMS_SED	Cadmium	P1027	55.7	10.4	mg/kg	01/21/2014	
ICP_SED	Zinc	P1092	2510	10.4	mg/kg	01/22/2014	

Field Comments H

Lab Comments

QC / Sample Comments

Approved By VDESHMUKH **On** 01/29/2014

OhioEPA Division of Environmental Services

Laboratory Inorganic Analysis Data Report

Sample	161084				
Date Received	12/04/2013 11:20 AM	**Matrix**	SED	**Collected by**	SAAS, ERIC
	Begin	**End**		**Sample Type**	SURVEY
Date Collected			12/03/2013 3:15 PM	**Station ID**	302463
Program	CDO-DSW			**Customer ID**	
Client	DSW			**External ID**	
OEPA Division	DSW				
Location	AMERICAN DITCH SED13-13				

Analysis	Parameter	Storet	Result	RL	Units	Date	Qualifier
% Solids_SED	% Solids	P70318	32.8		%	12/04/2013	
ICPMS_SED	Cadmium	P1027	128	23	mg/kg	01/21/2014	
ICP_SED	Zinc	P1092	10300	230	mg/kg	01/22/2014	

Field Comments S

Lab Comments

QC / Sample Comments

Approved By VDESHMUKH **On** 01/29/2014

OhioEPA Division of Environmental Services

Laboratory Inorganic Analysis Data Report

Sample	161085				
Date Received	12/04/2013 11:20 AM	**Matrix**	SED	**Collected by**	SAAS, ERIC
	Begin	**End**		**Sample Type**	SURVEY
Date Collected			12/03/2013 3:15 PM	**Station ID**	302463
Program	CDO-DSW			**Customer ID**	
Client	DSW			**External ID**	
OEPA Division	DSW				
Location	AMERICAN DITCH SED13-13				

Analysis	Parameter	Storet	Result	RL	Units	Date	Qualifier
% Solids_SED	% Solids	P70318	64.9		%	12/04/2013	
ICPMS_SED	Cadmium	P1027	29.0	1.19	mg/kg	01/21/2014	
ICP_SED	Zinc	P1092	4020	119	mg/kg	01/22/2014	

Field Comments A

Lab Comments

QC / Sample Comments

Approved By VDESHMUKH **On** 01/29/2014

OhioEPA Division of Environmental Services

Laboratory Inorganic Analysis Data Report

Sample	161086				
Date Received	12/04/2013 11:20 AM	**Matrix**	SED	**Collected by**	SAAS, ERIC
	Begin	**End**		**Sample Type**	SURVEY
Date Collected			12/03/2013 3:15 PM	**Station ID**	302463
Program	CDO-DSW			**Customer ID**	
Client	DSW			**External ID**	
OEPA Division	DSW				
Location	AMERICAN DITCH SED13-13				

Analysis	Parameter	Storet	Result	RL	Units	Date	Qualifier
% Solids_SED	% Solids	P70318	74.7		%	12/04/2013	
ICPMS_SED	Cadmium	P1027	34.8	1.88	mg/kg	01/21/2014	
ICP_SED	Zinc	P1092	4860	93.8	mg/kg	01/22/2014	

Field Comments B

Lab Comments

QC / Sample Comments

Approved By VDESHMUKH **On** 01/29/2014

OhioEPA Division of Environmental Services

Laboratory Inorganic Analysis Data Report

Sample	161087				
Date Received	12/04/2013 11:20 AM	**Matrix**	SED	**Collected by**	SAAS, ERIC
	Begin	**End**		**Sample Type**	SURVEY
Date Collected			12/03/2013 3:15 PM	**Station ID**	302463
Program	CDO-DSW			**Customer ID**	
Client	DSW			**External ID**	
OEPA Division	DSW				
Location	AMERICAN DITCH SED13-13				

Analysis	Parameter	Storet	Result	RL	Units	Date	Qualifier
% Solids_SED	% Solids	P70318	81.1		%	12/04/2013	
ICPMS_SED	Cadmium	P1027	24.7	1.91	mg/kg	02/13/2014	
ICP_SED	Zinc	P1092	3280	95.4	mg/kg	02/07/2014	

Field Comments C

Lab Comments

QC / Sample Comments

Approved By VDESHMUKH **On** 02/19/2014

OhioEPA Division of Environmental Services

Laboratory Inorganic Analysis Data Report

Sample	161088				
Date Received	12/04/2013 11:20 AM	**Matrix**	SED	**Collected by**	SAAS, ERIC
	Begin	**End**		**Sample Type**	SURVEY
Date Collected			12/03/2013 3:15 PM	**Station ID**	302463
Program	CDO-DSW			**Customer ID**	
Client	DSW			**External ID**	
OEPA Division	DSW				
Location	AMERICAN DITCH SED13-13				

Analysis	Parameter	Storet	Result	RL	Units	Date	Qualifier
% Solids_SED	% Solids	P70318	81.9		%	12/04/2013	
ICPMS_SED	Cadmium	P1027	11.2	0.918	mg/kg	02/12/2014	
ICP_SED	Zinc	P1092	2570	91.8	mg/kg	01/29/2014	

Field Comments D

Lab Comments

QC / Sample Comments

Approved By VDESHMUKH **On** 02/19/2014

OhioEPA Division of Environmental Services

Laboratory Inorganic Analysis Data Report

Sample	161089				
Date Received	12/04/2013 11:26 AM	**Matrix**	SED	**Collected by**	SAAS, ERIC
	Begin	**End**		**Sample Type**	SURVEY
Date Collected			12/03/2013 2:00 PM	**Station ID**	302462
Program	CDO-DSW			**Customer ID**	
Client	DSW			**External ID**	
OEPA Division	DSW				
Location	AMERICAN DITCH SED13-12				

Analysis	Parameter	Storet	Result	RL	Units	Date	Qualifier
% Solids_SED	% Solids	P70318	73.9		%	12/04/2013	
ICPMS_SED	Cadmium	P1027	43.3	1.98	mg/kg	02/12/2014	
ICP_SED	Zinc	P1092	3650	99	mg/kg	01/29/2014	

Field Comments S

Lab Comments

QC / Sample Comments

Approved By VDESHMUKH **On** 02/19/2014

OhioEPA Division of Environmental Services

Laboratory Inorganic Analysis Data Report

Sample	161090				
Date Received	12/04/2013 11:26 AM	**Matrix**	SED	**Collected by**	SAAS, ERIC
	Begin	**End**		**Sample Type**	SURVEY
Date Collected			12/03/2013 2:00 PM	**Station ID**	302462
Program	CDO-DSW			**Customer ID**	
Client	DSW			**External ID**	
OEPA Division	DSW				
Location	AMERICAN DITCH SED13-12 DUP A				

Analysis	Parameter	Storet	Result	RL	Units	Date	Qualifier
% Solids_SED	% Solids	P70318	74.7		%	12/04/2013	
ICPMS_SED	Cadmium	P1027	59.7	10.2	mg/kg	02/12/2014	
ICP_SED	Zinc	P1092	5190	102	mg/kg	01/29/2014	

Field Comments A (dup A)

Lab Comments

QC / Sample Comments

Approved By VDESHMUKH **On** 02/19/2014

OhioEPA Division of Environmental Services

Laboratory Inorganic Analysis Data Report

Sample	161091				
Date Received	12/04/2013 11:26 AM	**Matrix**	SED	**Collected by**	SAAS, ERIC
	Begin	**End**		**Sample Type**	SURVEY
Date Collected			12/03/2013 2:00 PM	**Station ID**	302462
Program	CDO-DSW			**Customer ID**	
Client	DSW			**External ID**	
OEPA Division	DSW				
Location	AMERICAN DITCH SED13-12 DUP B				

Analysis	Parameter	Storet	Result	RL	Units	Date	Qualifier
% Solids_SED	% Solids	P70318	70.8		%	12/04/2013	
ICPMS_SED	Cadmium	P1027	84.4	8.98	mg/kg	02/12/2014	
ICP_SED	Zinc	P1092	5140	89.8	mg/kg	01/29/2014	

Field Comments A (dup B)

Lab Comments

QC / Sample Comments

Approved By VDESHMUKH **On** 02/19/2014

OhioEPA Division of Environmental Services

Laboratory Inorganic Analysis Data Report

Sample	161092				
Date Received	12/04/2013 11:26 AM	**Matrix**	SED	**Collected by**	SAAS, ERIC
	Begin	**End**		**Sample Type**	SURVEY
Date Collected			12/03/2013 2:00 PM	**Station ID**	302462
Program	CDO-DSW			**Customer ID**	
Client	DSW			**External ID**	
OEPA Division	DSW				
Location	AMERICAN DITCH SED13-12				

Analysis	Parameter	Storet	Result	RL	Units	Date	Qualifier
% Solids_SED	% Solids	P70318	68.2		%	12/04/2013	
ICPMS_SED	Cadmium	P1027	69.3	11	mg/kg	02/12/2014	
ICP_SED	Zinc	P1092	5380	110	mg/kg	01/29/2014	

Field Comments B

Lab Comments

QC / Sample Comments

Approved By VDESHMUKH **On** 02/19/2014

OhioEPA Division of Environmental Services

Laboratory Inorganic Analysis Data Report

Sample	161093				
Date Received	12/04/2013 11:26 AM	**Matrix**	SED	**Collected by**	SAAS, ERIC
	Begin	**End**		**Sample Type**	SURVEY
Date Collected			12/03/2013 2:00 PM	**Station ID**	302462
Program	CDO-DSW			**Customer ID**	
Client	DSW			**External ID**	
OEPA Division	DSW				
Location	AMERICAN DITCH SED13-12				

Analysis	Parameter	Storet	Result	RL	Units	Date	Qualifier
% Solids_SED	% Solids	P70318	71.3		%	12/04/2013	
ICPMS_SED	Cadmium	P1027	48.8	10.5	mg/kg	02/12/2014	
ICP_SED	Zinc	P1092	35300	210	mg/kg	01/29/2014	

Field Comments C

Lab Comments

QC / Sample Comments

Approved By VDESHMUKH **On** 02/19/2014

OhioEPA Division of Environmental Services

Laboratory Inorganic Analysis Data Report

Sample	161094				
Date Received	12/04/2013 11:26 AM	**Matrix**	SED	**Collected by**	SAAS, ERIC
	Begin	**End**		**Sample Type**	SURVEY
Date Collected			12/03/2013 2:00 PM	**Station ID**	302462
Program	CDO-DSW			**Customer ID**	
Client	DSW			**External ID**	
OEPA Division	DSW				
Location	AMERICAN DITCH SED13-12				

Analysis	Parameter	Storet	Result	RL	Units	Date	Qualifier
% Solids_SED	% Solids	P70318	75.2		%	12/04/2013	
ICPMS_SED	Cadmium	P1027	10.4	0.987	mg/kg	02/12/2014	
ICP_SED	Zinc	P1092	1680	9.9	mg/kg	01/29/2014	

Field Comments D

Lab Comments

QC / Sample Comments

Approved By VDESHMUKH **On** 02/19/2014

OhioEPA Division of Environmental Services

Laboratory Inorganic Analysis Data Report

Sample	161095				
Date Received	12/04/2013 11:26 AM	**Matrix**	SED	**Collected by**	SAAS, ERIC
	Begin	**End**		**Sample Type**	SURVEY
Date Collected			12/03/2013 2:00 PM	**Station ID**	302462
Program	CDO-DSW			**Customer ID**	
Client	DSW			**External ID**	
OEPA Division	DSW				
Location	AMERICAN DITCH SED13-12				

Analysis	Parameter	Storet	Result	RL	Units	Date	Qualifier
% Solids_SED	% Solids	P70318	74.4		%	12/04/2013	
ICPMS_SED	Cadmium	P1027	45.5	8.43	mg/kg	02/12/2014	
ICP_SED	Zinc	P1092	9610	84.3	mg/kg	01/29/2014	

Field Comments F

Lab Comments

QC / Sample Comments

Approved By VDESHMUKH **On** 02/19/2014

OhioEPA Division of Environmental Services

Laboratory Inorganic Analysis Data Report

Sample	161096				
Date Received	12/04/2013 11:26 AM	**Matrix**	SED	**Collected by**	SAAS, ERIC
	Begin	**End**		**Sample Type**	SURVEY
Date Collected			12/03/2013 2:00 PM	**Station ID**	302462
Program	CDO-DSW			**Customer ID**	
Client	DSW			**External ID**	
OEPA Division	DSW				
Location	AMERICAN DITCH SED13-12				

Analysis	Parameter	Storet	Result	RL	Units	Date	Qualifier
% Solids_SED	% Solids	P70318	76.2		%	12/04/2013	
ICPMS_SED	Cadmium	P1027	2.93	0.18	mg/kg	02/12/2014	
ICP_SED	Zinc	P1092	220	9	mg/kg	01/29/2014	

Field Comments G

Lab Comments

QC / Sample Comments

Approved By VDESHMUKH **On** 02/19/2014

OhioEPA Division of Environmental Services

Laboratory Inorganic Analysis Data Report

Sample	161097				
Date Received	12/04/2013 11:32 AM	**Matrix**	SED	**Collected by**	SAAS, ERIC
	Begin	**End**		**Sample Type**	SURVEY
Date Collected			12/03/2013 12:40 PM	**Station ID**	302461
Program	CDO-DSW			**Customer ID**	
Client	DSW			**External ID**	
OEPA Division	DSW				
Location	AMERICAN DITCH SED13-11				

Analysis	Parameter	Storet	Result	RL	Units	Date	Qualifier
% Solids_SED	% Solids	P70318	51.7		%	12/04/2013	
ICPMS_SED	Cadmium	P1027	32.0	1.47	mg/kg	02/13/2014	J
ICP_SED	Zinc	P1092	3950	147	mg/kg	02/07/2014	

Field Comments S

Lab Comments

QC / Sample Comments Cd estimated due to poor precision.

Approved By VDESHMUKH **On** 02/19/2014

OhioEPA Division of Environmental Services

Laboratory Inorganic Analysis Data Report

Sample	161098				
Date Received	12/04/2013 11:32 AM	**Matrix**	SED	**Collected by**	SAAS, ERIC
	Begin	**End**		**Sample Type**	SURVEY
Date Collected			12/03/2013 12:40 PM	**Station ID**	302461
Program	CDO-DSW			**Customer ID**	
Client	DSW			**External ID**	
OEPA Division	DSW				
Location	AMERICAN DITCH SED13-11 DUP A				

Analysis	Parameter	Storet	Result	RL	Units	Date	Qualifier
% Solids_SED	% Solids	P70318	78.4		%	12/04/2013	
ICPMS_SED	Cadmium	P1027	6.20	0.926	mg/kg	02/12/2014	
ICP_SED	Zinc	P1092	827	9.3	mg/kg	01/29/2014	

Field Comments A (dup A)

Lab Comments

QC / Sample Comments

Approved By VDESHMUKH **On** 02/19/2014

OhioEPA Division of Environmental Services

Laboratory Inorganic Analysis Data Report

Sample	161099				
Date Received	12/04/2013 11:32 AM	**Matrix**	SED	**Collected by**	SAAS, ERIC
	Begin	**End**		**Sample Type**	SURVEY
Date Collected			12/03/2013 12:40 PM	**Station ID**	302461
Program	CDO-DSW			**Customer ID**	
Client	DSW			**External ID**	
OEPA Division	DSW				
Location	AMERICAN DITCH SED13-11 DUP B				

Analysis	Parameter	Storet	Result	RL	Units	Date	Qualifier
% Solids_SED	% Solids	P70318	77.0		%	12/04/2013	
ICPMS_SED	Cadmium	P1027	5.54	0.931	mg/kg	02/12/2014	
ICP_SED	Zinc	P1092	785	9.3	mg/kg	01/29/2014	

Field Comments A (dup B)

Lab Comments

QC / Sample Comments

Approved By VDESHMUKH **On** 02/19/2014

OhioEPA Division of Environmental Services

Laboratory Inorganic Analysis Data Report

Sample	161100				
Date Received	12/04/2013 11:32 AM	**Matrix**	SED	**Collected by**	SAAS, ERIC
	Begin	**End**		**Sample Type**	SURVEY
Date Collected			12/03/2013 12:40 PM	**Station ID**	302461
Program	CDO-DSW			**Customer ID**	
Client	DSW			**External ID**	
OEPA Division	DSW				
Location	AMERICAN DITCH SED13-11				

Analysis	Parameter	Storet	Result	RL	Units	Date	Qualifier
% Solids_SED	% Solids	P70318	77.8		%	12/04/2013	
ICPMS_SED	Cadmium	P1027	2.00	0.101	mg/kg	02/12/2014	
ICP_SED	Zinc	P1092	301	10.1	mg/kg	01/29/2014	

Field Comments B

Lab Comments

QC / Sample Comments

Approved By VDESHMUKH **On** 02/19/2014

OhioEPA Division of Environmental Services

Laboratory Inorganic Analysis Data Report

Sample	161101				
Date Received	12/04/2013 11:32 AM	**Matrix**	SED	**Collected by**	SAAS, ERIC
	Begin	**End**		**Sample Type**	SURVEY
Date Collected			12/03/2013 12:40 PM	**Station ID**	302461
Program	CDO-DSW			**Customer ID**	
Client	DSW			**External ID**	
OEPA Division	DSW				
Location	AMERICAN DITCH SED13-11				

Analysis	Parameter	Storet	Result	RL	Units	Date	Qualifier
% Solids_SED	% Solids	P70318	85.8		%	12/04/2013	
ICPMS_SED	Cadmium	P1027	1.19	0.078	mg/kg	02/12/2014	
ICP_SED	Zinc	P1092	162	7.8	mg/kg	01/29/2014	

Field Comments C

Lab Comments

QC / Sample Comments

Approved By VDESHMUKH **On** 02/19/2014

OhioEPA Division of Environmental Services

Laboratory Inorganic Analysis Data Report

Sample	161102				
Date Received	12/04/2013 11:32 AM	**Matrix**	SED	**Collected by**	SAAS, ERIC
	Begin	**End**		**Sample Type**	SURVEY
Date Collected			12/03/2013 12:40 PM	**Station ID**	302461
Program	CDO-DSW			**Customer ID**	
Client	DSW			**External ID**	
OEPA Division	DSW				
Location	AMERICAN DITCH SED13-11				

Analysis	Parameter	Storet	Result	RL	Units	Date	Qualifier
% Solids_SED	% Solids	P70318	70.5		%	12/04/2013	
ICPMS_SED	Cadmium	P1027	23.2	1	mg/kg	02/12/2014	
ICP_SED	Zinc	P1092	2900	100	mg/kg	01/29/2014	

Field Comments D

Lab Comments

QC / Sample Comments

Approved By VDESHMUKH **On** 02/19/2014

OhioEPA Division of Environmental Services

Laboratory Inorganic Analysis Data Report

Sample	161103				
Date Received	12/04/2013 11:32 AM	**Matrix**	SED	**Collected by**	SAAS, ERIC
	Begin	**End**		**Sample Type**	SURVEY
Date Collected			12/03/2013 12:40 PM	**Station ID**	302461
Program	CDO-DSW			**Customer ID**	
Client	DSW			**External ID**	
OEPA Division	DSW				
Location	AMERICAN DITCH SED13-11				

Analysis	Parameter	Storet	Result	RL	Units	Date	Qualifier
% Solids_SED	% Solids	P70318	73.1		%	12/04/2013	
ICPMS_SED	Cadmium	P1027	10.1	1.08	mg/kg	02/12/2014	
ICP_SED	Zinc	P1092	1210	10.8	mg/kg	01/29/2014	

Field Comments F

Lab Comments

QC / Sample Comments

Approved By VDESHMUKH **On** 02/19/2014

OhioEPA Division of Environmental Services

Laboratory Inorganic Analysis Data Report

Sample	161104				
Date Received	12/04/2013 11:32 AM	**Matrix**	SED	**Collected by**	SAAS, ERIC
	Begin	**End**		**Sample Type**	SURVEY
Date Collected			12/03/2013 12:40 PM	**Station ID**	302461
Program	CDO-DSW			**Customer ID**	
Client	DSW			**External ID**	
OEPA Division	DSW				
Location	AMERICAN DITCH SED13-11				

Analysis	Parameter	Storet	Result	RL	Units	Date	Qualifier
% Solids_SED	% Solids	P70318	78.4		%	12/04/2013	
ICPMS_SED	Cadmium	P1027	1.89	0.093	mg/kg	02/12/2014	
ICP_SED	Zinc	P1092	351	9.3	mg/kg	01/29/2014	

Field Comments G

Lab Comments

QC / Sample Comments

Approved By VDESHMUKH **On** 02/19/2014

OhioEPA Division of Environmental Services

Laboratory Inorganic Analysis Data Report

Sample	161105				
Date Received	12/04/2013 11:41 AM	**Matrix**	SED	**Collected by**	SAAS, ERIC
	Begin	**End**		**Sample Type**	SURVEY
Date Collected			12/03/2013 10:50 AM	**Station ID**	302460
Program	CDO-DSW			**Customer ID**	
Client	DSW			**External ID**	
OEPA Division	DSW				
Location	AMERICAN DITCH SED13-10				

Analysis	Parameter	Storet	Result	RL	Units	Date	Qualifier
% Solids_SED	% Solids	P70318	68.6		%	12/04/2013	
ICPMS_SED	Cadmium	P1027	29.1	2.01	mg/kg	02/12/2014	
ICP_SED	Zinc	P1092	5340	101	mg/kg	01/29/2014	

Field Comments S

Lab Comments

QC / Sample Comments

Approved By VDESHMUKH **On** 02/19/2014

OhioEPA Division of Environmental Services

Laboratory Inorganic Analysis Data Report

Sample	161106				
Date Received	12/04/2013 11:41 AM	**Matrix**	SED	**Collected by**	SAAS, ERIC
	Begin	**End**		**Sample Type**	SURVEY
Date Collected			12/03/2013 10:50 AM	**Station ID**	302460
Program	CDO-DSW			**Customer ID**	
Client	DSW			**External ID**	
OEPA Division	DSW				
Location	AMERICAN DITCH SED13-10 DUP A				

Analysis	Parameter	Storet	Result	RL	Units	Date	Qualifier
% Solids_SED	% Solids	P70318	67.9		%	12/04/2013	
ICPMS_SED	Cadmium	P1027	47.2	2.11	mg/kg	02/12/2014	
ICP_SED	Zinc	P1092	5610	106	mg/kg	01/29/2014	

Field Comments A (dup A)

Lab Comments

QC / Sample Comments

Approved By VDESHMUKH **On** 02/19/2014

OhioEPA Division of Environmental Services

Laboratory Inorganic Analysis Data Report

Sample	161107				
Date Received	12/04/2013 11:41 AM	**Matrix**	SED	**Collected by**	SAAS, ERIC
	Begin	**End**		**Sample Type**	SURVEY
Date Collected			12/03/2013 10:50 AM	**Station ID**	302460
Program	CDO-DSW			**Customer ID**	
Client	DSW			**External ID**	
OEPA Division	DSW				
Location	AMERICAN DITCH SED13-10 DUP B				

Analysis	Parameter	Storet	Result	RL	Units	Date	Qualifier
% Solids_SED	% Solids	P70318	71.6		%	12/04/2013	
ICPMS_SED	Cadmium	P1027	40.2	2.19	mg/kg	02/13/2014	
ICP_SED	Zinc	P1092	5370	109	mg/kg	02/06/2014	

Field Comments A (dup B)

Lab Comments

QC / Sample Comments

Approved By VDESHMUKH **On** 02/19/2014

OhioEPA Division of Environmental Services

Laboratory Inorganic Analysis Data Report

Sample	161108				
Date Received	12/04/2013 11:41 AM	**Matrix**	SED	**Collected by**	SAAS, ERIC
	Begin	**End**		**Sample Type**	SURVEY
Date Collected			12/03/2013 10:50 AM	**Station ID**	302460
Program	CDO-DSW			**Customer ID**	
Client	DSW			**External ID**	
OEPA Division	DSW				
Location	AMERICAN DITCH SED13-10				

Analysis	Parameter	Storet	Result	RL	Units	Date	Qualifier
% Solids_SED	% Solids	P70318	72.1		%	12/04/2013	
ICPMS_SED	Cadmium	P1027	34.8	1.95	mg/kg	02/13/2014	
ICP_SED	Zinc	P1092	3120	97.7	mg/kg	02/06/2014	

Field Comments B

Lab Comments

QC / Sample Comments

Approved By VDESHMUKH **On** 02/19/2014

OhioEPA Division of Environmental Services

Laboratory Inorganic Analysis Data Report

Sample	161109				
Date Received	12/04/2013 11:41 AM	**Matrix**	SED	**Collected by**	SAAS, ERIC
	Begin	**End**		**Sample Type**	SURVEY
Date Collected			12/03/2013 10:50 AM	**Station ID**	302460
Program	CDO-DSW			**Customer ID**	
Client	DSW			**External ID**	
OEPA Division	DSW				
Location	AMERICAN DITCH SED13-10				

Analysis	Parameter	Storet	Result	RL	Units	Date	Qualifier
% Solids_SED	% Solids	P70318	72.9		%	12/04/2013	
ICPMS_SED	Cadmium	P1027	3.20	0.211	mg/kg	02/13/2014	
ICP_SED	Zinc	P1092	380	10.6	mg/kg	02/06/2014	

Field Comments C

Lab Comments

QC / Sample Comments

Approved By VDESHMUKH **On** 02/19/2014

OhioEPA Division of Environmental Services

Laboratory Inorganic Analysis Data Report

Sample	161110				
Date Received	12/04/2013 11:41 AM	**Matrix**	SED	**Collected by**	SAAS, ERIC
	Begin	**End**		**Sample Type**	SURVEY
Date Collected			12/03/2013 10:50 AM	**Station ID**	302460
Program	CDO-DSW			**Customer ID**	
Client	DSW			**External ID**	
OEPA Division	DSW				
Location	AMERICAN DITCH SED13-10				

Analysis	Parameter	Storet	Result	RL	Units	Date	Qualifier
% Solids_SED	% Solids	P70318	74.9		%	12/04/2013	
ICPMS_SED	Cadmium	P1027	27.9	2.02	mg/kg	02/13/2014	
ICP_SED	Zinc	P1092	3770	101	mg/kg	02/06/2014	

Field Comments D

Lab Comments

QC / Sample Comments

Approved By VDESHMUKH **On** 02/19/2014

OhioEPA Division of Environmental Services

Laboratory Inorganic Analysis Data Report

Sample	161111				
Date Received	12/04/2013 11:41 AM	**Matrix**	SED	**Collected by**	SAAS, ERIC
	Begin	**End**		**Sample Type**	SURVEY
Date Collected			12/03/2013 10:50 AM	**Station ID**	302460
Program	CDO-DSW			**Customer ID**	
Client	DSW			**External ID**	
OEPA Division	DSW				
Location	AMERICAN DITCH SED13-10				

Analysis	Parameter	Storet	Result	RL	Units	Date	Qualifier
% Solids_SED	% Solids	P70318	62.6		%	12/04/2013	
ICPMS_SED	Cadmium	P1027	14.6	1.24	mg/kg	02/13/2014	
ICP_SED	Zinc	P1092	3510	124	mg/kg	02/07/2014	

Field Comments F

Lab Comments

QC / Sample Comments

Approved By VDESHMUKH **On** 02/19/2014

OhioEPA Division of Environmental Services

Laboratory Inorganic Analysis Data Report

Sample	161112				
Date Received	12/04/2013 11:41 AM	**Matrix**	SED	**Collected by**	SAAS, ERIC
	Begin	**End**		**Sample Type**	SURVEY
Date Collected			12/03/2013 10:50 AM	**Station ID**	302460
Program	CDO-DSW			**Customer ID**	
Client	DSW			**External ID**	
OEPA Division	DSW				
Location	AMERICAN DITCH SED13-10				

Analysis	Parameter	Storet	Result	RL	Units	Date	Qualifier
% Solids_SED	% Solids	P70318	75.9		%	12/04/2013	
ICPMS_SED	Cadmium	P1027	1.69	0.098	mg/kg	02/13/2014	
ICP_SED	Zinc	P1092	211	9.8	mg/kg	02/06/2014	

Field Comments G

Lab Comments

QC / Sample Comments

Approved By VDESHMUKH **On** 02/19/2014

Appendix C

Microbac TCLP Sediment Sampling Report

Microbac

Laboratory Report Number: L13120294

Doug Crandall
Ohio Environmental Protection Agency
P.O. Box 1049
Columbus, OH 43216-1049

Please find enclosed the analytical results for the samples you submitted to Microbac Laboratories. Review and compilation of your report was completed by Microbac's Ohio Valley Division (OVD). If you have any questions, comments, or require further assistance regarding this report, please contact your service representative listed below.

Laboratory Contact:
Stephanie Mossburg – Team Chemist/Data Specialist
(740) 373-4071
Stephanie.Mossburg@microbac.com

I certify that all test results meet all of the requirements of the accrediting authority listed below. All results for soil samples are reported on a 'dry-weight' basis unless specified otherwise. Analytical results for water and wastes are reported on a 'as received' basis unless specified otherwise. A statement of uncertainty for each analysis is available upon request. This laboratory report shall not be reproduced, except in full, without the written approval of Microbac Laboratories. The reported results are related only to the samples analyzed as received.

This report was certified on December 23 2013

David E. Vandenberg

David Vandenberg – Managing Director

State of Origin: OH
Accrediting Authority: N/A ID:N/A
QAPP: Microbac OVD

Microbac

Lab Report #: L13120294
Lab Project #: 2755.003
Project Name: CENTRAL DISTRICT OFFICE
Lab Contact: Stephanie Mossburg

Record of Sample Receipt and Inspection

Comments/Discrepancies

This is the record of the shipment conditions and the inspection records for the samples received and reported as a sample delivery group (SDG). All of the samples were inspected and observed to conform to our receipt policies, except as noted below.

There were no discrepancies.

Discrepancy	Resolution

Coolers

Cooler #	Temperature Gun	Temperature	COC #	Airbill #	Temp Required?
00110207	I	4.0		1Z4016632210119459	X

Inspection Checklist

#	Question	Result
1	Were shipping coolers sealed?	Yes
2	Were custody seals intact?	Yes
3	Were cooler temperatures in range of 0-6?	Yes
4	Was ice present?	Yes
5	Were COC's received/information complete/signed and dated?	Yes
6	Were sample containers intact and match COC?	Yes
7	Were sample labels intact and match COC?	Yes
8	Were the correct containers and volumes received?	Yes
9	Were samples received within EPA hold times?	Yes
10	Were correct preservatives used? (water only)	NA
11	Were pH ranges acceptable? (voa's excluded)	NA
12	Were VOA samples free of headspace (less than 6mm)?	NA

Microbac

Lab Report #: L13120294
Lab Project #: 2755.003
Project Name: CENTRAL DISTRICT OFFICE
Lab Contact: Stephanie Mossburg

Samples Received

Client ID	Laboratory ID	Date Collected	Date Received
SED13-7	L13120294-01	12/02/2013 14:00	12/05/2013 10:33
SED13-9	L13120294-02	12/03/2013 10:06	12/05/2013 10:33
SED13-12	L13120294-03	12/03/2013 14:17	12/05/2013 10:33
SED13-13	L13120294-04	12/03/2013 15:22	12/05/2013 10:33

Login Number: L13120294
Department: Volatiles
Analyst: Franci Bolden

METHOD

Preparation SW-846 5030C/5035A

Analysis SW-846 8260B

HOLDING TIMES

Sample Preparation: All holding times were met.

Sample Analysis: All holding times were met.

PREPARATION

Sample preparation proceeded normally.

CALIBRATION

Initial Calibration: For all compounds that yielded a %RSD greater than 15%, linear or higher order equations were applied. All acceptance criteria were met.

Alternate Source Standards: All acceptance criteria were met.

Continuing Calibration and Tune: All acceptance criteria were met.

BATCH QA/QC

Method Blank: Recoveries out of range were observed for the following analytes: 4-bromofluorobenzene. Please see the applicable QC report for a detailed presentation of the failures.

Laboratory Control Sample: All acceptance criteria were met.

Matrix Spikes: The MS/MSD results were not associated with this sample delivery group (SDG), due to insufficient volume of sample. The laboratory included an LCS and LCS duplicate in the preparation batch in lieu of the NELAC prescribed MS/MSD. Microbac Laboratories recommends site specific MS/MSD samples to avoid possible data qualifications.

SAMPLES

Internal Standards: All acceptance criteria were met.

Surrogates: Recoveries out of range were observed for the following analytes: 4-bromofluorobenzene. Please see the applicable QC report for a detailed presentation of the failures.

Other: Samples 01, 02, 03, 04, were run at a dilution.

Manual Integration Reason Codes

Reason #1: Data System Fails to Select Correct Peak. In some cases the chromatography system selects and integrates the 'wrong peak'. In this case the analyst must correct the selection and force the system to integrate the proper peak. Other times the system may miss the peak completely.

Reason #2: Data System Splits the Peak Incorrectly or Integrates a False Peak as a Rider Peak. This phenomena is common at low concentrations where the signal:noise ratio is low. A single compound (peak) is incorrectly split into multiple peaks or integrated as a main peak with one or more rider peaks resulting in low area counts for the target compound.

Reason #3: Improperly Integrated Isomers and/or coeluting compounds. This system often fails to distinguish coeluting compounds and or isomers. The integration areas and concentrations are wrong, and they must be corrected by manual integration. Prime examples are benzo(k)fluoranthene and benzo(b)fluoranthene which are often unresolved and integrated improperly when both are present at low concentrations in standards or samples.

Reason #4: System Establishes Incorrect Baseline. There are numerous situations in chromatography where the system establishes the baseline incorrectly. Some baseline errors will be obvious to the analyst and should be corrected via manual procedures.

Reason #5: Miscellaneous. Other situations involving integration errors may require in-depth review and technical judgment. These cases should be brought to the attention of the laboratory management. If the form of manual integration is not clearly covered by these four cases, then review and approval by the Managing Director or the QAO will be required.

I certify that this data package is in compliance with the terms and conditions agreed to by the client and Microbac Laboratories Inc., both technically and for completeness, except for the conditions noted above. Release of the data contained in this hard copy data package has been authorized by the Laboratory Manager or designated person, as verified by the following signature.

Narrative ID: 76835
Approved By: Michael Albertson

Login Number: L13120294
Department: Metals
Analyst: Kim Rhodes

METHOD

Preparation: SW-846 3015

Analysis: SW-846 6010

HOLDING TIMES

Sample Preparation: All holding times were met.

Sample Analysis: All holding times were met.

PREPARATION

Sample preparation proceeded normally.

CALIBRATION

Initial Calibration: All acceptance criteria were met.

Alternate Source Standards: All acceptance criteria were met.

Interference Check Standards: All acceptance criteria were met.

Continuing Calibration Verification: All acceptance criteria were met.

Continuing Calibration Blank: All acceptance criteria were met.

BATCH QA/QC

Method Blank: All acceptance criteria were met.

Laboratory Control Sample: All acceptance criteria were met.

Serial Dilution/Post Digestion Spikes: WG455779 - All acceptance criteria were met.

Matrix Spikes: All acceptance criteria were met.

SAMPLES

Samples: WG455779 - Due to a result within 20% of the regulatory limit, client sample 01 was analyzed for cadmium by the method of standard additions.

Narrative ID: 76177
Approved By: Sheri Pfalzgraf

Login Number: L13120294
Department: Metals - AA
Analyst: Pierce Morris

METHOD

Preparation: SW-846 7470

Analysis: SW-846 7470

HOLDING TIMES

Sample Preparation: All holding times were met.

Sample Analysis: All holding times were met.

PREPARATION

Sample preparation proceeded normally.

CALIBRATION

Initial Calibration: All acceptance criteria were met.

Alternate Source Standards: All acceptance criteria were met.

Interference Check Standards: All acceptance criteria were met.

Continuing Calibration Verification: All acceptance criteria were met.

Continuing Calibration Blank: All acceptance criteria were met.

BATCH QA/QC

Method Blank: All acceptance criteria were met.

Laboratory Control Sample: All acceptance criteria were met.

Serial Dilution/Post Digestion Spikes: WG455777 - All acceptance criteria were met.

Matrix Spikes: All acceptance criteria were met.

SAMPLES

Samples: All acceptance criteria were met.

Narrative ID: 76191
Approved By: Sheri Pfalzgraf

Certificate of Analysis

Certificate of Analysis

Sample #:	L13120294-01	**PrePrep Method:**		**Instrument:**	HPMS8
Client ID:	SED13-7	**Prep Method:**	5030B/5030C/5035A	**Prep Date:**	N/A
Matrix:	TCLP Leach	**Analytical Method:**	8260B	**Cal Date:**	10/13/2013 21:32
Workgroup #:	WG455735	**Analyst:**	MES	**Run Date:**	12/10/2013 21:45
Collect Date:	12/02/2013 14:00	**Dilution:**	10	**File ID:**	8M393255
Sample Tag:	DL01	**Units:**	ug/L		

Analyte	Result	Qual	RL	MDL	EPA HW#	Reg. Limit
Benzene		U	50.0	1.25	D018	500
Carbon tetrachloride		U	50.0	2.50	D019	500
Chlorobenzene		U	50.0	1.25	D021	100000
Chloroform		U	50.0	1.25	D022	6000
1,2-Dichloroethane		U	50.0	2.50	D028	500
1,1-Dichloroethene		U	50.0	5.00	D029	700
Methyl Ethyl Ketone		U	100	25.0	D035	200000
Tetrachloroethene		U	50.0	2.50	D039	700
Trichloroethene		U	50.0	2.50	D040	500
Vinyl chloride		U	100	2.50	D043	200

Surrogate	Recovery	Lower Limit	Upper Limit	Q
Dibromofluoromethane	109	86	118	
1,2-Dichloroethane-d4	94.6	80	120	
Toluene-d8	102	88	110	
4-Bromofluorobenzene	85.6	86	115	*

*	Surrogate or spike compound out of range
U	Not detected at or above adjusted sample detection limit

Sample #:	L13120294-01	**PrePrep Method:**		**Instrument:**	ICP-THERMO2
Client ID:	SED13-7	**Prep Method:**	3015	**Prep Date:**	12/10/2013 09:58
Matrix:	TCLP Leach	**Analytical Method:**	6010B	**Cal Date:**	12/10/2013 10:00
Workgroup #:	WG455779	**Analyst:**	KHR	**Run Date:**	12/10/2013 13:15
Collect Date:	12/02/2013 14:00	**Dilution:**	1	**File ID:**	T2.121013.131517
Sample Tag:	01	**Units:**	mg/L		

Analyte	Result	Qual	RL	MDL	EPA HW#	Reg. Limit
Arsenic, TCLP		U	1.00	0.500	D004	5
Barium, TCLP	0.734		0.100	0.0500	D005	100
Chromium, TCLP		U	0.200	0.100	D007	5
Lead, TCLP		U	1.00	0.500	D008	5
Selenium, TCLP		U	0.800	0.400	D010	1
Silver, TCLP		U	0.100	0.0500	D011	5

U	Not detected at or above adjusted sample detection limit

Sample #:	L13120294-01	**PrePrep Method:**		**Instrument:**	ICP-THERMO2
Client ID:	SED13-7	**Prep Method:**	3015	**Prep Date:**	12/10/2013 09:58
Matrix:	TCLP Leach	**Analytical Method:**	6010B	**Cal Date:**	12/11/2013 08:02
Workgroup #:	WG455779	**Analyst:**	KHR	**Run Date:**	12/11/2013 13:34
Collect Date:	12/02/2013 14:00	**Dilution:**	2	**File ID:**	T2.121113.133447
Sample Tag:	DL01	**Units:**	mg/L		

Analyte	Result	Qual	RL	MDL	EPA HW#	Reg. Limit
Cadmium, TCLP	0.893		0.200	0.100	D006	1
U	Not detected at or above adjusted sample detection limit					

Sample #:	L13120294-01	**PrePrep Method:**		**Instrument:**	CVAA1
Client ID:	SED13-7	**Prep Method:**	7470A	**Prep Date:**	12/10/2013 08:42
Matrix:	TCLP Leach	**Analytical Method:**	7470A	**Cal Date:**	12/10/2013 12:27
Workgroup #:	WG455777	**Analyst:**	PDM	**Run Date:**	12/10/2013 13:53
Collect Date:	12/02/2013 14:00	**Dilution:**	1	**File ID:**	M7.121013.135353
Sample Tag:	01	**Units:**	mg/L		

Analyte	Result	Qual	RL	MDL	EPA HW#	Reg. Limit
Mercury		U	0.00200	0.00100	D009	0.2
U	Not detected at or above adjusted sample detection limit					

Sample #:	L13120294-02	**PrePrep Method:**		**Instrument:**	HPMS11
Client ID:	SED13-9	**Prep Method:**	5030B/5030C/5035A	**Prep Date:**	N/A
Matrix:	TCLP Leach	**Analytical Method:**	8260B	**Cal Date:**	11/05/2013 21:39
Workgroup #:	WG456836	**Analyst:**	FJB	**Run Date:**	12/18/2013 17:48
Collect Date:	12/03/2013 10:06	**Dilution:**	10	**File ID:**	11M97700
Sample Tag:	DL01	**Units:**	ug/L		

Analyte	Result	Qual	RL	MDL	EPA HW#	Reg. Limit
Benzene		U	50.0	1.25	D018	500
Carbon tetrachloride		U	50.0	2.50	D019	500
Chlorobenzene		U	50.0	1.25	D021	100000
Chloroform		U	50.0	1.25	D022	6000
1,2-Dichloroethane		U	50.0	2.50	D028	500
1,1-Dichloroethene		U	50.0	5.00	D029	700
Methyl Ethyl Ketone		U	100	25.0	D035	200000
Tetrachloroethene		U	50.0	2.50	D039	700
Trichloroethene		U	50.0	2.50	D040	500

Certificate of Analysis

Analyte	Result	Qual	RL	MDL	EPA HW#	Reg. Limit
Vinyl chloride		U	100	2.50	D043	200

Surrogate	Recovery	Lower Limit	Upper Limit	Q
Dibromofluoromethane	89.9	86	118	
1,2-Dichloroethane-d4	99.0	80	120	
Toluene-d8	108	88	110	
4-Bromofluorobenzene	112	86	115	

U	Not detected at or above adjusted sample detection limit

Sample #:	L13120294-02	**PrePrep Method:**		**Instrument:**	ICP-THERMO2
Client ID:	SED13-9	**Prep Method:**	3015	**Prep Date:**	12/10/2013 09:58
Matrix:	TCLP Leach	**Analytical Method:**	6010B	**Cal Date:**	12/10/2013 10:00
Workgroup #:	WG455779	**Analyst:**	KHR	**Run Date:**	12/10/2013 13:18
Collect Date:	12/03/2013 10:06	**Dilution:**	1	**File ID:**	T2.121013.131846
Sample Tag:	01	**Units:**	mg/L		

Analyte	Result	Qual	RL	MDL	EPA HW#	Reg. Limit
Arsenic, TCLP		U	1.00	0.500	D004	5
Barium, TCLP	0.629		0.100	0.0500	D005	100
Cadmium, TCLP	0.0668	J	0.100	0.0500	D006	1
Chromium, TCLP		U	0.200	0.100	D007	5
Lead, TCLP		U	1.00	0.500	D008	5
Selenium, TCLP		U	0.800	0.400	D010	1
Silver, TCLP		U	0.100	0.0500	D011	5

J	The analyte was positively identified, but the quantitation was below the RL
U	Not detected at or above adjusted sample detection limit

Sample #:	L13120294-02	**PrePrep Method:**		**Instrument:**	CVAA1
Client ID:	SED13-9	**Prep Method:**	7470A	**Prep Date:**	12/10/2013 08:42
Matrix:	TCLP Leach	**Analytical Method:**	7470A	**Cal Date:**	12/10/2013 12:27
Workgroup #:	WG455777	**Analyst:**	PDM	**Run Date:**	12/10/2013 13:58
Collect Date:	12/03/2013 10:06	**Dilution:**	1	**File ID:**	M7.121013.135855
Sample Tag:	01	**Units:**	mg/L		

Analyte	Result	Qual	RL	MDL	EPA HW#	Reg. Limit
Mercury		U	0.00200	0.00100	D009	0.2

U	Not detected at or above adjusted sample detection limit

Certificate of Analysis

Sample #:	L13120294-03	**PrePrep Method:**		**Instrument:**	HPMS11
Client ID:	SED13-12	**Prep Method:**	5030B/5030C/5035A	**Prep Date:**	N/A
Matrix:	TCLP Leach	**Analytical Method:**	8260B	**Cal Date:**	11/05/2013 21:39
Workgroup #:	WG456836	**Analyst:**	FJB	**Run Date:**	12/18/2013 18:51
Collect Date:	12/03/2013 14:17	**Dilution:**	10	**File ID:**	11M97702
Sample Tag:	DL01	**Units:**	ug/L		

Analyte	Result	Qual	RL	MDL	EPA HW#	Reg. Limit
Benzene		U	50.0	1.25	D018	500
Carbon tetrachloride		U	50.0	2.50	D019	500
Chlorobenzene		U	50.0	1.25	D021	100000
Chloroform		U	50.0	1.25	D022	6000
1,2-Dichloroethane		U	50.0	2.50	D028	500
1,1-Dichloroethene		U	50.0	5.00	D029	700
Methyl Ethyl Ketone		U	100	25.0	D035	200000
Tetrachloroethene		U	50.0	2.50	D039	700
Trichloroethene		U	50.0	2.50	D040	500
Vinyl chloride		U	100	2.50	D043	200

Surrogate	Recovery	Lower Limit	Upper Limit	Q
Dibromofluoromethane	91.0	86	118	
1,2-Dichloroethane-d4	96.9	80	120	
Toluene-d8	107	88	110	
4-Bromofluorobenzene	111	86	115	

U	Not detected at or above adjusted sample detection limit

Sample #:	L13120294-03	**PrePrep Method:**		**Instrument:**	ICP-THERMO2
Client ID:	SED13-12	**Prep Method:**	3015	**Prep Date:**	12/10/2013 09:58
Matrix:	TCLP Leach	**Analytical Method:**	6010B	**Cal Date:**	12/10/2013 10:00
Workgroup #:	WG455779	**Analyst:**	KHR	**Run Date:**	12/10/2013 13:22
Collect Date:	12/03/2013 14:17	**Dilution:**	1	**File ID:**	T2.121013.132215
Sample Tag:	01	**Units:**	mg/L		

Analyte	Result	Qual	RL	MDL	EPA HW#	Reg. Limit
Arsenic, TCLP		U	1.00	0.500	D004	5
Barium, TCLP	0.664		0.100	0.0500	D005	100
Cadmium, TCLP		U	0.100	0.0500	D006	1
Chromium, TCLP		U	0.200	0.100	D007	5
Lead, TCLP		U	1.00	0.500	D008	5
Selenium, TCLP		U	0.800	0.400	D010	1
Silver, TCLP		U	0.100	0.0500	D011	5

Certificate of Analysis

U	Not detected at or above adjusted sample detection limit

Sample #:	L13120294-03	**PrePrep Method:**		**Instrument:**	CVAA1
Client ID:	SED13-12	**Prep Method:**	7470A	**Prep Date:**	12/10/2013 08:42
Matrix:	TCLP Leach	**Analytical Method:**	7470A	**Cal Date:**	12/10/2013 12:27
Workgroup #:	WG455777	**Analyst:**	PDM	**Run Date:**	12/10/2013 14:01
Collect Date:	12/03/2013 14:17	**Dilution:**	1	**File ID:**	M7.121013.140126
Sample Tag:	01	**Units:**	mg/L		

Analyte	Result	Qual	RL	MDL	EPA HW#	Reg. Limit
Mercury		U	0.00200	0.00100	D009	0.2

U	Not detected at or above adjusted sample detection limit

Sample #:	L13120294-04	**PrePrep Method:**		**Instrument:**	HPMS11
Client ID:	SED13-13	**Prep Method:**	5030B/5030C/5035A	**Prep Date:**	N/A
Matrix:	TCLP Leach	**Analytical Method:**	8260B	**Cal Date:**	11/05/2013 21:39
Workgroup #:	WG456836	**Analyst:**	FJB	**Run Date:**	12/18/2013 19:22
Collect Date:	12/03/2013 15:22	**Dilution:**	10	**File ID:**	11M97703
Sample Tag:	DL01	**Units:**	ug/L		

Analyte	Result	Qual	RL	MDL	EPA HW#	Reg. Limit
Benzene		U	50.0	1.25	D018	500
Carbon tetrachloride		U	50.0	2.50	D019	500
Chlorobenzene		U	50.0	1.25	D021	100000
Chloroform		U	50.0	1.25	D022	6000
1,2-Dichloroethane		U	50.0	2.50	D028	500
1,1-Dichloroethene		U	50.0	5.00	D029	700
Methyl Ethyl Ketone		U	100	25.0	D035	200000
Tetrachloroethene		U	50.0	2.50	D039	700
Trichloroethene		U	50.0	2.50	D040	500
Vinyl chloride		U	100	2.50	D043	200

Surrogate	Recovery	Lower Limit	Upper Limit	Q
Dibromofluoromethane	89.8	86	118	
1,2-Dichloroethane-d4	99.1	80	120	
Toluene-d8	108	88	110	
4-Bromofluorobenzene	111	86	115	

U	Not detected at or above adjusted sample detection limit

Certificate of Analysis

Sample #:	L13120294-04	**PrePrep Method:**		**Instrument:**	ICP-THERMO2
Client ID:	SED13-13	**Prep Method:**	3015	**Prep Date:**	12/10/2013 09:58
Matrix:	TCLP Leach	**Analytical Method:**	6010B	**Cal Date:**	12/10/2013 10:00
Workgroup #:	WG455779	**Analyst:**	KHR	**Run Date:**	12/10/2013 13:25
Collect Date:	12/03/2013 15:22	**Dilution:**	1	**File ID:**	T2.121013.132546
Sample Tag:	01	**Units:**	mg/L		

Analyte	Result	Qual	RL	MDL	EPA HW#	Reg. Limit
Arsenic, TCLP		U	1.00	0.500	D004	5
Barium, TCLP	0.619		0.100	0.0500	D005	100
Cadmium, TCLP		U	0.100	0.0500	D006	1
Chromium, TCLP		U	0.200	0.100	D007	5
Lead, TCLP		U	1.00	0.500	D008	5
Selenium, TCLP		U	0.800	0.400	D010	1
Silver, TCLP		U	0.100	0.0500	D011	5

U	Not detected at or above adjusted sample detection limit

Sample #:	L13120294-04	**PrePrep Method:**		**Instrument:**	CVAA1
Client ID:	SED13-13	**Prep Method:**	7470A	**Prep Date:**	12/10/2013 08:42
Matrix:	TCLP Leach	**Analytical Method:**	7470A	**Cal Date:**	12/10/2013 12:27
Workgroup #:	WG455777	**Analyst:**	PDM	**Run Date:**	12/10/2013 14:03
Collect Date:	12/03/2013 15:22	**Dilution:**	1	**File ID:**	M7.121013.140358
Sample Tag:	01	**Units:**	mg/L		

Analyte	Result	Qual	RL	MDL	EPA HW#	Reg. Limit
Mercury		U	0.00200	0.00100	D009	0.2

U	Not detected at or above adjusted sample detection limit

Microbac Laboratories Inc.
Ohio Valley Division Analyst List
December 23, 2013

001 - BIO-CHEM TESTING WVDEP 220	002 - REIC Consultants, Inc. WVDEP 060
003 - Sturm Environmental	004 - MICROBAC PITTSBURGH
005 - ES LABORATORIES	ADC - ANTHONY D. CANTER
ADG - APRIL D. GREENE	AJF - AMANDA J. FICKIESEN
AML - TONY M. LONG	AZH - AFTER HOURS
BAF - BRICE A. FENTON	BJO - BRIAN J. OGDEN
BLG - BRENDA L. GREENWALT	BRG - BRENDA R. GREGORY
CAA - CASSIE A. AUGENSTEIN	CAF - CHERYL A. FLOWERS
CEB - CHAD E. BARNES	CLC - CHRYS L. CRAWFORD
CLS - CARA L. STRICKLER	CLW - CHARISSA L. WINTERS
CPD - CHAD P. DAVIS	CRW - CHRISTINA R. WILSON
CSH - CHRIS S. HILL	CTB - CHRIS T. BUCINA
DAK - DEAN A. K	DCM - DAVID C. MERCKLE
DDE - DEBRA D. ELLIOTT	DEV - DAVID E. VANDENBERG
DIH - DEANNA I. HESSON	DLB - DAVID L. BUMGARNER
DLP - DOROTHY L. PAYNE	DLR - DIANNA L. RAUCH
DSM - DAVID S. MOSSOR	ECL - ERIC C. LAWSON
EDL - ERIN D. LONG	ENY - EMILY N. YOAK
EPT - ETHAN P. TIDD	ERP - ERIN R. PORTER
FJB - FRANCES J. BOLDEN	HCB - HEIDI C. BROWN
HJR - HOLLY J. REED	JBK - JEREMY B. KINNEY
JDH - JUSTIN D. HESSON	JKS - JANE K. SCHAAD
JLL - JOHN L. LENT	JWR - JOHN W. RICHARDS
JWS - JACK W. SHEAVES	JYH - JI Y. HU
KDW - KATHRYN D. WELCH	KEB - KATIE E. BARNES
KHR - KIM H. RHODES	KRA - KATHY R. ALBERTSON
KRB - KAELY R. BECKER	KSC - KELLY S. CUNNINGHAM
LKN - LINDA K. NEDEFF	LLS - LARRY L. STEPHENS
LSB - LESLIE S. BUCINA	MBK - MORGAN B. KNOWLTON
MDA - MIKE D. ALBERTSON	MDC - MIKE D. COCHRAN
MES - MARY E. SCHILLING	MLW - MATTHEW L. WARREN
MMB - MAREN M. BEERY	MRT - MICHELLE R. TAYLOR
MSW - MATT S. WILSON	PDM - PIERCE D. MORRIS
PIT - MICROBAC WARRENDALE	PSW - PEGGY S. WEBB
QX - QIN XU	RAH - ROY A. HALSTEAD
REK - BOB E. KYER	RLB - BOB BUCHANAN
RM - RAYMOND MALEKE	RNP - RICK N. PETTY
RS - ROSEMARY SCOTT	RWC - RODNEY W. CAMPBELL
SAV - SARAH A. VANDENBERG	SEP - SUZANNE J. PAUGH
SLM - STEPHANIE L. MOSSBURG	SLP - SHERI L. PFALZGRAF
TLC - TYLER L. CORDELL	TMB - TIFFANY M. BAILEY
TMM - TAMMY M. MORRIS	TPA - TYLER P. AMRINE
VC - VICKI COLLIER	WJB - WILL J. BEASLEY
WTD - WADE T. DELONG	XXX - UNAVAILABLE OR SUBCONTRACT

Microbac Laboratories Inc.
List of Valid Qualifiers
December 23, 2013

Qualkey: STD_ND=U

Qualifier	Description
*	Surrogate or spike compound out of range
+	Correlation coefficient for the MSA is less than 0.995
<	Result is less than the associated numerical value.
>	Result is greater than the associated numerical value.
A	See the report narrative
B	Analyte present in method blank
B1	Target analyte detected in method blank at or above the method reporting limit
B3	Target analyte detected in calibration blank at or above the method reporting limit
C	Confirmed by GC/MS
CG	Confluent growth
DL	Surrogate or spike compound was diluted out
E	Estimated concentration due to sample matrix interference
EDL	Elevated sample reporting limits, presence of non-target analytes
EMPC	Estimated Maximum Possible Concentration
F, S	Estimated result below quantitation limit; method of standard additions(MSA)
FL	Free Liquid
H1	Sample analysis performed past holding time.
I	Semiquantitative result (out of instrument calibration range)
J	The analyte was positively identified, but the quantitation was below the RL
J,B	Analyte detected in both the method blank and sample above the MDL.
J,P	Estimate; columns don't agree to within 40%
J,S	Estimated concentration; analyzed by method of standard addition (MSA)
L	Sample reporting limits elevated due to matrix interference
L1	The associated blank spike (LCS) recovery was above the laboratory acceptance limits.
L2	The associated blank spike (LCS) recovery was below the laboratory acceptance limits.
M	Matrix effect; the concentration is an estimate due to matrix effect.
N	Tentatively identified compound(TIC)
NA	Not applicable
ND, H1	Not detected; sample analysis performed past holding time.
ND, L	Not detected; sample reporting limit (RL) elevated due to interference
ND, S	Not detected; analyzed by method of standard addition (MSA)
NF	Not found by library search
NFL	No free liquid
NI	Non-ignitable
NR	Analyte is not required to be analyzed
NS	Not spiked
P	Concentrations >40% difference between the two GC columns
Q	One or more quality control criteria failed. See narrative.
QNS	Quantity of sample not sufficient to perform analysis
RA	Reanalysis confirms reported results
RE	Reanalysis confirms sample matrix interference
S	Analyzed by method of standard addition (MSA)
SMI	Sample matrix interference on surrogate
SP	Reported results are for spike compounds only
TIC	Library Search Compound
TNTC	Too numerous to count
U	Not detected at or above adjusted sample detection limit
UJ	Undetected; the MDL and RL are estimated due to quality control discrepancies.
W	Post-digestion spike for furnace AA out of control limits
X	Exceeds regulatory limit
X, S	Exceeds regulatory limit; method of standard additions (MSA)
Z	Cannot be resolved from isomer - see below

COC No. A 38965

158 Starlite Drive
Marietta, OH 45750

Microbac

CHAIN-OF-CUSTODY RECORD

Phone: 740-373-4071
Fax: 740-373-4835

Company Name: Ohio EPA

Project Contact: Doug Crendall

Contact Phone #: 614 387 6181

Turn Around Requirements: 14 day

Location: Columbus CDO

Project ID: American Pitch

Sampler (print): Eric Saas, Doug Crendall

Signature:

Program: ☐ CWA ☐ RCRA ☐ DOD ☐ AFCEE ☐ Other _____

ADDITIONAL REQUIREMENTS

Sample I.D. No.	Comp	Grab	Date	Time	Matrix*	NUMBER OF CONTAINERS	Hold	TCLP VOC	TCLP Metals	TOTAL # (LAB USE)
SED13-7	✓		12/2/13	2:00 PM	Sediment/Soil	2		1	1	
SED13-9	✓		12/3/13 Date	10:06 AM	" /Soil	2		1	1	
SED13-12	✓		12/3/13 Date	2:17 PM	" /Soil	2		1	1	
SED13-13	✓		12/3/13 Date	3:22 PM	" /Soil	2		1	1	

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
	12/4/13	9:35			
Relinquished by: (Signature)	Date	Time	Remarks:		

Microbac OVD
Received: 12/05/2013 10:33
By: ROSEMARY SCOTT
221000046333

*Water (W), Soil (S), Solid Waste (SD), Unknown (X)

Page 1 of 1

Internal Chain of Custody Report

Login: L13120294
Account: 2755
Project: 2755.003
Samples: 4
Due Date: 19-DEC-2013

Samplenum	Container ID	Products
L13120294-01	288446	TC-EX

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	05-DEC-2013 14:55	CLS		
2	ANALYZ	W1	TCL	09-DEC-2013 08:32	BRG	RLB	
3	STORE	TCL	W1	09-DEC-2013 14:50	CLS	BRG	
4	STORE	W1	A2	19-DEC-2013 17:14	RS	RS	

Samplenum	Container ID	Products
L13120294-01	288447	TC-ZHE

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	05-DEC-2013 14:55	CLS		
2	ANALYZ	W1	TCL	09-DEC-2013 08:33	BRG	RLB	
3	STORE	TCL	W1	09-DEC-2013 14:50	CLS	BRG	
4	STORE	W1	A2	19-DEC-2013 17:14	RS	RS	

Samplenum	Container ID	Products
L13120294-02	288448	TC-EX

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	05-DEC-2013 14:55	CLS		
2	ANALYZ	W1	TCL	09-DEC-2013 08:32	BRG	RLB	
3	STORE	TCL	W1	09-DEC-2013 14:50	CLS	BRG	
4	STORE	W1	A2	19-DEC-2013 17:14	RS	RS	

Samplenum	Container ID	Products
L13120294-02	288449	TC-ZHE

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	05-DEC-2013 14:55	CLS		
2	ANALYZ	W1	TCL	09-DEC-2013 08:32	BRG	RLB	
3	STORE	TCL	W1	09-DEC-2013 14:50	CLS	BRG	
4	STORE	W1	A2	19-DEC-2013 17:14	RS	RS	

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login

Internal Chain of Custody Report

Login: L13120294
Account: 2755
Project: 2755.003
Samples: 4
Due Date: 19-DEC-2013

Samplenum	Container ID	Products
L13120294-03	288450	TC-EX

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	05-DEC-2013 14:55	CLS		
2	ANALYZ	W1	TCL	09-DEC-2013 08:32	BRG	RLB	
3	STORE	TCL	W1	09-DEC-2013 14:50	CLS	BRG	
4	STORE	W1	A2	19-DEC-2013 17:14	RS	RS	

Samplenum	Container ID	Products
L13120294-03	288451	TC-ZHE

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	05-DEC-2013 14:55	CLS		
2	ANALYZ	W1	TCL	09-DEC-2013 08:32	BRG	RLB	
3	STORE	TCL	W1	09-DEC-2013 14:50	CLS	BRG	
4	STORE	W1	A2	19-DEC-2013 17:14	RS	RS	

Samplenum	Container ID	Products
L13120294-04	288452	TC-EX

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	05-DEC-2013 14:55	CLS		
2	ANALYZ	W1	TCL	09-DEC-2013 08:33	BRG	RLB	
3	STORE	TCL	W1	09-DEC-2013 14:50	CLS	BRG	
4	STORE	W1	A2	19-DEC-2013 17:14	RS	RS	

Samplenum	Container ID	Products
L13120294-04	288453	TC-ZHE

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	05-DEC-2013 14:55	CLS		
2	ANALYZ	W1	TCL	09-DEC-2013 08:32	BRG	RLB	
3	STORE	TCL	W1	09-DEC-2013 14:50	CLS	BRG	
4	STORE	W1	A2	19-DEC-2013 17:14	RS	RS	

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login