Annual Progress Report for 2009

Monitoring the Effectiveness and Validating Response to the Road Related Mitigation Practices Implemented on the Pikes Peak Highway

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Table of Contents

Executive Summary

Monitoring the Effectiveness and Validating Response to the Road Related Mitigation Practices Implemented on the Pikes Peak Highway

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This is the seventh annual report documenting the monitoring efforts on the Pikes Peak Highway as part of the Settlement Agreement between the Sierra Club and the United States Department of Agriculture, Forest Service in Sierra Club v. Veneman, Civil Action No. 98-M-662 (D. Colo.), (U.S. Department of Justice 2002). The original Monitoring Plan and subsequent amendments call for effectiveness monitoring, designed to determine how well the mitigation practices implemented contribute to meeting their objectives; and validation monitoring, designed to determine how the mitigation practices affect the riparian, wetland, and aquatic systems within the area of influence of the Pikes Peak Highway (USDA Forest Service 2002 and 2003). Meteorologically, 2009 was a relatively uneventful season allowing time for more routine monitoring and maintenance as well as more thorough quality assurance and quality control assessments.

Effectiveness monitoring focused on the 14 mile long, 300 foot wide highway corridor that starts at mile marker seven and continues to the summit of Pikes Peak. The only resurfacing treatment used on the highway for mitigation purposes is asphalt paving. Approximately 7 miles of the highway have been paved since the onset of the mitigation project. In 2009, the highway crew continued work on Basin 5 (Boehmer and East Fork of Beaver Creek Watersheds), which included paving from the summit to approximately 1 mile below. Construction of one of the two new sediment ponds in Basin 6 (East Fork and West Fork of Beaver Creek Watersheds) was also completed and will be included in the Monitoring Study for 2010. In addition, 2,796 tons of gravel were added to the road surface, of which 1,776 tons were used to reestablish the base for the paving completed this year (personal communication with Jack Glavan, City of Colorado Springs, Capital Projects Manager). Road surface data were gathered during the 2009 monitoring season on 10 of the original 11 road reaches. Road reach 154RX was paved in 2006 and will no longer be surveyed.

The field procedure for monitoring sediment accumulation in the rock weirs was modified in 2008 to simplify both instrument requirements for the survey and software requirements for subsequent data reduction and analysis as well as to allow for a more consistent comparison of volumetric change from survey to survey. A fixed area was defined and monumented within each rock weir to be surveyed each time, and compared form survey to survey or year to year. In 2009, as part of the process of changing a protocol, several quality control and quality assurance checks have been implemented as a means of better defining errors that might be associated with the survey procedure. In an attempt to further assess survey resolution, we evaluated how closely the elevation of the same rock weir is estimated by repeated surveys. During the winter of 2009, to clearly define and reduce potential survey errors associated with the rock weirs a detailed

schematic map of each rock weir was developed that identifies and locates the optimal survey grid.

Precipitation measurements from two of the three rain gauges did not indicate rainfall amounts greater than average for 2009. The data logger in rain gauge 077RG malfunctioned and did not provide any usable data for the 2009 field season. New data loggers for all rain gauges will be installed during the 2010 field season. Rainfall data was also not available from the NRCS Snotel site located at Glen Cove. Silt fences were not exposed to high runoff and erosion activities as in prior years, allowing time for the field crew to complete weekly surveys of each site. Silt fences from 13 cut slope and 28 fill slope sites were monitored in 2009. Seven of the 56 fill slope silt fences were breached during the 2009 field season. Site 088FS was obliterated by the highway crew depositing rock and sediment into the upper fence. As a result, the upper fence has been removed from the sampling. The lower fence will continue to be monitored. The silt fences at 196FS were removed due to excessive erosion causing frequent breaching of the upper fence. Conveyance channel 245CC was established to replace fill slope site 196FS. All silt fence sites were visited on a weekly basis, sediment volume measured, and silt fences evaluated for repair or replacement.

Eighteen of the original 20 drainage ditches selected were surveyed in 2009. Site 092DD was paved in 2005 and site 107DD was lined with shotcrete in 2006, eliminating the need for further monitoring. Most drainage ditches will be paved or lined with shotcrete once the highway is paved and will no longer need to be surveyed unless visual inspection provides evidence of failure, in which case cross sections will be established to document change. Six of the 18 remaining drainage ditches are treated (lined with erosion control fabric), and 12 remain untreated. Three of the untreated drainage ditches are adjacent to road surfaces paved with recycled asphalt, but have no other treatment applied to the drainage ditch. Nine of the untreated drainage ditches are associated with road reaches.

Forty of the 116 conveyance channels were surveyed in 2009, and one new conveyance channel monitoring site (245CC) was established. The sub-sample of 13 conveyance channels was measured in 2009 specifically to compare treated (7) and untreated (6) road sections. Twenty-two conveyance channels located below established rock weirs and one conveyance channel below sediment pond 199RW were surveyed in 2009. For safety reasons, conveyance channel 099CC located below rock weir 238RW and conveyance channel 118CC located below rock weir 242RW were not surveyed due to the exposure of large boulders and the general instability of the slope following weir failure. The field crew will continue to monitor 099CC and 118CC each year, using photography and by recording observations in the field notes to document changes in conveyance channel geometry, but the site is not likely to be surveyed. Because monitoring the full set of 117 conveyance channels is not feasible during each field season, the field crew will continue to survey a sub-sample of 40 conveyance channels each year and survey additional channels as time permits.

Twenty-eight sediment traps were monitored in 2009, including 26 rock weirs and two sediment ponds. Eighteen sites were surveyed at least twice to monitor their effectiveness in trapping sediment from winter and summer runoff. The rock weirs were surveyed and sediment volume was measured in the silt fences located down slope of the rock weirs (15 rock weirs have associated silt fences). The silt fence below rock weir 152RW was removed in 2009 as it contained only eroded berm material from the rock weir and organic material. The silt fence below rock weir 180RW was extended to capture sediment from a section of the rock weir that was exhibiting failure. Of the 28 sites, 19 demonstrated some degree of failure, where water and sediment were seen piping under or through the rock weir, the rock weir was overtopped, or the rock weir was breached. In addition, the silt fence associated with 008RW was breached in 2009.

The primary focus of the validation monitoring is to address the condition of the riparian wetland and aquatic systems along the Pikes Peak Highway. Stream channel surveys were completed on Boehmer Creek, East Fork of Beaver Creek, Glen Cove Creek, North Catamount Creek, North Fork of Crystal Creek, Oil Creek, South Catamount Creek, Ski Creek, Severy Creek, and West Fork of Beaver Creek in 2009. In the past, stream channel surveys have included planview surveys, profile surveys, cross section surveys, bank erosion surveys, vegetation surveys, pebble counts, and grab samples. In 2009, stream channel surveys included only cross section surveys, thalweg surveys, vegetation surveys, pebble counts, and grab samples.

Numerous sediment grab samples were collected from the cut slope and fill slope silt fences, the rock weirs and their associated silt fences, and from the stream bars throughout the 2009 field season. A subset of these was selected to be analyzed in the laboratory for particle size distribution. The balance of samples will be analyzed only if the variability in the particle size distribution of the subset of samples chosen for initial analysis warrants additional analysis. Laboratory analyses for the 2008, and 2009 field seasons have been completed and a summary of particle size distributions and graphs are presented in this report. Comparing the distribution of material captured in traps near the highway to sediment deposits (bars) in the streams will validate response to highway mitigation practices.

Included with the full report is a data DVD containing all survey data (field and post processing) plus digital photographs (recommended viewing) for all sites for the 2009 field season. The Annual Reports and data may also be obtained from:

http://www.fs.fed.us/emc/rig/pikespeak/index.shtml

INTRODUCTION

The proposed actions presented in the Pikes Peak Highway Drainage, Erosion and Sediment Control Plan Environmental Assessment (Hydrosphere Resource Consultants 1999) were designed to achieve the following goals:

- Stabilize road surface materials, cut slopes, and fill slopes
- Reduce runoff velocities and dissipate erosive energy
- Collect runoff in armored ditches and conveyance channels
- Reduce erosion and sediment deposition in drainage channels
- Retain sediment in traps and ponds to reduce downstream sedimentation

In May 2001, a Monitoring Plan was approved as part of the Settlement Agreement between the Sierra Club and the United States Department of Agriculture, Forest Service in Sierra Club v. Venneman, Civil Action No. 98-M-662 (D. Colo.), (U.S. Department of Justice 2002). The Monitoring Plan outlines appropriate procedures for monitoring and documenting the effectiveness of mitigation practices in achieving the above desired goals (USDA Forest Service 2002). The monitoring effort, which includes implementation monitoring, effectiveness monitoring, and validation monitoring, began in 2003.

Implementation monitoring verifies that mitigation practices are properly implemented. Staffs from both the city of Colorado Springs and the U.S. Forest Service are responsible for this aspect of the monitoring program. Because all parties assume that mitigation practices will be properly implemented, successes or failures in design or implementation will be addressed in the annual monitoring reports only to the extent that they impact subsequent monitoring.

Effectiveness monitoring is intended to document whether or not the properly implemented mitigation practice is effective in achieving the desired goal(s) or purpose(s). Effectiveness monitoring is the cornerstone of the monitoring effort described in this report.

The critical component in the monitoring program is validation monitoring, which is intended to document the degree to which the properly implemented and effective mitigation practices ultimately influence the resource of concern. In this report, validation monitoring addresses the condition of the riparian, wetland, and aquatic systems along the Pikes Peak Highway.

Changes in the proposed action plan for road mitigation practices (Burke 2002) have required amendment to the original approved Monitoring Plan (USDA Forest Service 2003). Initially, a variety of highway surface stabilization practices were proposed for road mitigation. These have been reduced to a single surfacing procedure, asphalt pavement, eliminating any need for a monitoring design that incorporates multiple surface treatments.

Other modifications were also made in the revised highway mitigation plan. Rock weirs are being constructed to collect or trap all the water and sediment exiting the road corridor from all events up to the magnitude of the design storm. Presumably, sediment will settle out in the rock weir with only the water percolating through a porous berm. This change eliminated the need to sample sediment concentrations in pond inflow and outflow as originally designed. In addition, revisions in the mitigation design direct road drainage from very long segments or reaches (as long as 2 miles) of both pavement and ditch line into diversion points and conveyance channels, reducing the number of diversions off the highway and the number of proposed sampling sites.

Over time, the entire highway will be paved, rather than surfaced using a variety of treatments, which should significantly reduce or eliminate the potential for continued surface erosion to occur from the road surface. Current erosion rates from the gravel portion of the highway will continue to be monitored as called for in the approved Monitoring Plan, but once the reach or section of road is paved it will be assumed that post mitigation erosion from the road surface is zero. As noted above, sediment pond design has been altered but monitoring will still focus on quantifying total sediment exported in the discharge water and the effectiveness of the mitigation practices in reducing that export. This report includes a brief description of the current monitoring protocol for each metric of concern and documents any changes in the monitoring protocol that may have occurred since the previous annual report.

The U.S. Forest Service oversees monitoring of the streams draining the basins below the highway to validate that discharge management and reductions in sedimentation from the highway result in improvements in the channel and riparian environment. A suite of tributaries in the Pikes Peak Watershed has been identified as either impacted or non-impacted by the presence and maintenance of the Pikes Peak Highway. North Catamount, South Catamount, Glen Cove, Oil, and Boehmer Creeks represent non-impacted streams. Ski, Severy, East Fork of Beaver, North Fork of Crystal, and West Fork of Beaver Creeks are all considered stream systems impacted by the highway. Depending on the magnitude of the reduction in the amount of sediment delivered to the stream system and changes in discharge energy, it may be possible to document changes in channel morphology and riparian condition that occur as a consequence of improved highway management.

Approximately 7 miles of the highway have been paved since the onset of the mitigation project. In 2009, the highway crew continued work on Basin 5 (Boehmer and East Fork of Beaver Creek Watersheds), which included paving from the summit to approximately 1 mile below. Construction of one of the two new sediment ponds in Basin 6 (East Fork and West Fork of Beaver Creek Watersheds) was also completed and will be included in the Monitoring Study for 2010. In addition, 2,796 tons of gravel were added to the road surface, of which 1,776 tons were used to reestablish the base for the paving completed this year (personal communication with Jack Glavan, City of Colorado Springs, Capital Projects Manager).

Site Location and Identification

A 15 year study requires that monitoring sites be uniquely identified and periodically relocated. Each precipitation gauge, cut slope and fill slope, road reach, drainage ditch and conveyance channel, rock weir and sediment pond, and stream channel reach has been uniquely identified and located. Each site is marked as a waypoint in a GIS platform with attributes for latitude, longitude, and altitude, as well as a unique code, to distinguish it in the field. The coding convention used for the effectiveness monitoring sites is a five-character alpha-numeric code starting with three digits followed by two letters (e.g., 001RX), where the numbers are sequential and the letters signify the feature being monitored (e.g., RX = Road Cross Section). The validation monitoring sites also use a five-character coding convention in which the first four letters identify the stream and the last digit signifies the reach (e.g., OILC1 = Oil Creek, Reach 1).

Where appropriate, every feature being monitored has at least three benchmarks or control points useful in obtaining repeated spatially similar, three dimensional surveys. The benchmarks or control points are monumented by 2.5 foot lengths of 0.5 inch rebar pounded into the ground and topped with plastic yellow caps. Aluminum nursery tags wired to the rebar identify the individual benchmarks or control points (e.g., CP01). Every feature surveyed has at least three points with which to register the survey, although some features in close proximity may share control points.

In 2009, one new conveyance channel monitoring site was established (245CC) to replace fill slope site 196FS. The silt fences at 196FS were removed due to excessive erosion causing breaching of the upper fence. Site names, locations, and feature descriptions can be found in Appendix A. Note that Appendix A provides a complete list of all waypoints established since the project began in 2003; not all of the sites listed were sampled during the 2009 monitoring season.

OBJECTIVE

The objective of this report is to document the data collected and progress made in the effectiveness and validation monitoring of the mitigation practices implemented on the Pikes Peak Highway during the 2009 field season. Each annual report beginning in 2007 will consist of a description of the protocol used to monitor each metric of concern as defined by the Monitoring Plan or its amendment, and a summary of the data collected for that particular year. It should be realized that, by design, not all metrics or sampling locations will be monitored every year. As a result, some reports will contain site data not presented in other reports. A full data set from all years is available in the data archive. It should also be noted that it was not the intent of the settlement agreement to include analysis of the data beyond a quality assurance and quality control assessment of the monitoring effort. Therefore the annual report will state the intended purpose for collecting the data and present the data in a format useful for subsequent analysis.

EFFECTIVENESS MONITORING

The road mitigation practices implemented by the city of Colorado Springs are intended to control erosion and manage the erosive energy of surface water discharge from the Pikes Peak Highway. The following describes the metrics monitored and the data collected in order to document the effectiveness of mitigation. The standard protocol for identifying and numbering the various sample sites is presented up front, followed by a description of the monitoring sites and metrics.

Precipitation

Three tipping bucket rain gauges (Onset Computer Corp.) equipped with event data loggers (HOBO) were installed at approximate elevations of 10,000, 11,500, and 13,000 feet to index precipitation over the elevation range of the monitored portion of the highway. Rain gauge 075RG is located just uphill from the Halfway Picnic Area near mile marker 10 at an elevation of 10,109 feet. This is at the upper end of Priority Basin 2, in the subalpine zone. Rain gauge 076RG is located near the Elk Park Trailhead (No. 652) at the boundary between the subalpine and the alpine zones at 11,810 feet elevation. Rain gauge 077RG is located near the Devil's Playground and well into the alpine area at 13,069 feet elevation. Rain gauges installed for this study operate from early May, or as soon as the field crew starts for the season, until late September or early October when the crew finishes for the year. Data loggers record a date-time stamp for each tip of the rain gauge bucket (1 tip = 0.01 inches) from which volume, duration, and intensity (or rate) of each rainfall event can be determined.

Total seasonal precipitation (May 5 – September 30, 2009) for two of the three sites is listed in Table 1. The data logger in rain gauge 077RG malfunctioned and did not provide any usable data for the 2009 field season. New data loggers for all rain gauges will be installed during the 2010 field season. In 2009, seasonal totals varied between the two sites with the mid elevation receiving the most precipitation (Figure 1). Daily precipitation is presented in Appendix B and the basic rain gauge data (date-time stamp) is presented on the data DVD accompanying the report.

Table 1. Location, precipitation accumulation, and dates of operation for two of the three rain gauges on Pikes Peak, 2009.

Gauge ID	Latitude (hddd˚mm.mmm)	Longitude (hddd˚mm.mmm)	Altitude (ft)	Total Precipitation (in)	Dates of Operation 2009
075RG	N38 53.797	W105 03.890	10,109	11.14	5/05–9/30
076RG	N38 52.582	W105 03.970	11,810	17.01	5/05–9/30

In addition to the three sites established as part of this study, an NRCS Snotel site located at Glen Cove usually has precipitation data available for the entire year. Rainfall data was not available from the NCRS Snotel site during the 2009 field season due to a system malfunction. Data for the NRCS Snotel site can be obtained from:

http://www.wcc.nrcs.usda.gov/snotel/snotel.pl?sitenum=1057&state=co

The NRCS Snotel site is located between rain gauges 075RG and 076RG at an elevation of 11,469 feet.

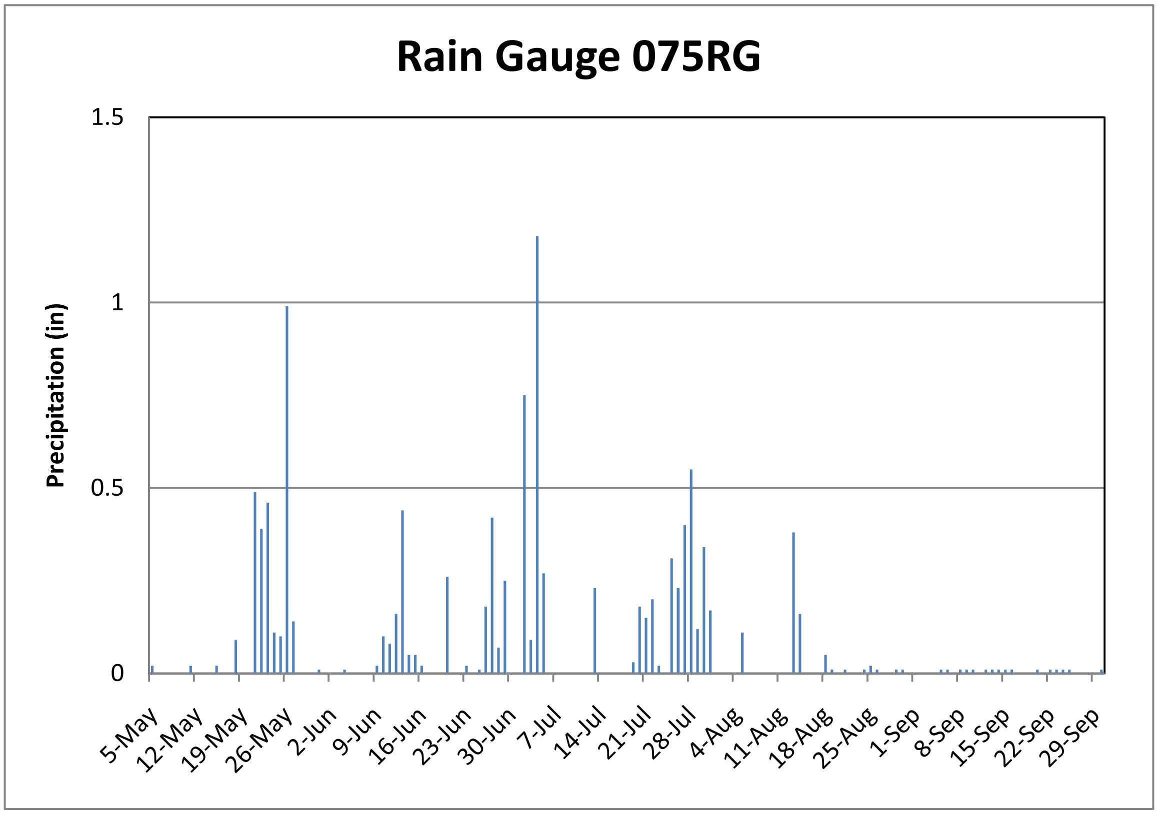
Highway Surface Stabilization

As noted earlier, and in amendments to the Monitoring Plan, the monitoring protocol, appropriate for estimating road erosion, has been significantly modified to reflect the changes in the road bed stabilization practices that have occurred since the initial design. Monitoring has been reduced to estimating the volume of material stored on the surface of untreated road reaches with the assumption that erosion, or changes in storage, from the paved segments will be zero.

As a surrogate for estimating actual erosion rates, road surface elevation for selected road reaches is being monitored over time to document erosion rates, or changes in the volume of material stored on untreated road segments. Uniformed road reaches have been selected with survey cross sections permanently established at five intervals along each selected road reach (i.e., approximately one cross section per 20 meters of road). The road cross sections are periodically surveyed to provide the basis for estimating the degree of erosion or deposition occurring in the road reach they represent. Individual road cross sections have been monumented using a 2.5 foot piece of rebar driven into the road surface at the upper edge of the fill slope. In addition, permanently monumented baseline elevation points (benchmarks) have been established for each road reach and are used as references for each cross section. Monitoring consists of surveying the surface elevation of the road cross sections, relative to the benchmark for the road reach.

Either the average elevation of the cross section, or the survey transect, can be compared for different surveys to determine changes in the volume of material stored, or changes in surface configuration that may have occurred between measures. Averaging the response for the five cross sections and multiplying that by the area of the road reach (estimated as average length times average width) yields an estimate of the change in the volume of material stored on the road reach during the interval between measurements. It is critical that any addition of gravel or other material to the monitored road surfaces be documented and included in the mass balance. All maintenance activity in monitored road reaches should also be documented and considered in evaluating changes. Ideally, monitoring consists of at least one survey of each road reach during the field season, although it is not critical to survey every road reach every year. However, whenever possible, it is of value to take additional measurements on specific road reaches before and after planned maintenance.

Road surface data were gathered during the 2009 monitoring season on 10 of the original 11 road reaches. Road reach 154RX was paved in 2006 and is no longer surveyed. In addition, 2,796 tons of gravel were added to the road surface (personal communication with Jack Glavan, City of Colorado Springs, Capital Projects Manager). All road reaches are associated with a corresponding drainage ditch except for 060RX. Table 2 contains a summary of road cross section monitoring sites measured in 2009. Cross section graphs



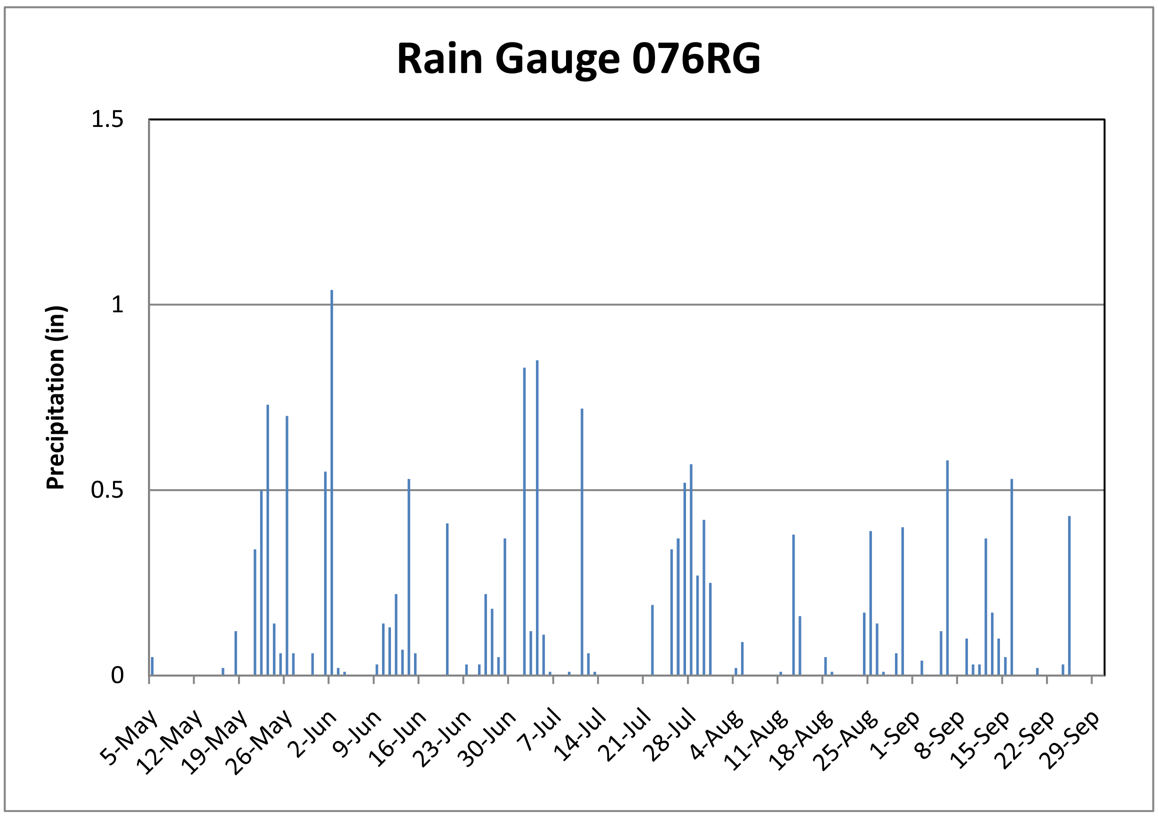


Figure 1. Daily precipitation for two of the three rain gauges on Pikes Peak, 2009.

for each road segment can be found in Appendix C. Photographs and survey data for all sites are available on the accompanying data DVD.

Table 2. Summary of road cross section monitoring sites surveyed on Pikes Peak, 2009.

Site ID	Basin #	Watershed	Survey Date
044RX	7	NCRY	7/31/2009
047RX	7	SKIC	10/15/2009
050RX	7	SKIC	7/24/2009
056RX	7	SKIC	7/24/2009
060RX †	7	SKIC	9/17/2009
062RX	7	SKIC	7/31/2009
072RX	7	SKIC	10/15/2009
156RX	6	WBVR	7/22/2009
158RX	6	WBVR	7/22/2009
160RX	6	WBVR	7/23/2009

† Only road reach without a corresponding drainage ditch

Stabilizing Cut and Fill Slopes

Cut and fill slopes along the highway provide a continuous source of sediment to wetland, riparian, and aquatic systems. It is expected that highway mitigation practices will reduce sediment movement from these slopes. Effectiveness will be estimated by comparing differences in the amount and timing of sediment transport from treated and untreated cut and fill slopes. A 30 foot silt fence placed at the base of the slope of interest is used to trap sediment. Periodic measurements of the volume of material trapped behind the fence (i.e., after spring snowmelt and again after each large rainfall event) provide an index of the amount of material being eroded from the slope above the fence. Each silt fence is routinely visited to ensure timely measurement and maintenance. Should the silt fence fill to the point of reduced efficiency or fail during the period between measurements, the fence will either be repaired, replaced, cleaned out, or relocated to a new monitoring site. Currently, accumulation of sediment behind the silt fence is determined by removing the accumulated material and measuring the amount removed by placing it in graduated containers for a measure of total volume. A sub-sample of the material removed is collected for laboratory analysis to determine total weight per unit volume and particle size distribution. Initially (2003 and 2004), the volume trapped was determined from a survey of the volume behind the fence before and after the sediment was removed.

Erosion from cut slopes is monitored in the following manner: a silt fence is placed across the base of the cut slope (lower fence) just above the ditch line to capture the sediment coming off the cut slope; a second silt fence is placed on the upper edge of the cut slope (upper fence) to intercept and trap what is delivered to the cut slope from the undisturbed hill slope above. This partitioning allows separation of the contribution of the cut slope to the road or ditch line from the contribution from the undisturbed hill slope above the cut slope. The latter measurement can also provide an estimate of the natural erosion rates. The contributing area varies for each fence depending on the slope characteristics above the fence. The contributing area of the lower fence is represented by the rectangle above the width of the fence and extending just below the upper fence to the toe of the undisturbed slope. The contributing area of the upper fence is more difficult to define and depends on the topographic features of the hill slope above. Contributing area for both lower and upper fences has been determined and measured for all cut slope monitoring sites. Twenty-three silt fences have been installed at 13 sites to monitor cut slopes. They are proportionally divided between the mitigated (paved) and untreated portions of the highway. The sampling design includes cut slopes located in road segments that will be mitigated at differing times in the future, ensuring a wide range in the variability of conditions sampled both before and after highway mitigation.

Cut slope silt fences were not exposed to high runoff and erosion activity in 2009. As a result, the field crew was able to complete weekly surveys of the 23 silt fences (13 sites). Notes were taken in the field to document the condition of the silt fence during each site visit. In the site summary.xls file on the data DVD, site visit and survey dates are annotated with the condition of the silt fence, any repairs or replacements that were done to maintain the silt fence and an indication if the fence was breached prior to the survey date. The sediment volume for each cut slope silt fence was recorded in the site summary.xls file only if there was sediment accumulation in the cut slope silt fence. All other silt fence site visits would have had zero sediment accumulation. A summary of cut slope site visits, and sediment accumulation in cut slope silt fences for the 2009 monitoring season are presented in Appendix D. All cut slope data and photographs for the 2009 season are available on the accompanying data DVD.

A similar design has been implemented for monitoring the effectiveness of mitigation practices intended to minimize erosion from fill slopes. The design includes the use of two silt fences per site, the first fence placed at the base of the fill slope (upper fence) to trap what originated from the fill slope, and the second fence placed at the base of the hill slope (lower fence) on which the fill slope resides (or at the boundary of the 150 foot corridor associated with the road right-of-way, whichever is the shorter distance). The second fence is offset from the first fence and presumably not influenced by the upper fence. This pattern allows for trapping the eroded material as it leaves the fill slope as well as trapping the sediment being delivered off-site or down slope. Material trapped in the lower fence would include any natural erosion from the slope as well as material contributed from the fill slope. In this way, not only will the on-site effectiveness of the mitigation practice as it effects fill slope erosion be evaluated, but an estimate of the amount of eroded material from the fill slope that is attenuated down slope can also be obtained. The contributing area of the upper fence is bounded by the width of the fence and extends upslope to the edge of the road bed. The contributing area of the lower fence is defined by the width of the lower fence and the distance to the upper fence. However, like the upper fence above the cut slope, the actual contributing area of the lower fence is influenced by the topographic features of the hill slope. Contributing area for both the lower and upper fences has been determined and measured for all fill slope monitoring sites. Fifty-six silt fences have been installed at 28 sites to monitor fill slopes. Again, the sites are distributed between treated and untreated sections of the highway. Determination of the volume of material trapped behind the fill slope silt fences is accomplished in the same manner as that for the cut slope fences.

As with the cut slope silt fences, accumulation in the fill slope silt fences did not exhibit high runoff and erosion activity in 2009, allowing time for the field crew to complete weekly surveys of each site. Seven of the 56 silt fences (28 sites) were breached during the 2009 field season; two of those sites were breached more than once during the season. Site 088FS was obliterated by the highway crew depositing rock and sediment into the upper fence. As a result, the upper fence has been removed from the sampling. The lower fence will continue to be monitored. The silt fences at 196FS were removed due to excessive erosion causing frequent breaching of the upper fence. As a surrogate, conveyance channel 245CC was established on the fill slope to replace 196FS to estimate erosion. Two of the fill slope sites (007FS and 039FS) had double fences that were offset at the upper and lower fence locations to capture sediment. One of the fences was removed and the remaining fence was extended to capture sediment from the same contributing area as both fences. The sediment volume for the fill slope silt fences was recorded in the site summary.xls file only if there was sediment accumulation in the fill slope silt fence. All other silt fence site visits had zero sediment accumulation. A summary of fill slope site visits, and sediment accumulation in fill slope silt fences for the 2009 monitoring season can be found in Appendix E. All fill slope data and photographs for 2009 are available on the accompanying data DVD.

Numerous sediment grab samples were collected from material trapped in the cut slope and fill slope silt fences throughout the 2009 season. A subset of these was selected to be analyzed in the laboratory for particle size distribution. The balance of samples will be analyzed only if the variability in the particle size distribution of the subset of samples chosen for initial analysis warrants additional analysis. Laboratory analyses for the 2008 and 2009 grab samples have been completed and a summary of particle size distributions and graphs are presented in Appendix F and on the accompanying data DVD.

Initially, the Monitoring Plan anticipated taking measurements of the accumulation behind all silt fences two to three times per year. The actual number of measurements taken is dependent on many factors including; winter snowpack, soil moisture, number of rainfall events, and availability of crew members to clean out silt fences while completing other tasks. Estimates of human induced erosion and sediment delivery (from cut slope, fill slope, and silt fences located down slope near the streamside or boundary of the 150 foot corridor), can be compared with estimates of "natural movement" estimated from what is trapped in the silt fencing placed above cut slopes for periods before and after mitigation to determine the effectiveness of the practice and other best management practices (BMPs) on reducing human induced erosion.

Using silt fences to monitor sediment transport has proven to be difficult where silt fences cross rock surfaces, as indicated by the frequent breaching or fence failure that has occurred over the course of the monitoring. The primary cause of silt fence failure has been where fence material cannot be reliably fastened to rock surfaces, particularly at the base of the cut slopes at higher elevations. As a corrective measure, the sampling protocol was revised in 2008 for three cut slope monitoring sites (102CS, 123CS, and 141CS) with lower fences that cross rock surfaces. The lower cut slope silt fence was removed and two permanent survey cross sections (labeled A and B) established, one at the vegetation line just below the upper fence and one 1/3 of the way downslope of the upper fence. The cross sections are the same length as the original fence and have been monumented by the placement of rebar at each end. In addition, permanently monumented baseline elevation points were established for each cut slope monitored in this way and are used as references for each cross section. Monitoring consists of surveying the surface elevation, relative to the benchmark, of the cut slope cross section. Repeated surveys provide a basis for documenting volumetric changes in the surface of the cut slope. This procedural change is intended to provide a qualitative estimate of cut slope erosion in situations where a quantitative estimate is not feasible. Cross section graphs for cut slope monitoring sites that correspond to the survey dates presented in Table 3 can be found in Appendix G. Photographs and survey data for all sites are available on the accompanying data DVD.

Table 3. Summary of cut slope monitoring sites surveyed on Pikes Peak, 2009.

Site ID	Basin #	Watershed	Survey Dates	
102CS	6	WBVR	6/24/2009	10/15/2009
123CS	6	WBVR	6/25/2009	10/2/2009
141CS	6	WBVR	6/24/2009	10/2/2009

Armoring Drainage Channels

Drainage channels, which include both drainage ditches along roads and conveyance channels below culverts, were to be lined (armored) with riprap or concrete to control further erosion and deposition of sediment. However, instead of armoring roadside drainage ditches, all reaches except those meeting the criteria stated in the latest U.S. Forest Service Design Review (Burke 2002) are or will be either lined with shotcrete or erosion control fabric or left untreated. Effectiveness monitoring consists of selecting a sample of the fabric-lined and unlined drainage ditches, establishing cross sections in the channels to be periodically surveyed, and using measured changes in cross sectional area to determine if erosion or deposition is reduced or increased in armored channels relative to unarmored channels. Once drainage ditches have been paved or lined with shotcrete, they will no longer be surveyed unless visual inspection provides evidence of failure, in which case cross sections will be re-established to document future change. Conveyance channels are those features that drain water away from the road system to the streams below. For the most part, they are not physically treated or stabilized as part of the road mitigation effort, although road management practices may greatly alter the amount of discharge delivered to the conveyance channels. Although the monitoring technique will be similar for both ditches and conveyance channels, the sample size differs.

Drainage Ditches

Many of the drainage ditches selected for monitoring align with the road sections selected for monitoring. Additional ditches were selected independently of the road sections as needed to complete the road slope/contributing area/armoring material matrix. As with the road surface erosion transects, five cross sectional transects (labeled A–E except for site 188DD, which has eight cross sections labeled A–H) per segment of drainage channel (lined, not lined) were established. For each cross section, a reference pin was located at the base of the cut slope on the inside of the ditch; a second pin was located on the edge of the road surface when possible. By anticipating the order in which ditches will be lined in future years, the effectiveness of the lining methods in reducing erosion and deposition can be better defined by obtaining cross section information at control sites for several years prior to treatment.

Eighteen of the original 20 drainage ditches selected were surveyed in 2009. Site 092DD was paved in 2005, and ditch 107DD was lined with shotcrete in 2006, eliminating the need for further monitoring. Most drainage ditches will be paved or lined with shotcrete once the highway is paved and will no longer need to be surveyed unless visual inspection provides evidence of failure, in which case cross sections will be established to document change. Six of the 18 remaining drainage ditches are treated (lined with erosion control fabric), and 12 remain untreated. Three of the untreated drainage ditches are adjacent to road surfaces paved with recycled asphalt, but have no other treatment applied to the drainage ditch. Nine of the untreated drainage ditches are associated with road reaches. Drainage ditch survey cross sections that correspond to the survey dates presented in Table 4 can be found in Appendix H. Drainage ditch survey data and photographs for 2009 are available on the accompanying data DVD.

Table 4. Description of road treatments above drainage ditches, treatments for drainage ditches, and drainage ditch survey dates on Pikes Peak, 2009.

Site ID	Basin #	Watershed	Road Treatment	Ditch Treatment	Survey Date
005DD	1	Lower SKIC	Asphalt	Erosion Control Fabric	7/1/2009
010DD	1	Lower SKIC	Asphalt	Erosion Control Fabric	7/1/2009
042DD	7	NCRY	Gravel	Untreated	7/31/2009
046DD	7	SKIC	Gravel	Untreated	10/15/2009
051DD	7	SKIC	Gravel	Untreated	7/24/2009
057DD	7	SKIC	Gravel	Untreated	7/24/2009
061DD	7	SKIC	Gravel	Untreated	7/31/2009
071DD	7	SKIC	Gravel	Untreated	10/15/2009
080DD	7	SKIC	Gravel, Recycled Asphalt	Untreated	9/17/2009
082DD	7	SKIC	Gravel, Recycled Asphalt	Untreated	10/15/2009
085DD	7	SKIC	Gravel, Recycled Asphalt	Untreated	8/13/2009
155DD	6	WBVR	Gravel	Untreated	7/22/2009
157DD	6	WBVR	Gravel	Untreated	7/22/2009
159DD	6	WBVR	Gravel	Untreated	7/23/2009
182DD	2	SKIC	Asphalt	Erosion Control Fabric	7/1/2009
188DD	2	NCRY	Asphalt	Erosion Control Fabric	7/14/2009
195DD	2	SKIC	Asphalt	Erosion Control Fabric	7/1/2009
205DD	2	SKIC	Asphalt	Erosion Control Fabric	6/18/2009

Conveyance Channels

Monitoring the effectiveness of mitigation practices on conveyance channels also represents a critical component in the monitoring program. These channels are eroding into gullies, and may contribute most significantly to the sediment load in the adjacent wetland, riparian, and aquatic systems. One hundred fifteen conveyance channels were identified and cross sections established during the first 3 years of this monitoring effort. Cross sections for conveyance channel 244CC were established in 2008 and conveyance channel 245CC in 2009 for a total of 117 documented conveyance channels. Surveying all 117 conveyance channels each year is prohibitive. Instead, as many conveyance channels as possible are surveyed each year depending on time availability. A sub-sample of at least 13 conveyance channels are surveyed every year, specifically to compare response to treated (7) and untreated (6) road segments. Conveyance channels that appear to be or become present below the rock weirs are also surveyed annually. If the rock weirs fail, changes in the conveyance channel geometry that may result will be documented. Effectiveness of the rock weir can be evaluated by comparing the erosion rate in the channels below the rock weir with erosion rates observed to occur in other conveyance channels located in proximity to treated and untreated road segments. Every conveyance channel is surveyed using a series of three cross sections located within the 150 foot boundary of the highway corridor (labeled A–C except for site 232CC, which has five cross sections labeled A–E).

Forty of the 116 conveyance channels were surveyed in 2009, and one new conveyance channel monitoring site (245CC) was established (Table 4). The sub-sample of 13 conveyance channels was measured in 2009 specifically to compare treated (7) and untreated (6) road sections. Twenty-two conveyance channels located below established rock weirs and one conveyance channel below sediment pond 199RW were surveyed in 2009. For safety reasons, conveyance channel 099CC located below rock weir 238RW and conveyance channel 118CC located below rock weir 242RW were not surveyed due to the exposure of large boulders and the general instability of the slope following weir failure. The field crew will continue to monitor 099CC and 118CC each year, using photography and by recording observations in the field notes to document changes in conveyance channel geometry, but the sites are not likely to be surveyed. Cross sections for the conveyance channels listed in Table 5 are presented in Appendix I. Conveyance channel survey data and photographs for 2009 are available on the accompanying data DVD.

Sediment Traps (Sediment Ponds and Rock Weirs)

Originally, the mitigation plan called for building sediment ponds designed to trap sediment while allowing water to exit the pond as a stream. Proposed monitoring consisted of repeated surveys of the ponds to determine changes in sediment accumulations over time as well as measuring the suspended sediment concentrations entering and exiting the pond in concentrated discharge. The combination of sediment accumulation in the pond plus the sediment exiting the pond in the outflow was considered to provide an estimate of total sediment transport. However, in the revised mitigation design for sediment ponds, the ponds are now designed as rock weirs capable of detaining all the water and sediment discharged from the road segment. The new monitoring strategy assumes that the rock weirs retain all the discharge long enough for the sediment to settle out, so that only water will percolate out of the rock weir through the porous berm. If that assumption is correct, measuring sediment accumulation in the rock weir will estimate total sediment movement. In the event the rock weir cannot retain all the storm flow delivered to it (actual discharge exceeds the design discharge or the

Table 5. Description of road treatments above conveyance channels, treatments for conveyance channels, and conveyance channel survey dates on Pikes Peak, 2009.

Site ID	Basin #	Watershed	Road Treatment	Channel Treatment	Survey Date
013CC	2	SKIC	Asphalt	Rock Weir	7/8/2009
016CC	2	NCRY	Asphalt	Culvert Plugged	6/30/2009
018CC	2	NCRY	Asphalt, Shotcrete Ditch	Untreated	7/23/2009
020CC	2	NCRY	Asphalt, Shotcrete Ditch	Culvert Plugged	7/22/2009
021CC	2	NCRY	Asphalt, Shotcrete Ditch	Culvert Plugged	7/22/2009
030CC	2	NCRY	Asphalt, Fabric Ditch	Rock Weir	6/26/2009
031CC	2	NCRY	Asphalt, Fabric Ditch	Rock Weir	6/26/2009
035CC	2	SKIC	Asphalt, Gravel	Rock Dissipaters	6/16/2009
037CC	7	NCRY	Gravel	Untreated	7/9/2009
040CC	1	Lower NCRY	Asphalt, Curb	Straw Logs	7/9/2009
058CC	7	SKIC	Gravel	Untreated	7/22/2009
063CC	7	SKIC	Gravel	Untreated	7/9/2009
066CC	7	SKIC	Gravel	Untreated	10/14/2009
070CC	7	SKIC	Gravel	Untreated	6/24/2009
089CC	3	GLEN	Asphalt	Rock Weir	6/24/2009
094CC	3	SKIC	Asphalt	Culvert Plugged	7/23/2009
099CC †	3	GLEN	Asphalt	Rock Weir	9/11/2009
104CC	6	WBVR	Gravel	Untreated	7/23/2009
108CC	4	FRENCH	Asphalt, Shotcrete Ditch	Rock Weir	8/21/2009
111CC	4	GLEN	Asphalt, Shotcrete Ditch	Rock Weir	8/12/2009
114CC	4	FRENCH	Asphalt, Shotcrete Ditch	Rock Weir	8/19/2009
118CC †	4	SKIC	Asphalt, Shotcrete Ditch	Rock Weir	10/19/2009
119CC	4	GLEN	Asphalt, Shotcrete Ditch	Rock Weir	8/5/2009
127CC	6	WBVR	Gravel	Untreated	7/23/2009
129CC	6	WBVR	Gravel	Untreated	7/14/2009
175CC	1	Lower NCRY	Asphalt, Curb	Rock Weir	6/30/2009
184CC	2	SKIC	Gravel, Recycled Asphalt, Shotcrete Ditch	Sediment Pond, Shotcrete Ditch	7/8/2009
211CC	2	SKIC	Asphalt, Shotcrete Ditch	Untreated	6/18/2009
216CC	1	Lower NCRY	Asphalt, Curb	Rock Weir	6/30/2009
217CC	1	Lower NCRY	Asphalt, Curb	Rock Weir	6/30/2009
220CC	1	Lower SKIC	Asphalt	Rock Weir	6/23/2009
221CC	1	Lower NCRY	Asphalt	Rock Weir	6/30/2009
222CC	1	Lower NCRY	Asphalt	Rock Weir	6/30/2009
223CC	1	Lower SKIC	Asphalt	Rock Weir	6/23/2009
224CC	2	NCRY	Asphalt, Asphalt Ditch	Rock Weir	6/24/2009
225CC	2	SKIC	Asphalt, Fabric Ditch	Rock Weir	7/2/2009
226CC	2	NCRY	Asphalt, Curb	Rock Weir	7/8/2009
228CC	2	SKIC	Asphalt	Rock Weir	7/8/2009
229CC	2	NCRY	Asphalt	Rock Weir	6/26/2009
230CC	2	NCRY	Asphalt	Rock Weir	6/26/2009
235CC	3	SVRY	Asphalt, Shotcrete Ditch	Rock Weir	7/23/2009
244CC	2	NCRY	Asphalt, Shotcrete Ditch	Untreated	6/25/2009
245CC	2	NCRY	Asphalt Road, Ditch, Erosion Ctrl Fabric	Untreated	7/6/2009

† Survey not completed due to instability of the site. Photographs taken and observations recorded in the field notebook.

rock weirs fail to function properly), silt fences have been installed on the downhill side of the rock weirs to measure sediment carried in surface discharge passing over or through the berm. A silt fence is preferred over an attempt to obtaining a discharge sample because any overflow or through flow that occurs is most likely to be diffused and not concentrated. The measurement protocol for these silt fences is the same as that employed for the cut and fill slope silt fences.

The field procedure for monitoring sediment accumulation in the rock weirs was modified in 2008 to simplify both instrument requirements for the survey and software requirements for subsequent data reduction and analysis as well as to allow for a more consistent comparison of volumetric change from survey to survey. A fixed area was defined and monumented within each rock weir to be surveyed each time, and compared form survey to survey or year to year.

Prior to 2008, the area surveyed within each rock weir had not been predefined. Although the criteria for selecting the area to be surveyed within each rock weir was well defined in the survey protocol, the area actually surveyed as well as the number and distribution of survey points within that area were not necessarily consistent from one survey to the next. Much was left to the discretion of the field crew. As part of each survey (spring, fall, and as needed during the summer), the field crew would identify areas of sediment accumulation within the rock weirs and, although virtually all of the rock weir area was surveyed, sampling points were concentrated in the vicinity of the areas of deposition and more widely spaced over the balance of the rock weir area. The survey capabilities of the Trimble Robotics Total Station, which is used for all surveying on the Pikes Peak Project, records the geospatially correct location of survey points for virtually any survey pattern, so utilizing a variable sampling scheme did not create a problem. In order to compensate for the variable distribution of survey points, an AutoCAD package was used to develop a 0.5 foot Digital Terrain Model (DTM) for the surface of the sediment pond. This provided a very high resolution measurement of the topographic variability in the survey data collected in the vicinity of active deposition without requiring similar resolution (and sample size) in areas perceived to have had little or no activity. This DTM could then be intersected with the DTM for earlier or subsequent surveys to obtain an estimate of volumetric change between surveys. The procedure called for any non-overlapping areas to be clipped from either survey as needed, and resulted in two overlapping surfaces of equal size. The volumetric difference between the two intersected surfaces represented the estimate of the volumetric change in sediment accumulation that occurred in the rock weir during the interval between surveys. Although valid, it became apparent that this protocol had several drawbacks specific to this study that included: 1) dependence on the Trimble Robotics Total Station, 2) risk of inconsistent survey data, and 3) dependence on an AutoCAD package and associated technical skills that may or may not be available in the future.

First, the choice of survey tools was limited to automated systems such as the Trimble Robotics Total Station, limiting alternative instrument choices while requiring a specific level of technical expertise in the field crew. Second, because the area to be surveyed within each rock weir had not been predefined, the perimeter of the DTM's for individual surveys were not necessarily identical when intersected. Therefore, the clipping process that became necessary introduced the risk of inconsistent or lost information. Fortunately, the field crew leader was the same for each year of monitoring up to 2007 so disparities in survey areas are in fact minimal. Lastly, the protocol required the use of an AutoCAD package to develop and intersect the three dimensional surfaces used to estimate sediment accumulation. This required software and technical skills not readily available within the project, requiring that the data reduction be outsourced to other consultants.

In 2008 the field procedures for surveying the rock weirs were modified. First, each rock weir was visited and the perimeter of the critical portion of the sediment accumulating pond was identified and monumented with rebar. These monumented locations were then referenced to the three benchmark locations (control points) already established for each rock weir. An attempt was made to define the area to be surveyed in rectangular form, but sometimes five or six sides were needed to most efficiently define the perimeter of the area of interest. In every case, the area selected for a given rock weir encompassed all the areas surveyed prior to 2008. It should be noted that all unstable areas identified to be within the rock weir were also included in the survey area to ensure that migration of material from one location within the rock weir to another were balanced out in the survey and not construed to be additions or losses in accumulation between surveys. Because the permanent survey area defined for each rock weir encompasses the area of every previous survey, no loss of historic data will occur.

After the survey perimeter was defined, one side was arbitrarily selected as the baseline for the survey. Depending on the size and shape of the rock weir area of interest, a rectangular survey grid system was established that originates from the baseline and uniformly and consistently covers the rock weir area. Survey lines initiate from the baseline at uniform intervals, and cross the rock weir perpendicular to the baseline, and extend to the opposite boundary line. Survey points along each line are also uniformly spaced. The spacing of both survey lines and survey points on a survey line vary with rock weir size. An example schematic for rock weir 008RW is shown in Figure 2. Lines located perpendicular to the baseline and survey points along the line may result in a 1 X 1, 1 X 2, 2 X 1, 2 X 2, or comparable survey grid depending on the area and shape of the rock weir. The objective was to locate several hundred survey points, uniformly distributed in each rock weir that would be revisited at each survey. This approach has several advantages over the original survey protocol. First, surveying using a fixed grid system allows obtaining a simple estimate of elevation of the rock weir area relative to the control points for each survey. Following this protocol is not particularly instrument specific, nor is data reduction as software or skill dependant as the initial protocol. Second, because the area to be surveyed is fixed, repeated measures allow for a more uniform comparison of volumetric change from survey to survey and surveys are not biased by field crew changes or interpretations.

Changing the survey protocol may result in some loss of resolution (sampling intensity) in the areas of most active accumulation. However, because the current rock weir area is

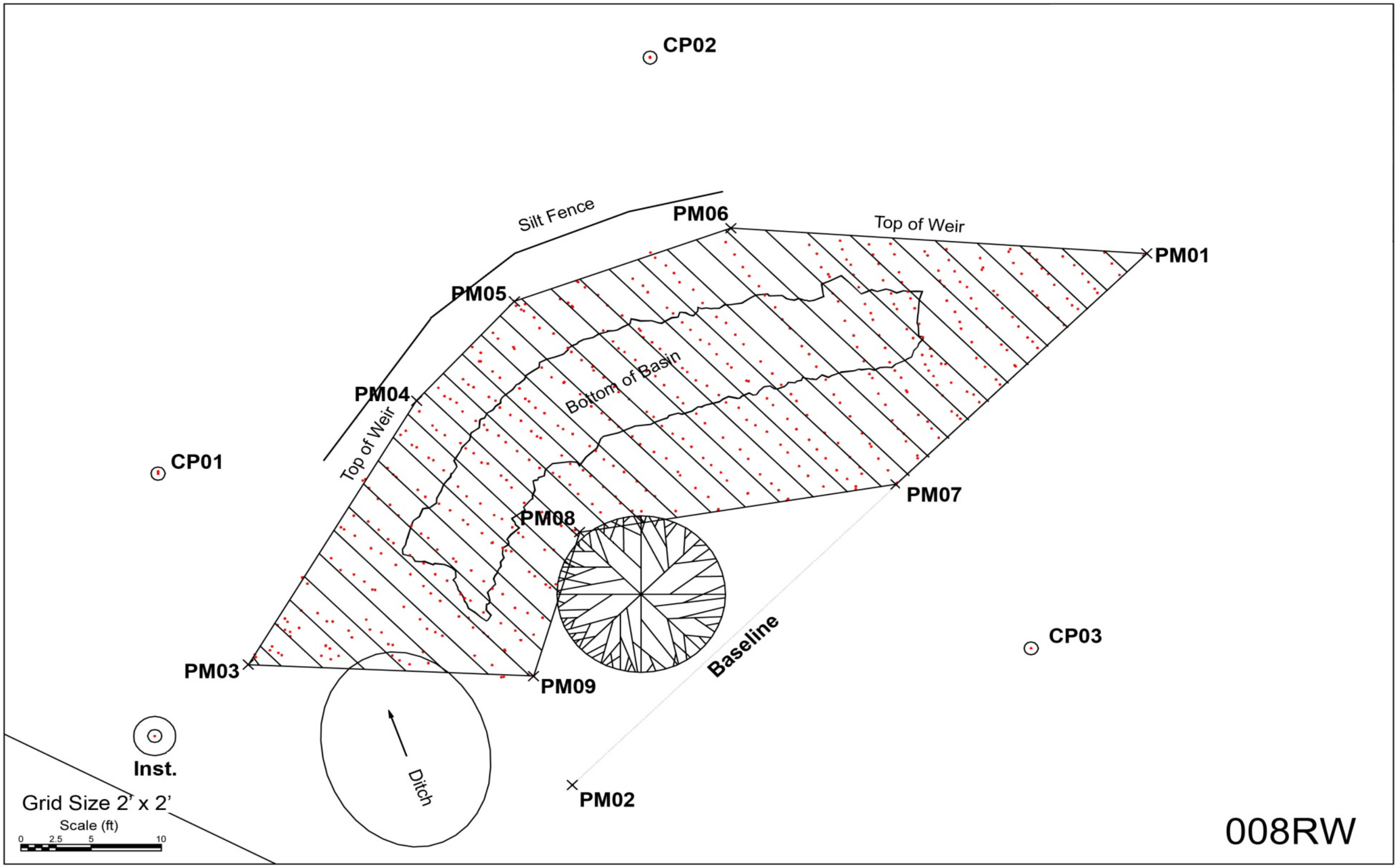


Figure 2. Schematic map of rock weir 008RW defining a fixed area, baseline, perimeter points and survey grid on Pikes Peak, 2008

fixed and the same approximate points will be surveyed each time, that loss should be minimal and offset by greater consistency from survey to survey. Changing the field procedure does not preclude the use of AutoCAD packages for data analysis. However, if an AutoCAD package is not used to process the data, the average elevation of the rock weir surface can be obtained by determining the average elevation of the survey points. The volumetric change between any two surveys can be estimated by multiplying the difference in the average geo-referenced elevations for the two surveys by the area of the rock weir.

As part of the process of changing a protocol, several quality control and quality assurance checks have been implemented as a means of better defining errors that might be associated with the survey procedure. The concerns were; 1) whether or not the initial survey grid system selected for each rock weir was adequate to define the average elevation of the surface, 2) whether or not observed discrepancies in the total number of points observed in the successive surveys of the same pond were significant, and 3) whether or not measurement error associated with defining the reference elevation used for the feature of interest caused a significant error. Two rock weirs (234RW and 243RW) were chosen for evaluation in 2008.

In order to assess whether or not the initial survey grid system selected for each rock weir was adequate to define the average elevation of the rock weir, the elevation of two rock weirs (234RW and 243RW) was estimated for two different surveys using all the survey points for each weir and again using half of the total survey points. With the possible exception of the survey for 234RW on June 14, 2008, the estimates of average elevation were quite consistent when based on either all or only half (every other) of the survey points (Table 6) implying that using a survey grid system is appropriate but may have some potential for introducing error.

Table 6. Change in elevation of the rock weirs as indexed by rock weirs 234RW and 243RW on Pikes Peak, 2008.

Rock Weir	Survey Date	Number of Survey Points	Average Elevation Based on all Points (ft)	Average Elevation Based on half the Points (ft)
234RW	6/14/2008	747	12,100.93	12,100.02
234RW	8/20/2008	652	12,100.14	12,100.14
243RW	7/16/2008	422	12,896.97	12,896.96
243RW	8/29/2008	451	12,896.90	12,896.88

In the case of 234RW, the two successive surveys imply a decrease in sediment accumulation occurred between June 14, and August 20, 2008. A decrease in rock weir elevation would imply a decrease in accumulation, if settling or scouring occurred during the interim between measurements. Settling, or a lowering of the surface elevation of the material in the weir, may occur as a result of compaction, organic matter decomposition, or subsequent scour and does represent a potential weakness in using volumetric changes in accumulation to estimate sediment volume. The discrepancy might also reflect survey error. In either case, the negative change reflects a resolution error in the measurement protocol, regardless of the cause. In 2009, in an attempt to further assess survey resolution, we evaluated how closely the elevation of the same rock weir is estimated by repeated surveys. Rock weir 003RW was chosen for evaluation and on June 12, 2009, two repeat surveys were completed on rock weir 003RW by two different field crew members and each of the two surveys were compared to a survey completed on September 26, 2008 (Table 7). The data for the survey of 003RW completed on September 26, 2008 was retrieved from the 2008 data set. Two separate surveys of 003RW were completed on June 12, 2009 by the two person crew. In each case, the instrument was setup and the survey of the rock weir was completed. The crew members alternated responsibility in setting up the instrument and conducting the survey. The intent of the repeated survey was to develop some insight into the degree that survey error, or variance, might play in the measurement of change in volume. The results shed some light on the overall resolution of the measurement protocol.

Table 7. Change in elevation of rock weir 003RW as indexed by successive surveys Pikes Peak, 2008 and 2009.

Survey	Rock Weir Area (sq ft)	Number of Points in Survey	Average Elevation of the points (ft)	Elevation Change between successive surveys (ft)	Volume Change (cu ft)
003RW_092608	521	318	8991.38		
003RW_061209_1	521	343	8991.22	-0.16	-83.36
003RW_061209_2	521	338	8991.30	-0.08	-41.68

First, as was the case for 243RW during the summer of 2008 (Table 6), the average elevation of 003RW decreased during the interval from September 26, 2008 to June 12, 2009 (Table 7). However, the estimated decrease, based on either elevation or volume, varied depending on which of the June 12, 2009 surveys were used as the basis for comparison. In this comparison, the estimate of change between fall and summer differed by 50 percent depending on which of the two 2009 surveys is used as the base for comparison. This finding provides some insight as to the relative resolution in the estimate of sediment accumulation that can be derived using this procedure.

The second observation that may contribute to error is the slight discrepancy that exists in the total number of survey points in each of the successive surveys of the same pond, even though the same survey grid was followed. For example, 318 points were surveyed in 003RW on September 26, 2008 while 343 points were surveyed on June 12, 2009 in survey 1 and 338 points were surveyed in survey 2. The reason for the discrepancy is not clear, other than possible survey error. Steps are being taken that will address this discrepancy before the 2010 field season, although there is no indication that this discrepancy affected the 2008/2009 survey comparisons.

As noted in earlier reports, there is an additional error in the surveys of the rock weirs (and all other surveys as well) that is associated with defining the reference benchmarks for each feature. The benchmarks are used to orient the Trimble Robotics Total Station as to the elevation and the geospatial location of the feature being surveyed. Field experience in the use of the Total Station indicates that the measurement error in defining the reference elevation for the feature of interest, based on the use of three benchmarks, is

0.01 feet or less. This error could contribute to some of the discrepancies observed in Table 6.

During the winter of 2009, several measures were taken to clearly define and reduce potential survey errors associated with the rock weirs. First, a detailed schematic map of each rock weir was developed that identifies and locates the optimal survey grid (Appendix J). This will assist the field crew in locating the control points, perimeter points, survey lines and points on the lines. Second, the DTMs for all previous surveys should be corrected to match the currently defined rock weir area so that there is no loss of historic data. As an example, rock weir 002RW was chosen for evaluation and the DTM's were corrected to determine fill volumes between the 2005/2006 and 2006/2007 sets of survey data points using the Carlson Software Civil Suite program running inside of AutoCAD 2007 (Appendix K). However, other survey software programs have similar functions that can be used.

As with the road surface erosion transects, the two sediment ponds are surveyed using a series of cross sections (labeled A–E for 199RW and labeled A-C for 234 RW) to estimate volumetric changes in sediment accumulation. In those few cases where there is a defined inflow and outflow to a pond, water samples to estimate trap efficiency can be grab sampled from the inlet and outlet of the ponds as originally planned. Surveys of the sediment traps should be completed after spring snowmelt and again after significant rainfall events, perhaps a total of four times per year. In addition, surveys taken before and after rock weir cleaning can be used to estimate the total volume or amount of material removed and this cumulative estimate can be used to verify appropriateness of the incremental surveys.

As noted above, any conveyance channels that appear to be present below the rock weirs are monitored. If the rock weirs fail, as some did in 2009, any changes in the conveyance channel geometry that may result will be documented. If the rock weirs are effective in reducing the erosive energy of the discharge, the reduction in erosion in the conveyance channels can be documented by comparing response in channels draining treated and untreated road segments.

In 2009, the highway crew completed construction of one of the two new sediment ponds in Basin 6 (East Fork and West Fork of Beaver Creek Watersheds), which will be included in the Monitoring Study in 2010 (personal communication with Jack Glavan, City of Colorado Springs, Capital Projects Manager). Twenty-eight sites were monitored in 2009, including 26 rock weirs and two sediment ponds. At these sites, the rock weirs were surveyed, and sediment volume was measured in the silt fences located down slope of the rock weirs (15 rock weirs have associated silt fences). The silt fence below rock weir 152RW was removed in 2009 as it contained only eroded berm material from the rock weir and organic material. The silt fence below rock weir 180RW was extended to capture sediment from a section of the rock weir that was exhibiting failure. Of the 28 sites, 19 demonstrated some degree of failure, where water and sediment were seen piping under or through the rock weir, the rock weir was overtopped, or the rock weir was breached. In addition, the silt fence below 008RW was breached. As noted earlier for silt fences on the cut and fill slopes, the data from the breached rock weirs or sediment fences may be an inaccurate estimate of total sediment production. Survey dates for the rock weirs and sediment ponds are presented in Table 8. Water has been diverted from 162RW by a sediment berm constructed by the Highway Department. The rock weir is full of sediment and will not be surveyed until cleaned-out by the Highway Department. A summary of rock weir silt fence site visits, and sediment accumulation in rock weir silt fences and the rock weirs for the 2009 monitoring season, as well as sediment pond cross sections from 2009 are presented in Appendix L.

Table 8. Description of management practices above sediment traps, and sediment trap survey dates on Pikes Peak, 2009.

Site ID	Basin #	Watershed	Management Practice	Survey Dates	
002RW	1	Lower SKIC	Untreated Ditch	6/15/2009	9/30/2009
003RW	1	Lower SKIC	Shotcrete Ditch	6/12/2009	9/24/2009
006RW	1	Lower SKIC	Erosion Control Fabric Ditch	6/12/2009	9/24/2009
008RW	1	Lower NCRY	Shotcrete Ditch	6/17/2009	10/14/2009
009RA	1	Lower SKIC	Erosion Control Fabric Ditch	6/11/2009	9/24/2009
152RW	2	SKIC	Erosion Control Fabric Ditch	6/15/2009	10/13/2009
153RW	2	SKIC	Erosion Control Fabric Ditch	6/15/2009	10/14/2009
161RW	2	NCRY	Asphalt Curb and Ditch	6/12/2009	9/25/2009
176RW	2	NCRY	Erosion Control Fabric Ditch	6/17/2009	10/14/2009
178RW	2	NCRY	Erosion Control Fabric Ditch	6/17/2009	10/14/2009
179RW	2	NCRY	Erosion Control Fabric Ditch	6/17/2009	10/14/2009
180RW	2	NCRY	Erosion Control Fabric Ditch	6/17/2009	10/13/2009
181RW	2	NCRY	Erosion Control Fabric Ditch	6/18/2009	10/13/2009
199RW	2	SKIC	Shotcrete Ditch	7/24/2009	
200RW	1	Lower NCRY	Asphalt Curb and Ditch	6/15/2009	10/14/2009
201RW	2	NCRY	Asphalt Curb and Ditch	6/12/2009	9/25/2009
202RW	2	SKIC	Erosion Control Fabric Ditch	6/11/2009	9/30/2009
233RW	3	GLEN	Shotcrete Ditch	6/25/2009	10/13/2009
234RW	3	SVRY	Shotcrete Ditch	9/18/2009	
236RW	3	SKIC	Shotcrete Ditch	9/2/2009	
237RW	3	SKIC	Shotcrete Ditch	7/24/2009	10/15/2009
238RW	3	SKIC	Shotcrete Ditch	9/11/2009	
239RW	3	FRENCH	Shotcrete Ditch	8/21/2009	
240RW	3	SKIC	Shotcrete Ditch	8/12/2009	
241RW	4	FRENCH	Shotcrete Ditch	8/19/2009	
242RW	4	SKIC	Shotcrete Ditch	7/24/2009	
243RW	4	SKIC	Shotcrete Ditch	8/5/2009	

The average elevations for the rock weir surfaces were obtained by determining the average elevation of the survey points. The volumetric change between the two surveys was then estimated by multiplying the difference in the average geo-referenced elevations for the two surveys by the area of the rock weir (Appendix L). As noted earlier, the negative values imply a decrease in estimate of sediment accumulation between two surveys. Sediment trap data and photographs for 2009 are available on the accompanying data DVD.

Grab samples of the sediment retained in both the rock weirs and silt fences below the weirs were collected each time the weirs were surveyed or the fences cleaned. As noted earlier, a subset of these grab samples was selected for analysis of particle size distribution. The balance of samples will be analyzed only if the variability in the particle size distribution of the subset of samples chosen for initial analysis warrants additional analysis. In addition, water samples to determine suspended sediment were collected from the inflow and outflow of the major sediment pond 199RW. Laboratory analyses for the 2008 and 2009 grab samples have been completed and a summary of particle size distributions and graphs are presented in Appendix M and on the accompanying data DVD. Laboratory analyses on the suspended sediment samples for the 2009 field season are also presented in Appendix M and on the accompanying data DVD.

VALIDATION MONITORING

Validating the effect of road restoration practices on aquatic, wetland, and riparian conditions is much more difficult than determining the effectiveness of mitigation practices in reducing erosion and sedimentation on site, or close to the highway. On-site response to the mitigation practices should be direct, dramatic, and occur in real time. Off-site response, such as in the channels, is likely to be much more diffused, less dramatic, cumulative in nature, and subject to changes elsewhere in the watershed, all of which make validation of response to site specific mitigation difficult. The watersheds of concern have been subject to road related impacts that have been ongoing for over 80 years. The existing degradation is the aggregate result of long-term road related discharge and sediment pulses. The interruption of those pulses as a result of road rehabilitation might be too insignificant to be detectable in the near term, therefore creating a challenge in selecting the most appropriate indicator metric.

The scale chosen for validation monitoring is that of the stream channel reach. Within each stream reach selected, channel morphology, bed and bank particle size distribution, bank erosion, and vegetation diversity is monitored and characterized. A suite of tributaries in the Pikes Peak Watershed has been identified as either impacted or non-impacted by the presence and maintenance of the Pikes Peak Highway. North Catamount, South Catamount, Glen Cove, Oil, and Boehmer Creeks represent non-impacted streams. Ski, Severy, East Fork of Beaver, North Fork of Crystal, and West Fork of Beaver Creeks are all considered stream systems impacted by the highway. Stream reaches have been selected in each of the ten streams, and periodic monitoring will be conducted in each stream reach for the entire 15 year study period. Oil Creek has only one monitored stream reach because upper reaches of the stream are on private land. Glen Cove Creek also has only one stream reach because it is a tributary of South Catamount Creek which has three stream reaches. All other streams have two stream reaches. This will result in more pre-treatment data for some stream reaches and more post-treatment data in others, depending on the timing of road mitigation in the watersheds contributing to each of the streams. Because response can be expected to be gradual, it is not necessary that all streams be measured every year.

The monitoring design assumes that stream channel adjustments that occur in the impacted stream reaches after road mitigation practices will not occur on the reference stream reaches (those not influenced by the highway or subsequent mitigation practices). However, this does not imply that differences that may have existed at the start of the monitoring program between the four reference and the five impaired stream systems were the result of road related impacts. Rather, any long-term trends in convergence or divergence in the comparison of conditions in the impacted and the control stream reaches following road mitigation will be evaluated as potential indicators of response to mitigation.

The techniques proposed by Harrelson et al. (1994) are used to establish the stream channel reference sites. Selected stream reaches are at least 100 meters in length and contain several meander lengths or riffle-pool-riffle complexes when present. In 2005, two additional sites were established in response to the diversion wall built on Ski Creek to divert all alpine runoff into Glen Cove Creek. Glen Cove Creek is a tributary to South Catamount Creek, and enters upstream from the two reference stream reaches on South Catamount Creek. The diversion on Ski Creek will increase discharges into both Glen Cove and South Catamount creeks. The additional monitoring sites are located just above the confluence on each of the streams and are named GLEN1 and SCAT3, respectively, and are intended to characterize the impact of the diverted water.

Stream Channel Cross Sections

Five channel cross sections have been located and permanently referenced in each of the stream reaches, following the selection and installation criteria in Harrelson et al. (1994). The purpose for the cross sections is to document changes in channel cross sectional geometry that may occur over time. Five cross sections in a 100 meter stream reach should be adequate to provide an indication of change in channel cross section geometry, should it occur naturally or as the consequence of mitigation. In addition to the cross sections, longitudinal surveys of the channel thalweg through the stream reach are conducted to document surface water and thalweg slope and location (Harrelson et al. 1994). Over time, changes in geometry such as width to depth ratios in the cross sections, thalweg elevation and location in the floodplain, longitudinal profile, or channel gradient may reflect a response to road mitigation impacts on sediment supply or discharge energy when compared to responses in the control reaches. If possible, cross sections should be surveyed each fall so that changes in channel geometry can be documented on an annual basis. Because it can be expected that channel responses to the road mitigation practices will not be as robust as other metrics, it is not critical that each stream be surveyed each year.

Stream survey cross sections were completed on Boehmer Creek, East Fork of Beaver Creek, Glen Cove Creek, North Catamount Creek, North Fork of Crystal Creek, Oil Creek, South Catamount Creek, Ski Creek, Severy Creek, and West Fork of Beaver Creek. The stream surveys did not include bank erosion surveys, or planview surveys. Stream channel cross sections from the 2009 monitoring season can be found in Appendix N. Stream channel cross section and thalweg survey data for 2009 are available on the accompanying data DVD.

Bank Erosion

Bank erosion is being documented through the channel cross section surveys. If the channel is actively down cutting or migrating laterally, the change is an index of bank erosion. Additional bed and bank features are also displayed in a map of the stream reach (Harrelson et al., 1994) and through the use of permanent photo points. In each stream reach, measuring and comparing the lengths of bank that are stable versus lengths of bank that are actively eroding also provides an index of the proportion of eroding banks. If the stream reach contains areas of significant bank erosion, bank pins will be installed to measure the lateral rate of erosion. Installation of such pins is only warranted if erosion appears to be active and severe in certain locations within the stream reach or if the onset of bank erosion begins to occur during the monitoring period. Over the long-term, the five cross sections located within a 100 meter stream reach should index channel and bank stability by documenting changes in channel geometry and location. Secondary measures such as thalweg surveys and bank erosion monitoring should help document any further change.

In 2009, measurements specific to bank erosion consisted of channel cross section surveys, thalweg surveys, and photographic documentation. Visual indications were that bank erosion was not significant enough to warrant installation of bank pins to measure the lateral rate of erosion.

Particle Size Distribution

Assuming that road mitigation practices are effective in reducing discharge energy and sediment delivery to the channel system, and that no offsetting responses occur, the percentage of fine particles in the stream channel bed can be expected to decrease over time. A greater percentage of the stream bed is likely to be composed of larger particles as the fine particles are winnowed out and not replaced. The composition of the sediment trapped behind silt fences, and deposited in rock weirs and in bars on the stream reaches is assessed through the collection of grab samples and analyzed in the laboratory for particle size distribution. Comparing the particle size distribution in material captured in traps near the highway with sediment deposits (bars) in the streams and pebble counts taken in the stream channel should validate response to highway mitigation practices.

Pebble Counts

Pebble counts in each stream reach are conducted during each survey using the Bevenger and King Pebble Count Procedure (Bevenger and King, 1995). The procedure calls for a zigzag sampling pattern that passes through the stream reach, crossing from bank to bank. Three hundred particles are sampled in each survey and one survey per field season is completed in each of the stream reaches. To help support this aspect of the validation monitoring, the particle size distribution of the material caught in silt fences and in the rock weir sediment traps is available for comparison to the bed material in the streams.

Stream pebble counts were completed on Boehmer Creek, East Fork of Beaver Creek, Glen Cove Creek, North Catamount Creek, North Fork of Crystal Creek, Oil Creek, South Catamount Creek, Ski Creek, Severy Creek and West Fork of Beaver Creek. A summary of the stream channel particle size distribution from the pebble counts is presented in Table 9. Stream pebble count particle size distribution graphs from the 2009 monitoring season can be found in Appendix O and on the accompanying data DVD.

Grab Samples

Sediment grab samples were collected from bars at Boehmer Creek, East Fork of Beaver Creek, Glen Cove Creek, North Catamount Creek, North Fork of Crystal Creek, Oil Creek, South Catamount Creek, Ski Creek, Severy Creek and West Fork of Beaver

Creek. Comparing the distribution of material captured in traps near the highway to sediment deposits (bars) in the streams might be useful in validating response to highway mitigation practices.

Because laboratory analyses for particle size distribution of stream bar samples for 2008 were not completed at the time of last year's report, they have been included in the 2009 Annual Report. A summary of stream channel particle size distributions of bar samples and graphs for 2008 and 2009 is presented in Appendix P and on the accompanying data DVD.

Table 9. Summary of particle size distribution of pebble counts in stream channels on Pikes Peak, 2009.

Site Name	Site ID	Date	Particle Size Distribution					
			D15	D35	D50	D84	D95	D100
Boehmer Creek Reach 1	BHMR1	8/30/2009	0.184	2.071	4.411	18.627	66.648	175.0
Boehmer Creek Reach 2	BHMR2	8/29/2009	1.439	4.540	10.744	91.256	162.155	350.0
East Fork Beaver Creek Reach 1	EBVR1	8/30/2009	2.048	6.385	9.158	20.042	39.192	360.0
East Fork Beaver Creek Reach 2	EBVR2	8/30/2009	1.613	3.605	6.169	14.702	24.000	80.0
Glen Cove Reach 1	GLEN1	8/23/2009	2.114	8.619	12.418	30.294	114.087	350.0
North Catamount Creek Reach 1	NCAT1	8/16/2009	1.177	3.235	5.154	12.711	22.814	44.0
North Catamount Creek Reach 2	NCAT2	8/16/2009	2.308	4.452	6.240	12.413	17.119	18.0
North Fork Crystal Creek Reach 1	NCRY1	9/20/2009	2.357	5.396	7.268	16.375	24.000	65.0
North Fork Crystal Creek Reach 2	NCRY2	9/20/2009	2.089	4.736	6.835	15.836	21.635	29.0
Oil Creek Reach 1	OILC1	9/5/2009	1.665	4.819	7.512	26.647	50.014	320.0
South Catamount Creek Reach 1	SCAT1	9/20/2009	0.746	3.614	6.447	21.067	45.886	120.0
South Catamount Creek Reach 2	SCAT2	8/23/2009	2.438	6.072	7.952	23.434	78.384	310.0
South Catamount Creek Reach 3	SCAT3	8/23/2009	1.803	5.642	7.705	14.364	21.424	208.0
Ski Creek Reach 1	SKIC1	8/16/2009	0.920	4.606	6.649	13.335	21.571	42.0
Ski Creek Reach 2	SKIC2	7/25/2009	2.000	7.072	10.537	25.179	96.000	205.0
Severy Creek Reach 1	SVRY1	9/27/2009	0.094	0.230	1.859	7.773	15.587	170.0
Severy Creek Reach 2	SVRY2	9/27/2009	1.250	2.828	5.899	30.935	61.004	165.0
West Fork Beaver Creek Reach 1	WBVR1	9/5/2009	3.281	7.604	11.122	61.004	256.000	700.0
West Fork Beaver Creek Reach 2	WBVR2	8/1/2009	2.122	5.533	7.737	19.494	30.796	82.0

Vegetation

Vegetation photo points established at the top of the left and right banks (facing downstream) at each cross section have been monumented and are intended to document changes in vegetation type, density, and percent cover over time as riparian and wetland areas recover (Hall 2002). Vegetation is grouped into general categories of moss, grass, sedge, forb, or shrub to document vegetation presence. Percent cover is estimated for the top of bank area 1.5 feet on either side of the center line of the cross section. This monitoring is not intended to determine the degree of departure that current conditions might reflect relative to a reference value. Monitoring will document the evolution or transition that occurs as the disturbed streams respond to the effects of road mitigation and will allow for comparison of any trends to those that occur in the control stream reaches.

The riparian vegetation summary from the 2009 monitoring season is presented in Appendix Q. Vegetation data and photographs from 2009 are available on the accompanying data DVD.

SUMMARY

Meteorologically, 2009 was a relatively uneventful season allowing time for more routine monitoring and maintenance as well as more thorough quality assurance and quality control assessments. As a result, minor but important changes were made to some of the monitoring procedures. A total of 140 features were monitored during the 2009 field season, many of which were visited more than once.

The field procedure for monitoring sediment accumulation in the rock weirs was modified in 2008 to simplify both instrument requirements for the survey and software requirements for subsequent data reduction and analysis as well as to allow for a more consistent comparison of volumetric change from survey to survey. A fixed area was defined and monumented within each rock weir to be surveyed each time, and compared form survey to survey or year to year. In 2009, the changes were more completely documented and a more thorough error analysis completed.

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Appendix A

Site Locations for Effectiveness and Validation Monitoring

2009

Site Locations for Effectiveness and Validation Monitoring on Pikes Peak, 2009 †

Site ID	Latitude (hddd°mm.mmm)	Longitude (hddd°mm.mmm)	Altitude (ft)	Feature Description
001FS	N38 55.211	W105 02.238	9410	Fill Slope
002RW	N38 55.224	W105 02.264	9410	Rock Weir/Apron
003RW	N38 55.200	W105 02.258	9416	Rock Weir/Apron
004CC	N38 55.132	W105 02.278	9431	Conveyance Channel
005DD	N38 55.087	W105 02.415	9447	Drainage Ditch
006RW	N38 55.109	W105 02.482	9415	Rock Weir/Apron
007FS	N38 55.094	W105 02.520	9414	Fill Slope
008RW	N38 55.075	W105 02.554	9417	Rock Weir/Apron
009RA	N38 55.046	W105 02.655	9443	Rock Weir/Apron
010DD	N38 54.907	W105 02.734	9457	Drainage Ditch
011CS	N38 54.909	W105 02.730	9459	Cut Slope
012CC	N38 54.748	W105 03.060	9528	Conveyance Channel
013CC	N38 54.730	W105 03.068	9525	Conveyance Channel
014CC	N38 54.691	W105 03.089	9519	Conveyance Channel
015CC	N38 54.603	W105 03.174	9547	Conveyance Channel
016CC	N38 54.602	W105 03.111	9525	Conveyance Channel
017CC	N38 54.510	W105 03.246	9565	Conveyance Channel
018CC	N38 54.472	W105 03.298	9576	Conveyance Channel
019CC	N38 54.457	W105 03.384	9599	Conveyance Channel
020CC	N38 54.345	W105 03.383	9637	Conveyance Channel
021CC	N38 54.299	W105 03.461	9668	Conveyance Channel
022CC	N38 54.288	W105 03.552	9692	Conveyance Channel
023CC	N38 54.272	W105 03.583	9701	Conveyance Channel
024CC	N38 54.289	W105 03.638	9715	Conveyance Channel
025CC	N38 54.258	W105 03.697	9744	Conveyance Channel
026CC	N38 54.232	W105 03.643	9752	Conveyance Channel
027CC	N38 54.183	W105 03.652	9771	Conveyance Channel
028CC	N38 54.149	W105 03.714	9818	Conveyance Channel
029CC	N38 54.145	W105 03.816	9856	Conveyance Channel
030CC	N38 54.134	W105 03.828	9855	Conveyance Channel
031CC	N38 54.130	W105 03.829	9861	Conveyance Channel
032CC	N38 54.159	W105 03.836	9858	Conveyance Channel
033CC	N38 54.106	W105 03.854	9886	Conveyance Channel
034CC	N38 54.037	W105 03.896	9940	Conveyance Channel
035CC	N38 53.909	W105 04.000	10060	Conveyance Channel
036CC	N38 53.866	W105 03.875	10126	Conveyance Channel
037CC	N38 53.821	W105 03.855	10217	Conveyance Channel
038CC	N38 53.759	W105 03.787	10254	Conveyance Channel
039FS	N38 54.910	W105 02.812	9455	Fill Slope
040CC	N38 54.914	W105 02.789	9464	Conveyance Channel
041CP	N38 53.807	W105 03.893	10072	Road Survey Control Point
042DD	N38 53.719	W105 03.746	10161	Drainage Ditch
043FS	N38 53.726	W105 03.764	10180	Fill Slope
044RX	N38 53.726	W105 03.763	10183	Road Cross Section

Site ID	Latitude (hddd°mm.mmm)	Longitude (hddd°mm.mmm)	Altitude (ft)	Feature Description
045CS	N38 53.657	W105 03.868	10266	Cut Slope
046DD	N38 53.658	W105 03.868	10268	Drainage Ditch
047RX	N38 53.658	W105 03.868	10268	Road Cross Section
048FS	N38 53.651	W105 03.880	10275	Fill Slope
049CS	N38 53.592	W105 04.020	10406	Cut Slope
050RX	N38 53.593	W105 04.020	10404	Road Cross Section
051DD	N38 53.593	W105 04.021	10397	Drainage Ditch
052FS	N38 53.593	W105 04.021	10401	Fill Slope
053CC	N38 53.560	W105 04.127	10478	Conveyance Channel
054CC	N38 53.579	W105 04.148	10448	Conveyance Channel
055FS	N38 53.612	W105 04.095	10445	Fill Slope
056RX	N38 53.614	W105 04.096	10442	Road Cross Section
057DD	N38 53.613	W105 04.095	10445	Drainage Ditch
058CC	N38 53.513	W105 04.057	10512	Conveyance Channel
059CS	N38 53.353	W105 04.222	10697	Cut Slope
060RX	N38 53.354	W105 04.219	10691	Road Cross Section
061DD	N38 53.221	W105 04.381	10808	Drainage Ditch
062RX	N38 53.216	W105 04.381	10805	Road Cross Section
063CC	N38 53.223	W105 04.394	10803	Conveyance Channel
064CC	N38 53.448	W105 04.155	10634	Conveyance Channel
065CC	N38 53.382	W105 04.192	10679	Conveyance Channel
066CC	N38 53.336	W105 04.243	10701	Conveyance Channel
067CC	N38 53.297	W105 04.299	10736	Conveyance Channel
068CC	N38 53.251	W105 04.305	10841	Conveyance Channel
069CC	N38 53.019	W105 04.287	10989	Conveyance Channel
070CC	N38 52.956	W105 04.276	11028	Conveyance Channel
071DD	N38 52.972	W105 04.285	11017	Drainage Ditch
072RX	N38 52.972	W105 04.285	11015	Road Cross Section
073ST	N38 52.879	W105 04.311	11062	Sediment Trap
074FS	N38 52.927	W105 04.272	11053	Fill Slope
075RG	N38 53.797	W105 03.890	10109	Precipitation Gauge
076RG	N38 52.582	W105 03.970	11810	Precipitation Gauge
077RG	N38 51.783	W105 03.999	13069	Precipitation Gauge
078CS	N38 53.331	W105 04.275	10478	Cut Slope
079FS	N38 52.882	W105 04.382	11254	Fill Slope
080DD	N38 52.865	W105 04.391	11256	Drainage Ditch
081CC	N38 52.943	W105 04.415	11194	Conveyance Channel
082DD	N38 52.787	W105 04.376	11284	Drainage Ditch
083FS	N38 52.777	W105 04.362	11288	Fill Slope
084CC	N38 52.796	W105 04.471	11360	Conveyance Channel
085DD	N38 52.786	W105 04.410	11313	Drainage Ditch
086FS	N38 52.602	W105 04.390	11447	Fill Slope
087CS	N38 52.435	W105 04.432	11542	Cut Slope
088FS	N38 52.388	W105 04.549	11590	Fill Slope
089CC	N38 52.391	W105 04.555	11580	Conveyance Channel
090CS	N38 52.366	W105 04.540	11604	Cut Slope

Site ID	Latitude (hddd°mm.mmm)	Longitude (hddd°mm.mmm)	Altitude (ft)	Feature Description
091CC	N38 52.402	W105 04.414	11643	Conveyance Channel
092DD	N38 52.432	W105 04.204	11781	Drainage Ditch
093FS	N38 52.399	W105 04.401	11642	Fill Slope
094CC	N38 52.540	W105 04.069	11873	Conveyance Channel
095CC	N38 52.452	W105 04.205	11787	Conveyance Channel
096CC	N38 52.379	W105 04.217	11746	Conveyance Channel
097CC	N38 52.381	W105 04.310	11678	Conveyance Channel
098FS	N38 52.265	W105 03.995	12242	Fill Slope
099CC	N38 52.131	W105 04.046	12319	Conveyance Channel
100CC	N38 52.133	W105 03.936	12353	Conveyance Channel
101FS	N38 52.097	W105 03.875	12390	Fill Slope
102CS	N38 51.641	W105 04.063	12963	Cut Slope
103FS	N38 51.491	W105 04.021	12950	Fill Slope
104CC	N38 51.444	W105 03.894	12923	Conveyance Channel
105FS	N38 51.062	W105 03.694	13083	Fill Slope
106CC	N38 52.082	W105 03.858	12251	Conveyance Channel
107DD	N38 52.044	W105 03.824	12312	Drainage Ditch
108CC	N38 51.994	W105 03.769	12362	Conveyance Channel
109CC	N38 52.027	W105 03.825	12393	Conveyance Channel
110CC	N38 52.062	W105 03.914	12448	Conveyance Channel
111CC	N38 52.051	W105 03.992	12511	Conveyance Channel
112CC	N38 52.049	W105 03.933	12531	Conveyance Channel
113CC	N38 52.002	W105 03.873	12577	Conveyance Channel
114CC	N38 51.956	W105 03.840	12601	Conveyance Channel
115CC	N38 51.977	W105 03.995	12692	Conveyance Channel
116CC	N38 51.940	W105 04.080	12736	Conveyance Channel
117CC	N38 51.925	W105 04.141	12777	Conveyance Channel
118CC	N38 51.912	W105 04.177	12797	Conveyance Channel
119CC	N38 51.914	W105 04.032	12850	Conveyance Channel
120CC	N38 51.823	W105 04.090	12876	Conveyance Channel
121CC	N38 51.439	W105 03.804	12877	Conveyance Channel
122CC	N38 51.347	W105 03.789	12920	Conveyance Channel
123CS	N38 51.361	W105 03.782	12920	Cut Slope
124FS	N38 51.362	W105 03.788	12931	Fill Slope
125CC	N38 51.238	W105 03.806	12986	Conveyance Channel
126CC	N38 51.158	W105 03.789	13031	Conveyance Channel
127CC	N38 51.032	W105 03.697	13064	Conveyance Channel
128FS	N38 50.930	W105 03.732	13072	Fill Slope
129CC	N38 50.897	W105 03.662	13068	Conveyance Channel
130CC	N38 50.900	W105 03.177	13183	Conveyance Channel
131CC	N38 50.940	W105 03.382	13088	Conveyance Channel
132CC	N38 50.840	W105 03.274	13217	Conveyance Channel
133CC	N38 50.768	W105 03.213	13282	Conveyance Channel
134CC	N38 50.671	W105 03.035	13401	Conveyance Channel
135CC	N38 50.285	W105 02.872	13677	Conveyance Channel
136CC	N38 50.299	W105 02.931	13624	Conveyance Channel

Site ID	Latitude (hddd°mm.mmm)	Longitude (hddd°mm.mmm)	Altitude (ft)	Feature Description
137CC	N38 50.260	W105 02.755	13733	Conveyance Channel
138CC	N38 50.221	W105 02.605	13805	Conveyance Channel
139CC	N38 50.774	W105 03.110	13370	Conveyance Channel
140CC	N38 50.730	W105 03.195	13327	Conveyance Channel
141CS	N38 51.043	W105 03.690	13103	Cut Slope
152RW	N38 54.912	W105 02.837	9444	Rock Weir/Apron
153RW	N38 54.741	W105 03.066	9457	Rock Weir/Apron
154RX	N38 52.040	W105 03.817	12112	Road Cross Section
155DD	N38 51.245	W105 03.803	12917	Drainage Ditch
156RX	N38 51.244	W105 03.799	12922	Road Cross Section
157DD	N38 51.074	W105 03.684	13100	Drainage Ditch
158RX	N38 51.074	W105 03.683	13099	Road Cross Section
159DD	N38 51.610	W105 04.072	13091	Drainage Ditch
160RX	N38 51.611	W105 04.072	13066	Road Cross Section
161RW	N38 54.720	W105 03.055	9516	Rock Weir/Apron
162RW	N38 54.887	W105 02.854	9518	Rock Weir/Apron
163RA	N38 54.665	W105 03.115	9528	Rock Weir/Apron
175CC	N38 55.104	W105 02.532	9437	Conveyance Channel
176RW	N38 54.146	W105 03.795	9838	Rock Weir
177FS	N38 55.302	W105 02.224	9323	Fill Slope
178RW	N38 54.142	W105 03.821	9839	Rock Weir
179RW	N38 54.127	W105 03.852	9851	Rock Weir
180RW	N38 54.055	W105 03.903	9906	Rock Weir
181RW	N38 54.025	W105 03.918	9919	Rock Weir
182DD	N38 54.895	W105 02.860	9430	Drainage Ditch
183FS	N38 54.675	W105 03.109	9453	Fill Slope
184CC	N38 54.708	W105 03.363	9308	Conveyance Channel
185CS	N38 54.536	W105 03.246	9532	Cut Slope
186FS	N38 54.524	W105 03.242	9538	Fill Slope
187FS	N38 54.281	W105 03.658	9711	Fill Slope
188DD	N38 54.075	W105 03.892	9894	Drainage Ditch
189CC	N38 54.073	W105 03.886	9887	Conveyance Channel
190CC	N38 54.095	W105 03.869	9871	Conveyance Channel
191CC	N38 54.117	W105 03.854	9855	Conveyance Channel
192CS	N38 54.183	W105 03.677	9786	Cut Slope
193FS	N38 54.821	W105 02.983	9507	Fill Slope
194FS	N38 54.811	W105 03.004	9506	Fill Slope
195DD	N38 54.827	W105 02.983	9505	Drainage Ditch
196FS	N38 54.872	W105 02.900	9497	Fill Slope
197CS	N38 54.364	W105 03.383	9640	Cut Slope
198FS	N38 54.497	W105 03.254	9560	Fill Slope
199RW	N38 54.688	W105 03.389	9326	Sediment Pond
200RW	N38 55.261	W105 02.246	9418	Rock Weir
201RW	N38 54.805	W105 03.021	9522	Rock Weir
202RW	N38 54.619	W105 03.132	9450	Rock Weir
203FS	N38 54.603	W105 03.139	9517	Fill Slope

Site ID	Latitude (hddd°mm.mmm)	Longitude (hddd°mm.mmm)	Altitude (ft)	Feature Description
204FS	N38 54.273	W105 03.572	9707	Fill Slope
205DD	N38 54.022	W105 03.927	9983	Drainage Ditch
206CC	N38 54.689	W105 03.097	9506	Conveyance Channel
207CC	N38 51.664	W105 04.062	12962	Conveyance Channel
208CC	N38 52.754	W105 04.445	11172	Conveyance Channel
209CC	N38 52.647	W105 04.411	11365	Conveyance Channel
210CC	N38 54.059	W105 03.916	9849	Conveyance Channel
211CC	N38 54.130	W105 03.844	9853	Conveyance Channel
212CC	N38 53.149	W105 04.311	10893	Conveyance Channel
213CC	N38 50.964	W105 03.391	13046	Conveyance Channel
214CC	N38 50.234	W105 02.661	13198	Conveyance Channel
215CC	N38 50.356	W105 02.792	13375	Conveyance Channel
216CC	N38 55.263	W105 02.236	9289	Conveyance Channel
217CC	N38 55.255	W105 02.232	9284	Conveyance Channel
218CC	N38 55.226	W105 02.268	9359	Conveyance Channel
219CC	N38 55.202	W105 02.262	9371	Conveyance Channel
220CC	N38 55.108	W105 02.482	9411	Conveyance Channel
221CC	N38 55.107	W105 02.482	9305	Conveyance Channel
222CC	N38 55.070	W105 02.554	9319	Conveyance Channel
223CC	N38 55.048	W105 02.657	9394	Conveyance Channel
224CC	N38 54.878	W105 02.852	9493	Conveyance Channel
225CC	N38 54.917	W105 02.840	9441	Conveyance Channel
226CC	N38 54.796	W105 03.010	9431	Conveyance Channel
227CC	N38 54.706	W105 03.053	9480	Conveyance Channel
228CC	N38 54.746	W105 03.078	9431	Conveyance Channel
229CC	N38 54.140	W105 03.788	9774	Conveyance Channel
230CC	N38 54.028	W105 03.912	9902	Conveyance Channel
231CC	N38 54.050	W105 03.908	9910	Conveyance Channel
232CC	N38 52.583	W105 04.557	11399	Conveyance Channel
233RW	N38 52.383	W105 04.560	11074	Rock Weir
234RW	N38 52.502	W105 03.924	11915	Rock Weir
235CC	N38 52.504	W105 03.920	11928	Conveyance Channel
236RW	N38 52.185	W105 04.066	12177	Rock Weir
237RW	N38 52.398	W105 04.393	11219	Sediment Pond
238RW	N38 52.131	W105 04.048	12340	Rock Weir
239RW	N38 52.008	W105 03.774	12517	Rock Weir
240RW	N38 52.048	W105 03.990	12644	Rock Weir
241RW	N38 51.976	W105 03.834	12686	Rock Weir
242RW	N38 51.903	W105 04.176	12851	Rock Weir
243RW	N38 51.919	W105 04.043	12900	Rock Weir
244CC	N38 54.487	W105 03.232	9569	Conveyance Channel
245CC	N38 54.872	W105 02.900	9497	Conveyance Channel
BHMR1	N38 48.951	W105 03.040	11885	Boehmer Creek 1
BHMR2	N38 49.061	W105 03.027	11995	Boehmer Creek 2
EBVR1	N38 49.832	W105 03.612	12156	East Fork Beaver Creek 1
EBVR2	N38 49.907	W105 03.598	12190	East Fork Beaver Creek 2

Site ID	Latitude (hddd°mm.mmm)	Longitude (hddd°mm.mmm)	Altitude (ft)	Feature Description
GLEN1	N38 54.457	W105 04.690	9519	Glen Cove Creek 1
NCAT1	N38 54.746	W105 05.994	9415	North Catamount Creek 1
NCAT2	N38 54.402	W105 06.106	9519	North Catamount Creek 2
NCRY1∞	N38 54.418	W105 03.199	9453	North Fork Crystal Creek 1 & 2
OILC1	N38 48.449	W105 06.511	10505	Oil Creek 1
SCAT1	N38 55.035	W105 04.112	9368	South Catamount Creek 1
SCAT2	N38 54.974	W105 04.181	9345	South Catamount Creek 2
SCAT3	N38 54.316	W105 04.899	9412	South Catamount Creek 3
SKIC1	N38 54.975	W105 04.078	9418	Ski Creek 1
SKIC2	N38 53.767	W105 03.987	10035	Ski Creek 2
SVRY1	N38 52.467	W105 03.039	10732	Severy Creek 1
SVRY2	N38 52.472	W105 03.339	10926	Severy Creek 2
WBVR1	N38 48.181	W105 05.710	10726	West Fork Beaver Creek 1
WBVR2	N38 48.349	W105 05.591	10698	West Fork Beaver Creek 2

† Not all sites were sampled during the 2009 field season.
∞ North Fork Crystal Creek Reach 2 (NCRY2) is located 200 ft upstream from NCRY1.

Appendix B

Daily Precipitation

2009

Daily Precipitation for Rain Gauges on Pikes Peak, 2009

Date	075RG (Altitude 10,109') Precipitation (in)	076RG (Altitude 11,810') Precipitation (in)
5/5/2009	0.02	0.05
5/6/2009	0	0
5/7/2009	0	0
5/8/2009	0	0
5/9/2009	0	0
5/10/2009	0	0
5/11/2009	0.02	0
5/12/2009	0	0
5/13/2009	0	0
5/14/2009	0	0
5/15/2009	0.02	0
5/16/2009	0	0.02
5/17/2009	0	0
5/18/2009	0.09	0.12
5/19/2009	0	0
5/20/2009	0	0
5/21/2009	0.49	0.34
5/22/2009	0.39	0.5
5/23/2009	0.46	0.73
5/24/2009	0.11	0.14
5/25/2009	0.1	0.06
5/26/2009	0.99	0.7
5/27/2009	0.14	0.06
5/28/2009	0	0
5/29/2009	0	0
5/30/2009	0	0.06
5/31/2009	0.01	0
6/1/2009	0	0.55
6/2/2009	0	1.04
6/3/2009	0	0.02
6/4/2009	0.01	0.01
6/5/2009	0	0
6/6/2009	0	0
6/7/2009	0	0
6/8/2009	0	0
6/9/2009	0.02	0.03
6/10/2009	0.1	0.14
6/11/2009	0.08	0.13
6/12/2009	0.16	0.22
6/13/2009	0.44	0.07
6/14/2009	0.05	0.53
6/15/2009	0.05	0.06
6/16/2009	0.02	0
6/17/2009	0	0

Date	075RG (Altitude 10,109’) Precipitation (in)	076RG (Altitude 11,810’) Precipitation (in)
6/18/2009	0	0
6/19/2009	0	0
6/20/2009	0.26	0.41
6/21/2009	0	0
6/22/2009	0	0
6/23/2009	0.02	0.03
6/24/2009	0	0
6/25/2009	0.01	0.03
6/26/2009	0.18	0.22
6/27/2009	0.42	0.18
6/28/2009	0.07	0.05
6/29/2009	0.25	0.37
6/30/2009	0	0
7/1/2009	0	0
7/2/2009	0.75	0.83
7/3/2009	0.09	0.12
7/4/2009	1.18	0.85
7/5/2009	0.27	0.11
7/6/2009	0	0.01
7/7/2009	0	0
7/8/2009	0	0
7/9/2009	0	0.01
7/10/2009	0	0
7/11/2009	0	0.72
7/12/2009	0	0.06
7/13/2009	0.23	0.01
7/14/2009	0	0
7/15/2009	0	0
7/16/2009	0	0
7/17/2009	0	0
7/18/2009	0	0
7/19/2009	0.03	0
7/20/2009	0.18	0
7/21/2009	0.15	0
7/22/2009	0.2	0.19
7/23/2009	0.02	0
7/24/2009	0	0
7/25/2009	0.31	0.34
7/26/2009	0.23	0.37
7/27/2009	0.4	0.52
7/28/2009	0.55	0.57
7/29/2009	0.12	0.27
7/30/2009	0.34	0.42
7/31/2009	0.17	0.25
8/1/2009	0	0
8/2/2009	0	0

Date	075RG (Altitude 10,109') Precipitation (in)	076RG (Altitude 11,810') Precipitation (in)
8/3/2009	0	0
8/4/2009	0	0.02
8/5/2009	0.11	0.09
8/6/2009	0	0
8/7/2009	0	0
8/8/2009	0	0
8/9/2009	0	0
8/10/2009	0	0
8/11/2009	0	0.01
8/12/2009	0	0
8/13/2009	0.38	0.38
8/14/2009	0.16	0.16
8/15/2009	0	0
8/16/2009	0	0
8/17/2009	0	0
8/18/2009	0.05	0.05
8/19/2009	0.01	0.01
8/20/2009	0	0
8/21/2009	0.01	0
8/22/2009	0	0
8/23/2009	0	0
8/24/2009	0.01	0.17
8/25/2009	0.02	0.39
8/26/2009	0.01	0.14
8/27/2009	0	0.01
8/28/2009	0	0
8/29/2009	0.01	0.06
8/30/2009	0.01	0.4
8/31/2009	0	0
9/1/2009	0	0
9/2/2009	0	0.04
9/3/2009	0	0
9/4/2009	0	0
9/5/2009	0.01	0.12
9/6/2009	0.01	0.58
9/7/2009	0	0
9/8/2009	0.01	0
9/9/2009	0.01	0.1
9/10/2009	0.01	0.03
9/11/2009	0	0.03
9/12/2009	0.01	0.37
9/13/2009	0.01	0.17
9/14/2009	0.01	0.1
9/15/2009	0.01	0.05
9/16/2009	0.01	0.53
9/17/2009	0	0

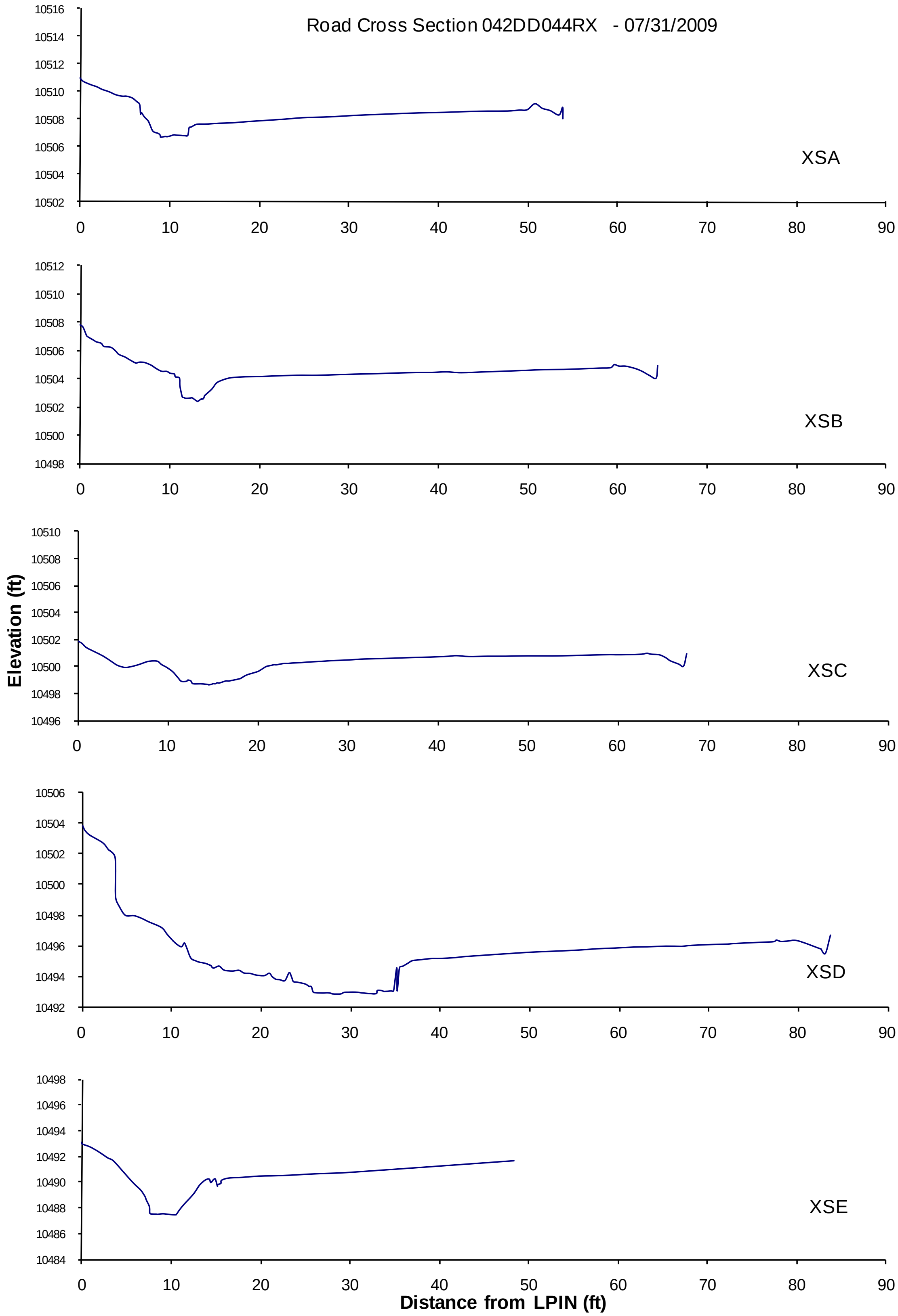
Date	075RG (Altitude 10,109') Precipitation (in)	076RG (Altitude 11,810') Precipitation (in)
9/18/2009	0	0
9/19/2009	0	0
9/20/2009	0.01	0.02
9/21/2009	0	0
9/22/2009	0.01	0
9/23/2009	0.01	0
9/24/2009	0.01	0.03
9/25/2009	0.01	0.43
9/26/2009	0	0
9/27/2009	0	0
9/28/2009	0	0
9/29/2009	0	0
9/30/2009	0.01	0
Total	**11.14**	**17.01**

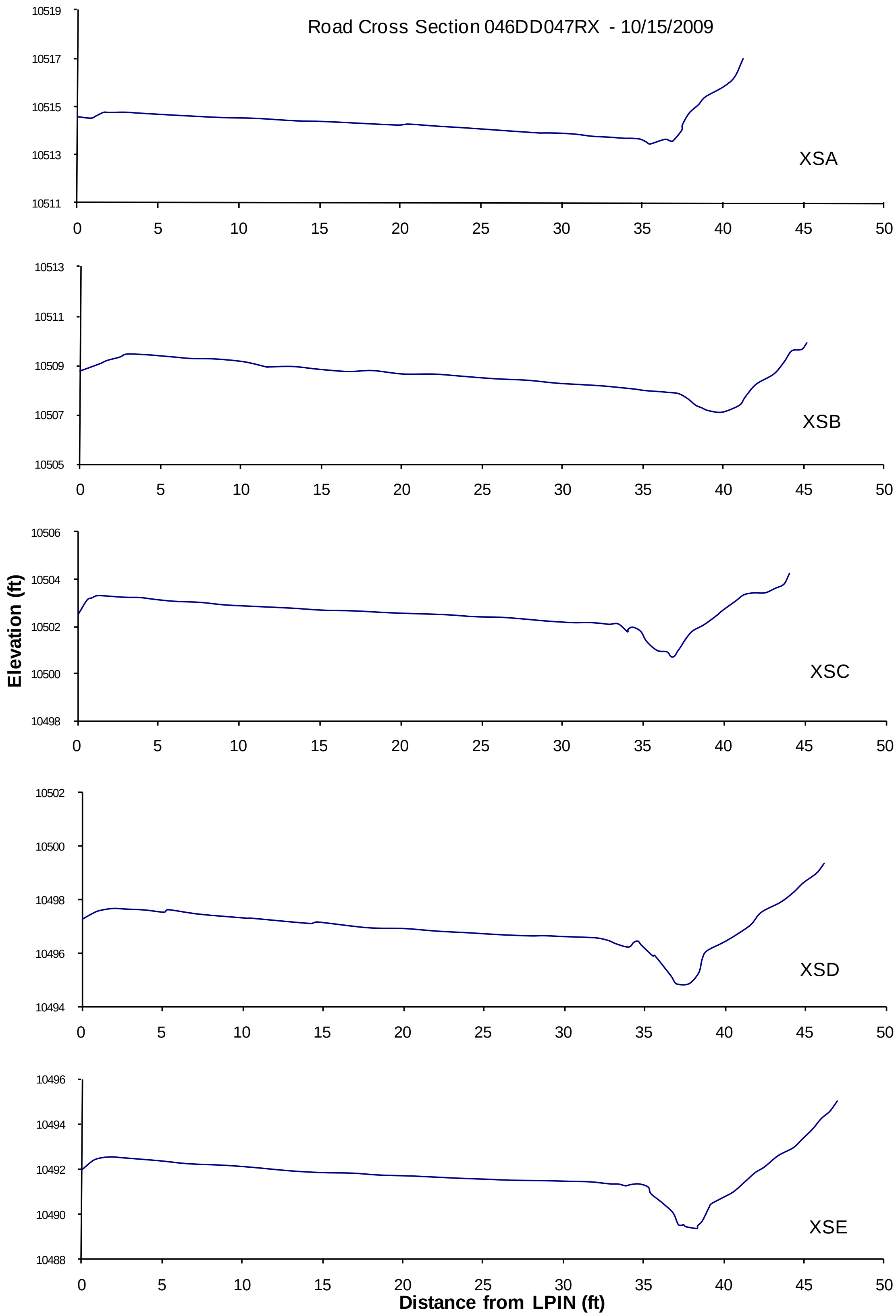
Appendix C

Road Reach

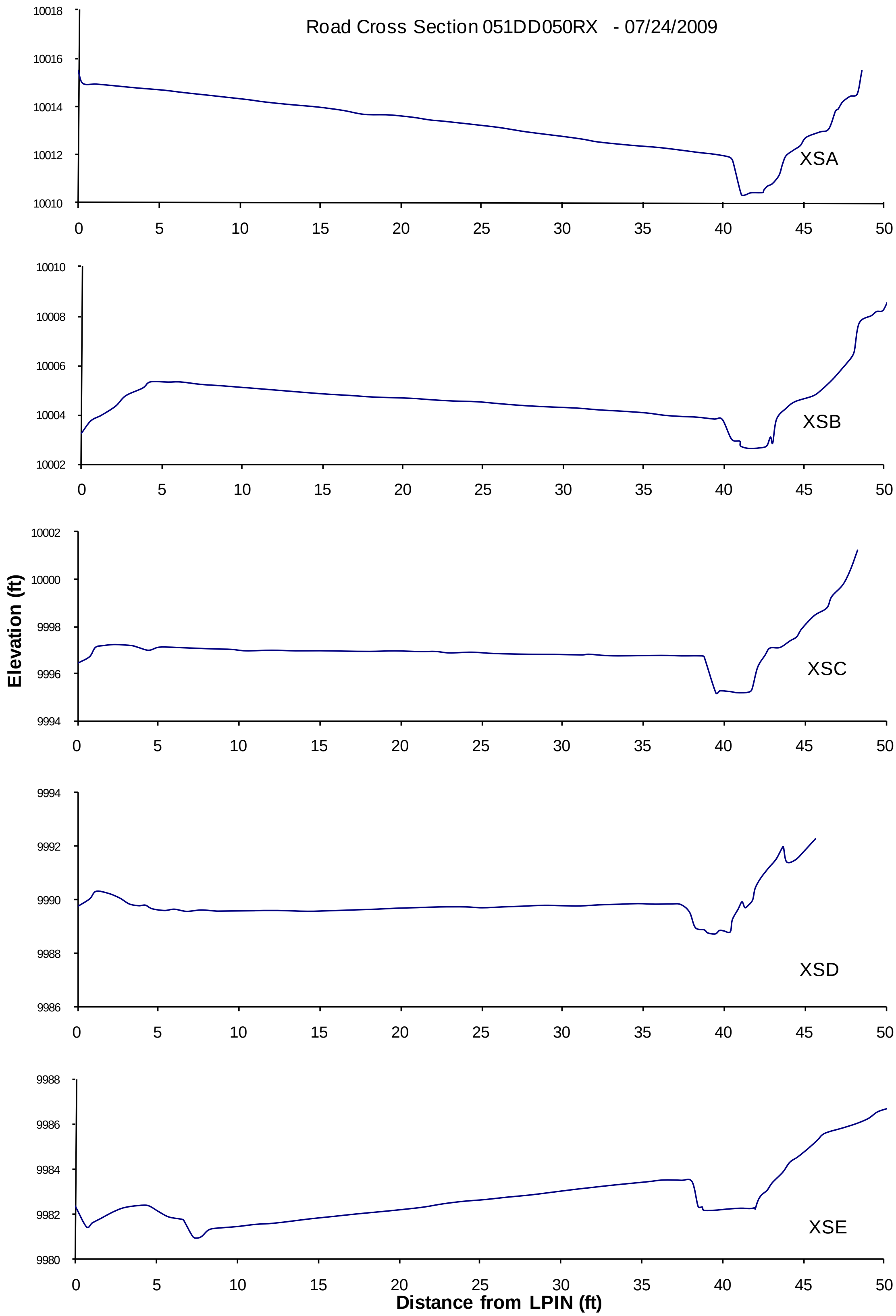
Cross Section Graphs

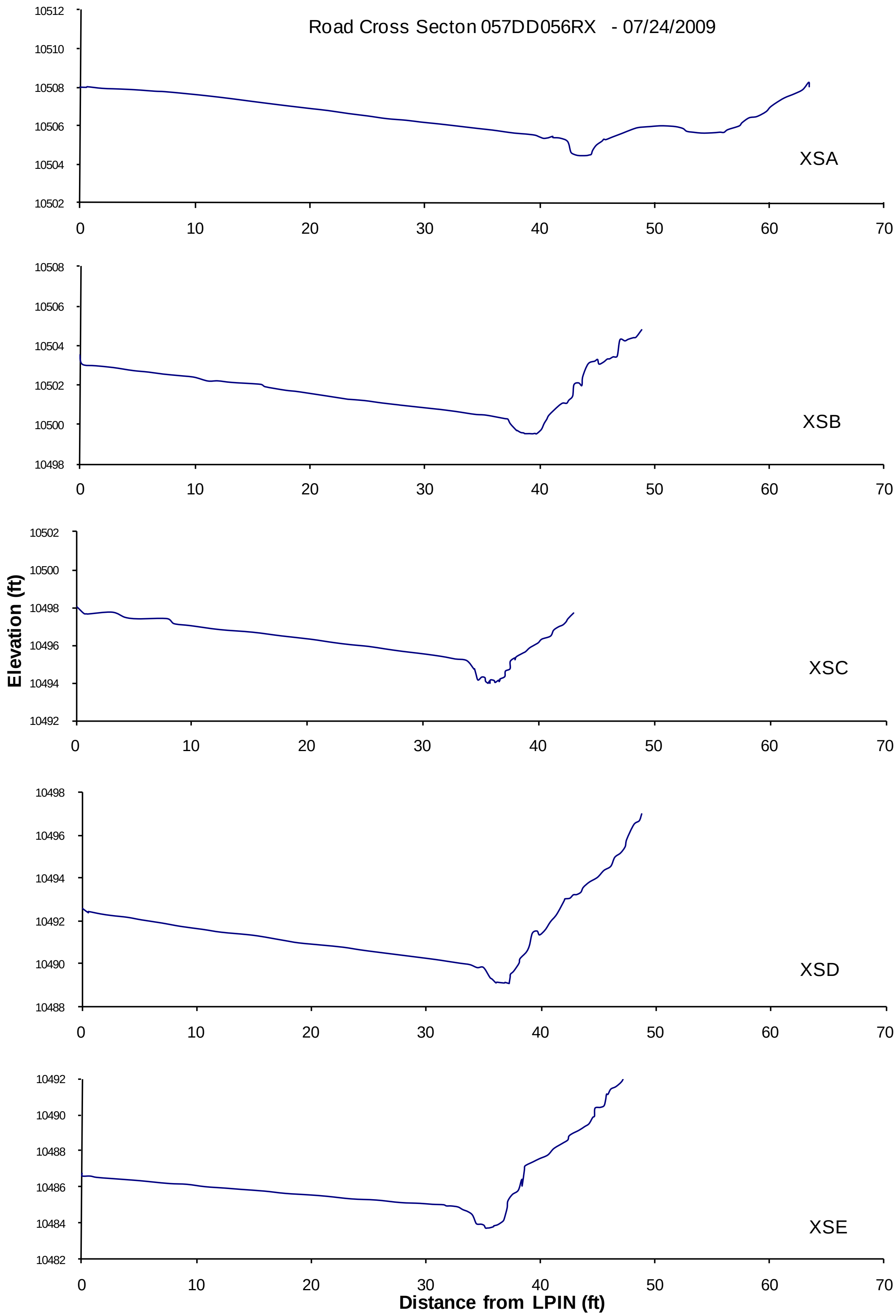
2009

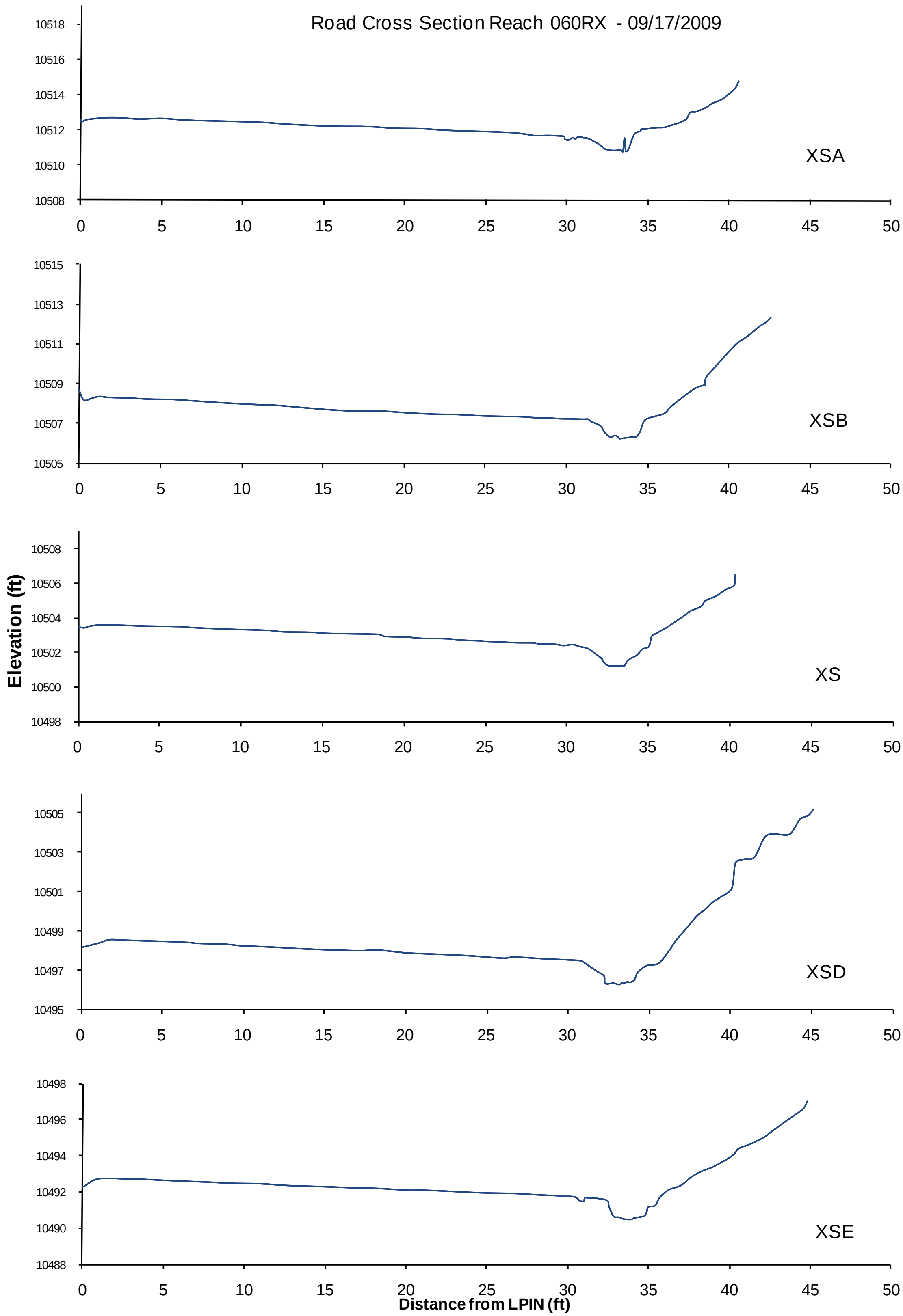

Road Cross Section 042DD044RX - 07/31/2009
XSA
XSB
XSC
XSD
XSE
Elevation (ft)
Distance from LPIN (ft)
10516
10514
10512
10510
10508
10506
10504
10502
10500
10498
10496
10494
10492
10490
10488
10486
10484
0
10
20
30
40
50
60
70
80
90

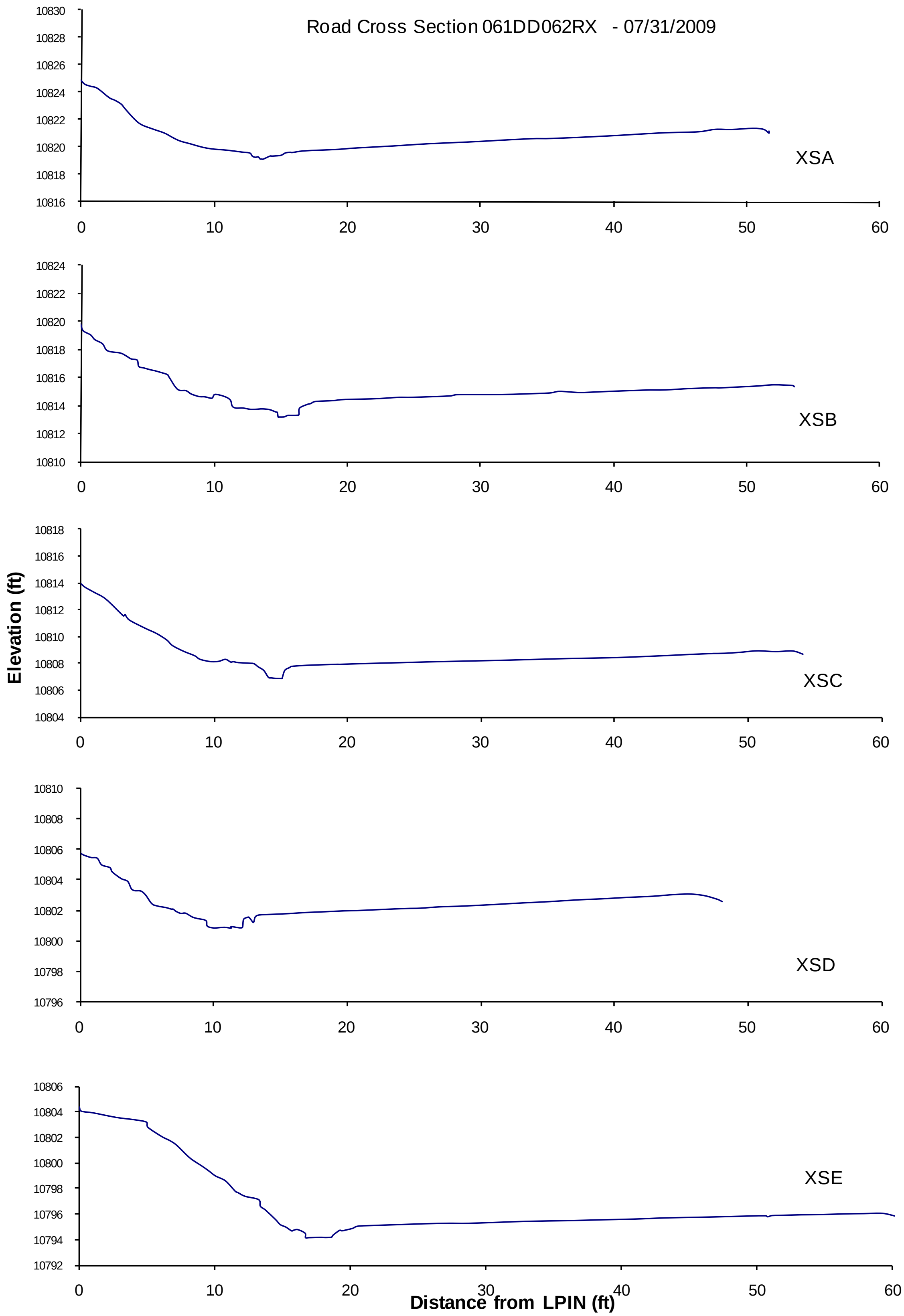


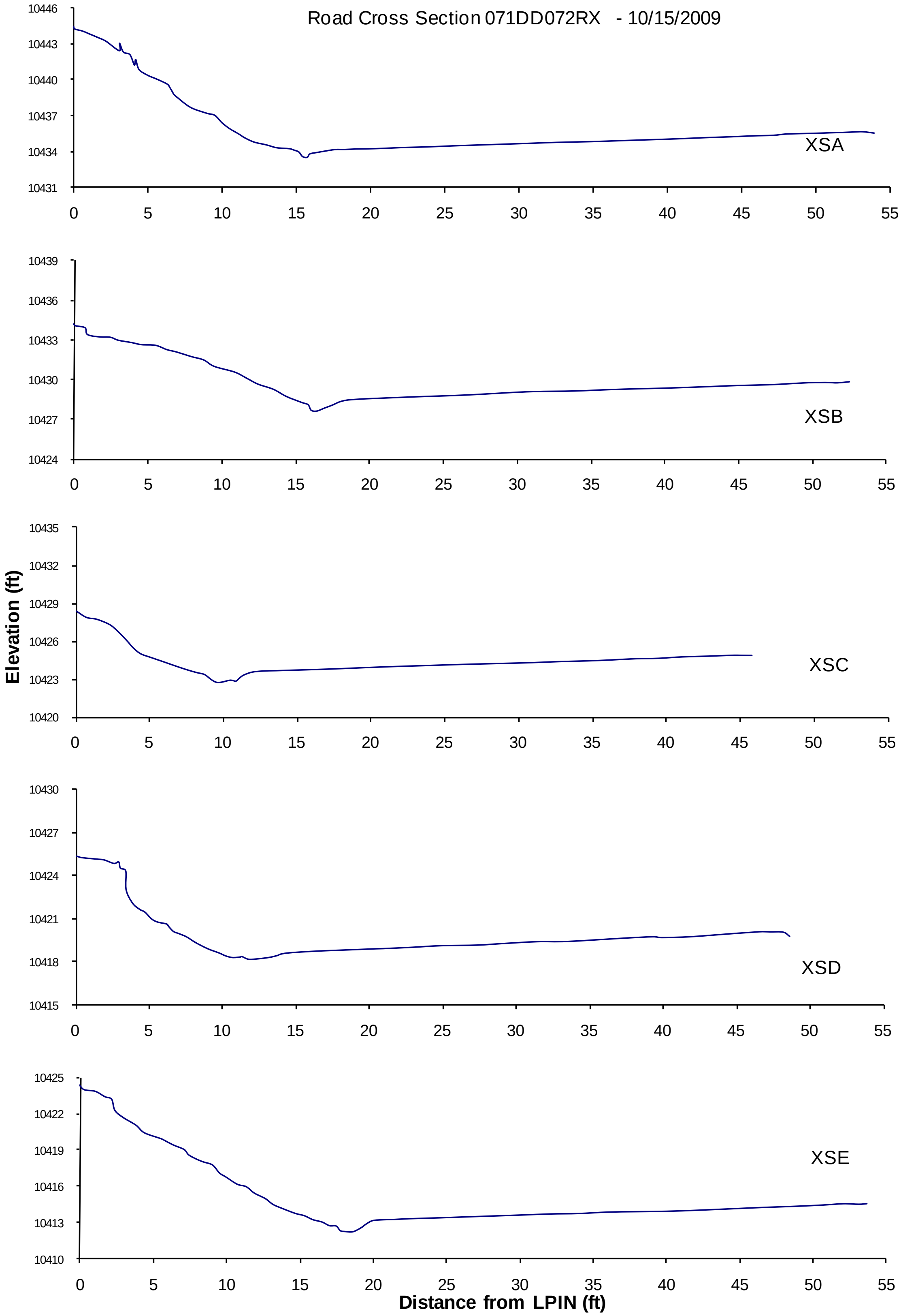
Road Cross Section 046DD047RX - 10/15/2009
XSA
XSB
XSC
XSD
XSE
Elevation (ft)
Distance from LPIN (ft)

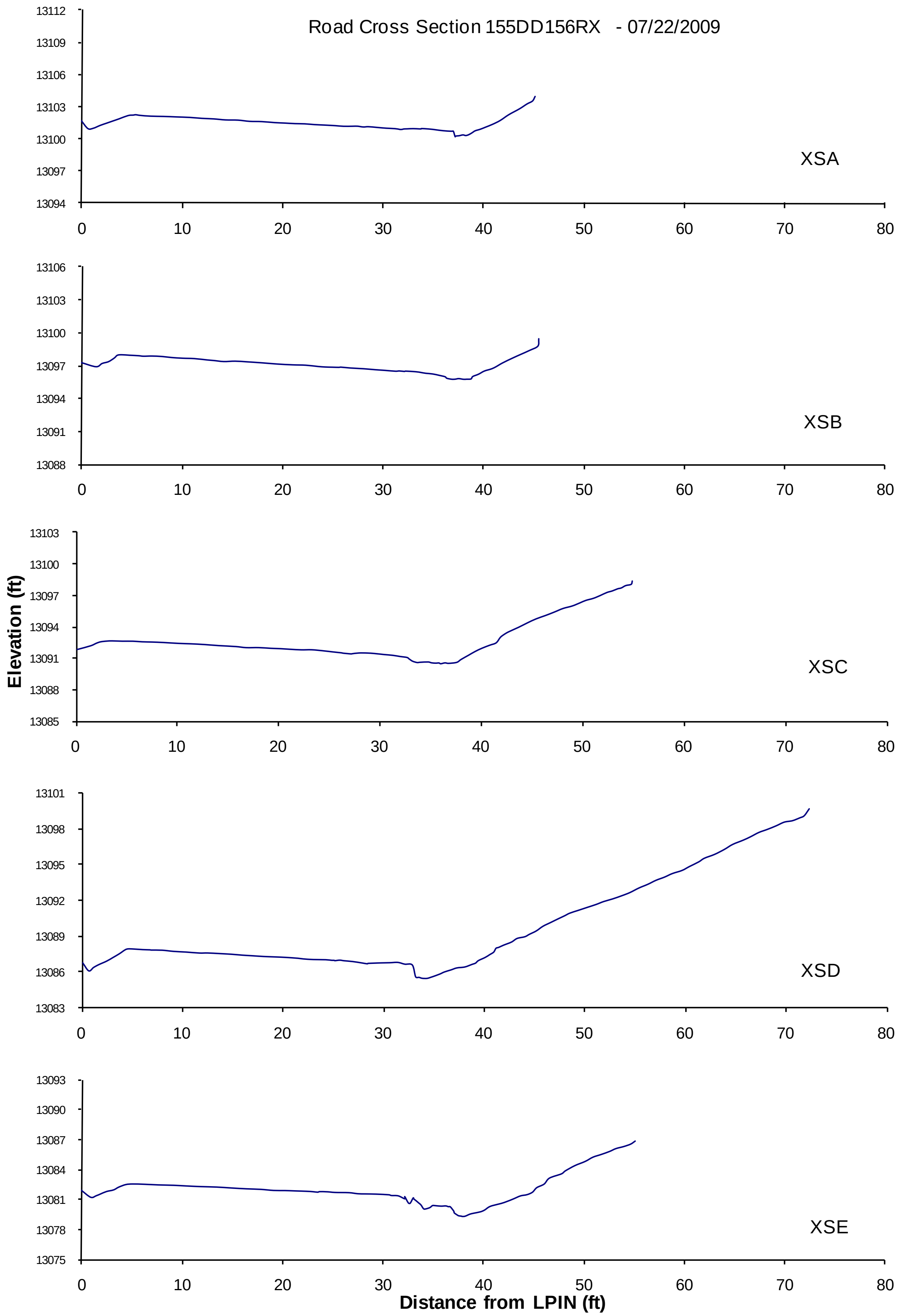

Road Cross Section 051DD050RX - 07/24/2009
Elevation (ft)
Distance from LPIN (ft)
XSA
XSB
XSC
XSD
XSE
10018
10016
10014
10012
10010
10008
10006
10004
10002
10000
9998
9996
9994
9992
9990
9988
9986
9984
9982
9980
0
5
10
15
20
25
30
35
40
45
50


Road Cross Secton 057DD056RX - 07/24/2009
XSA
XSB
XSC
XSD
XSE
Elevation (ft)
Distance from LPIN (ft)

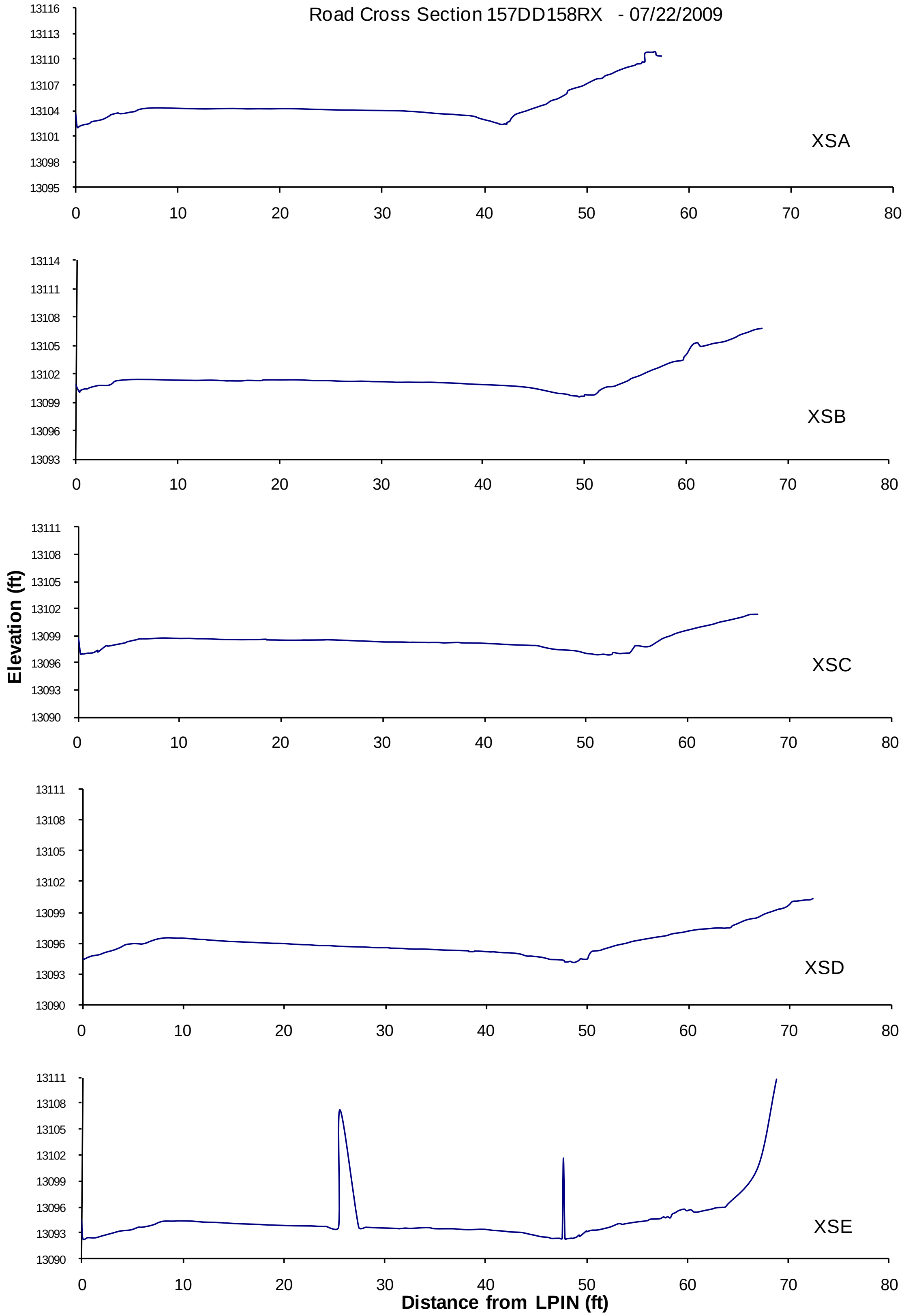

Road Cross Section Reach 060RX - 09/17/2009
Elevation (ft)
Distance from LPIN (ft)
XSA
XSB
XS
XSD
XSE

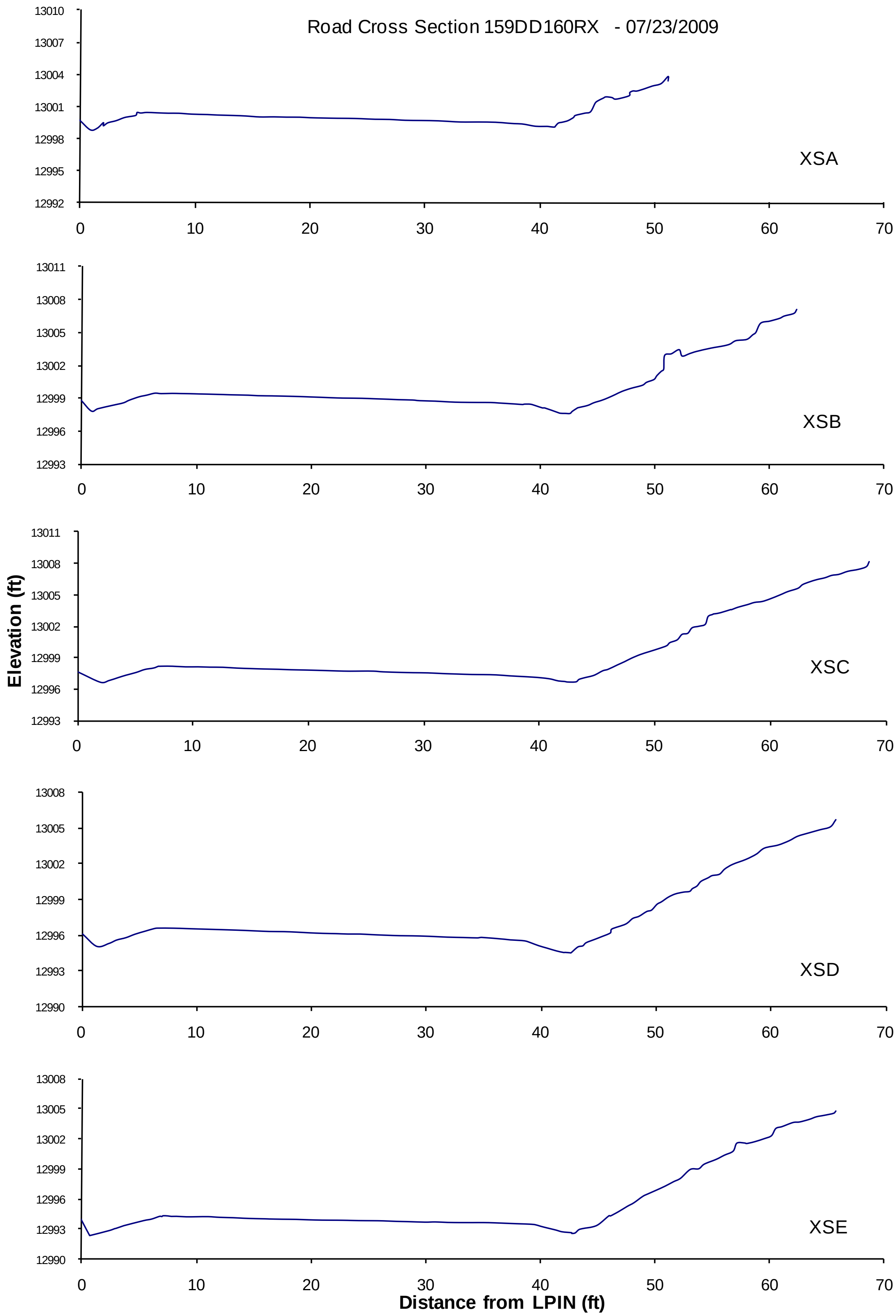

Road Cross Section 061DD062RX - 07/31/2009
XSA
XSB
XSC
XSD
XSE
Elevation (ft)
Distance from LPIN (ft)


Road Cross Section 071DD072RX - 10/15/2009
XSA
XSB
XSC
XSD
XSE
Elevation (ft)
Distance from LPIN (ft)
10446
10443
10440
10437
10434
10431
10439
10436
10433
10430
10427
10424
10435
10432
10429
10426
10423
10420
10430
10427
10424
10421
10418
10415
10425
10422
10419
10416
10413
10410
0
5
10
15
20
25
30
35
40
45
50
55



Road Cross Section 155DD156RX - 07/22/2009
XSA
XSB
XSC
XSD
XSE
Elevation (ft)
Distance from LPIN (ft)


Road Cross Section 157DD158RX - 07/22/2009
XSA
13116
13113
13110
13107
13104
13101
13098
13095
XSB
13114
13111
13108
13105
13102
13099
13096
13093
XSC
13111
13108
13105
13102
13099
13096
13093
13090
XSD
13111
13108
13105
13102
13099
13096
13093
13090
XSE
13111
13108
13105
13102
13099
13096
13093
13090
0 10 20 30 40 50 60 70 80
Elevation (ft)
Distance from LPIN (ft)



Road Cross Section 159DD160RX - 07/23/2009
Elevation (ft)
Distance from LPIN (ft)
XSA
XSB
XSC
XSD
XSE
13010
13007
13004
13001
12998
12995
12992
13011
13008
13005
13002
12999
12996
12993
12990
0
10
20
30
40
50
60
70

Appendix D

Cut Slope

Site Visit Dates
and
Sediment Accumulation

2009

Site Visit Dates of Cut Slope Silt Fences on Pikes Peak, 2009

Site ID	Cut Slope Site Visit Dates 2009																			
011CS	5/11	5/18	6/3	6/9	6/15	6/23	6/29	7/2	7/7	7/13	7/21	7/29	8/4	8/13	8/18	8/27	9/4	9/16		
045CS	5/11	5/18	5/27	5/28	6/3	6/9	6/15	6/23	6/29	7/7	7/13	7/21	7/29	8/4	8/13	8/18	8/27	9/4	9/16	
049CS	5/11	5/12	5/18	5/27	6/3	6/9	6/15	6/23	6/29	7/7	7/13	7/21	7/29	8/4	8/13	8/18	8/27	9/4	9/16	
059CS	5/11	5/14	5/18	5/27	6/3	6/9	6/15	6/23	6/29	7/7	7/13	7/21	7/29	8/4	8/13	8/18	8/27	9/4	9/16	
078CS	5/11	5/14	5/18	5/27	6/3	6/9	6/15	6/23	6/29	7/2	7/7	7/13	7/21	7/29	8/4	8/13	8/18	8/27	9/4	9/16
087CS	5/11	5/18	5/27	6/3	6/9	6/15	6/23	6/29	7/2	7/7	7/13	7/21	7/29	8/4	8/13	8/18	8/27	9/4	9/16	
090CS	5/11	5/18	5/27	6/3	6/9	6/15	6/23	6/29	7/7	7/13	7/21	7/29	8/4	8/13	8/18	8/27	9/4	9/16		
102CS	5/11	5/18	5/27	6/3	6/9	6/15	6/23	6/29	7/7	7/13	7/21	7/29	8/4	8/13	8/18	8/27	9/4	9/16		
123CS	5/11	5/18	5/27	6/3	6/9	6/15	6/25	6/29	7/7	7/13	7/21	7/29	8/4	8/13	8/18	8/27	9/4	9/16		
141CS	5/11	5/18	5/27	6/3	6/9	6/15	6/23	6/29	7/7	7/13	7/21	7/29	8/4	8/13	8/18	8/27	9/4	9/16		
185CS	5/6	5/11	5/18	5/27	6/3	6/9	6/15	6/23	6/29	7/7	7/13	7/21	7/29	8/4	8/13	8/18	8/27	9/4	9/16	
192CS	5/6	5/11	5/18	5/27	6/3	6/9	6/15	6/23	6/29	7/7	7/14	7/21	7/29	8/4	8/13	8/18	8/27	9/4	9/16	
197CS	5/11	5/18	5/27	6/3	6/9	6/15	6/23	6/29	7/7	7/13	7/21	7/29	8/4	8/13	8/18	8/27	9/4	9/16		

Sediment Accumulation in Cut Slope Silt Fences on Pikes Peak, 2009

Site ID	Location	Date	Volume (ft^3)	Grab Sample
185CS	Lower Fence	5/6/09	0.27	Yes
185CS	Upper Fence	5/6/09	0.07	Yes
192CS	Lower Fence	5/6/09	1.08	Yes
011CS	Lower Fence	5/11/09	0.20	Yes
011CS	Upper Fence	5/11/09	0.07	Yes
045CS	Lower Fence	5/11/09	0.61	Yes
197CS	Lower Fence	5/11/09	0.81	Yes
197CS	Upper Fence	5/11/09	0.40	Yes
049CS	Lower Fence	5/12/09	0.61	Yes
049CS	Upper Fence	5/12/09	0.20	Yes
059CS	Lower Fence	5/14/09	0.20	Yes
078CS	Lower Fence	5/14/09	0.34	Yes
045CS	Lower Fence	5/28/09	0.07	Yes
059CS	Lower Fence	6/3/09	0.07	Yes
185CS	Lower Fence	6/3/09	0.07	Yes
192CS	Lower Fence	6/3/09	0.40	Yes
197CS	Lower Fence	6/3/09	0.07	Yes
087CS	Lower Fence	6/15/09	0.67	Yes
123CS	Upper Fence	6/23/09	0.54	Yes
141CS	Upper Fence	6/23/09	0.27	Yes
192CS	Lower Fence	7/7/09	3.36	Yes
192CS	Lower Fence	7/14/09	0.54	Yes
049CS	Lower Fence	7/21/09	0.40	Yes
078CS	Lower Fence	7/21/09	0.34	Yes
045CS	Lower Fence	7/29/09	0.07	Yes
078CS	Lower Fence	7/29/09	0.20	Yes
185CS	Lower Fence	7/29/09	0.13	Yes
192CS	Lower Fence	7/29/09	0.61	Yes
141CS	Upper Fence	8/4/09	0.07	Yes
045CS	Lower Fence	8/13/09	0.20	Yes
078CS	Lower Fence	8/13/09	0.13	Yes
123CS	Upper Fence	8/13/09	0.07	Yes
192CS	Lower Fence	8/13/09	0.66	Yes
087CS	Lower Fence	8/18/09	0.34	Yes
192CS	Lower Fence	8/18/09	0.40	Yes
197CS	Lower Fence	8/18/09	0.40	Yes
197CS	Upper Fence	8/18/09	0.20	Yes
059CS	Lower Fence	8/27/09	0.40	Yes

Site ID	Location	Date	Volume (ft^3)	Grab Sample
011CS	Lower Fence	9/4/09	0.47	Yes
011CS	Upper Fence	9/4/09	0.13	Yes
049CS	Lower Fence	9/4/09	0.47	Yes
078CS	Lower Fence	9/16/09	0.13	Yes
192CS	Lower Fence	9/16/09	1.21	Yes

Appendix E

Fill Slope

Site Visit Dates
and
Sediment Accumulation

2009

Site Visit and Dates of Fill Slope Silt Fences on Pikes Peak, 2009

Site ID	Fill Slope Site Visit Dates 2009																			
001FS	5/11	5/18	5/27	6/3	6/9	6/15	6/23	6/29	7/7	7/13	7/21	7/29	8/4	8/13	8/18	8/27	9/4	9/16		
007FS	5/11	5/14	5/18	5/27	6/3	6/9	6/15	6/23	6/29	7/7	7/13	7/21	7/29	8/4	8/13	8/18	8/27	9/4	9/16	
039FS	5/11	5/18	5/27	6/3	6/9	6/15	6/23	6/29	7/7	7/13	7/21	7/29	8/4	8/13	8/18	8/27	9/4	9/16		
043FS	5/11	5/18	5/19	5/28	6/3	6/9	6/15	6/23	6/29	7/7	7/13	7/21	7/29	8/4	8/13	8/13	8/18	8/27	9/4	9/16
048FS	5/11	5/18	5/27	6/3	6/9	6/15	6/23	6/29	7/7	7/13	7/21	7/29	8/4	8/13	8/18	8/27	9/4	9/16		
052FS	5/11	5/12	5/18	5/27	6/3	6/9	6/15	6/23	6/29	7/7	7/13	7/21	7/29	8/4	8/13	8/18	8/27	9/4	9/16	
055FS	5/11	5/18	5/27	6/3	6/9	6/15	6/23	6/29	7/7	7/13	7/21	7/29	8/4	8/13	8/18	8/27	9/4	9/16		
074FS	5/11	5/18	5/19	5/27	6/3	6/9	6/15	6/23	6/29	7/7	7/13	7/21	7/29	8/4	8/13	8/18	8/27	9/4	9/16	
079FS	5/11	5/18	5/27	6/3	6/9	6/15	6/23	6/29	7/7	7/13	7/21	7/29	8/4	8/13	8/18	8/27	9/4	9/16		
083FS	5/11	5/18	5/27	6/3	6/9	6/15	6/23	6/29	7/7	7/13	7/21	7/29	8/4	8/13	8/18	8/27	9/4	9/16		
086FS	5/11	5/18	5/27	6/3	6/9	6/15	6/23	6/29	7/7	7/14	7/21	7/29	8/4	8/13	8/18	8/27	9/4	9/16		
088FS	5/11	5/18	5/27	6/3	6/9	6/15	6/23	6/29	7/7	7/14	7/21	7/29	8/4	8/13	8/18	8/27	9/4	9/16		
093FS	5/11	5/18	5/27	6/3	6/9	6/15	6/23	6/29	7/7	7/13	7/21	7/29	8/4	8/13	8/18	8/27	9/4	9/16		
098FS	5/11	5/18	5/19	5/27	6/3	6/9	6/15	6/23	6/29	7/7	7/13	7/21	7/29	8/4	8/13	8/18	8/27	9/4	9/16	
101FS	5/11	5/18	5/27	6/3	6/9	6/15	6/23	6/29	7/7	7/8	7/13	7/21	7/29	8/4	8/13	8/18	8/27	9/4	9/16	
103FS	5/11	5/18	5/27	6/3	6/9	6/15	6/23	6/29	7/7	7/13	7/21	7/29	8/4	8/13	8/18	8/27	9/4	9/16	10/19	
105FS	5/11	5/18	5/27	6/3	6/9	6/15	6/23	6/29	7/7	7/13	7/21	7/29	8/4	8/13	8/18	8/27	9/4	9/16		
124FS	5/11	5/18	5/27	6/3	6/9	6/15	6/23	6/29	7/7	7/13	7/21	7/29	8/4	8/13	8/18	8/27	9/4	9/16		
128FS	5/11	5/18	5/27	6/3	6/9	6/15	6/23	6/29	7/7	7/13	7/21	7/29	8/4	8/13	8/18	8/27	9/4	9/16		
177FS	5/11	5/14	5/18	5/27	6/3	6/9	6/15	6/23	6/29	7/7	7/13	7/21	7/29	8/4	8/13	8/18	8/27	9/4	9/16	
183FS	5/11	5/18	5/27	6/3	6/9	6/15	6/23	6/29	7/7	7/13	7/21	7/29	8/4	8/13	8/18	8/27	9/4	9/16		
186FS	5/6	5/11	5/18	5/27	6/3	6/9	6/15	6/23	6/29	7/7	7/13	7/21	7/29	8/4	8/13	8/18	8/27	9/4	9/16	
187FS	5/11	5/18	5/19	5/27	6/3	6/9	6/15	6/23	6/29	7/7	7/13	7/21	7/29	8/4	8/13	8/18	8/27	9/4	9/16	
193FS	5/11	5/18	5/27	6/3	6/9	6/15	6/23	6/29	7/7	7/13	7/21	7/29	8/4	8/13	8/18	8/27	9/4	9/16		
194FS	5/11	5/12	5/18	5/27	6/3	6/9	6/15	6/23	6/29	7/7	7/13	7/21	7/29	8/4	8/13	8/18	8/27	9/4	9/16	
196FS †	5/11	5/13	5/18	5/27	6/3	7/6														
198FS	5/11	5/12	5/18	5/27	6/3	6/9	6/15	6/23	6/29	7/7	7/13	7/21	7/29	8/4	8/13	8/18	8/27	9/4	9/16	
203FS	5/6	5/11	5/18	5/27	6/3	6/9	6/15	6/23	6/29	7/7	7/13	7/21	7/29	8/4	8/13	8/18	8/27	9/4	9/16	
204FS	5/6	5/11	5/18	5/27	6/3	6/9	6/15	6/23	6/29	7/7	7/13	7/21	7/29	8/4	8/13	8/18	8/27	9/4	9/16	

† Silt fences at 196FS were removed on 7/6/2009 due to excessive erosion causing frequent breaching of upper fence. As a surrogate, conveyance channel 245CC was established to estimate erosion.

Sediment Accumulation in Fill Slope Silt Fences on Pikes Peak, 2009

Site ID	Location	Date	Volume (ft^3)	Grab Sample
186FS	Upper Fence	5/6/09	0.61	Yes
186FS	Lower Fence	5/6/09	0.40	Yes
203FS	Upper Fence	5/6/09	0.40	Yes
203FS	Lower Fence	5/6/09	0.07	Yes
204FS	Upper Fence	5/6/09	0.67	Yes
001FS	Upper Fence	5/11/09	0.40	Yes
183FS	Upper Fence	5/11/09	0.07	Yes
193FS	Upper Fence	5/11/09	0.47	Yes
052FS	Upper Fence	5/12/09	3.10	Yes
052FS	Lower Fence	5/12/09	0.07	Yes
194FS	Upper Fence	5/12/09	0.27	Yes
198FS	Upper Fence	5/12/09	0.34	Yes
198FS	Lower Fence	5/12/09	0.13	Yes
196FS	Upper Fence	5/13/09	2.96	Yes
196FS	Lower Fence	5/13/09	0.47	Yes
007FS	Upper Fence	5/14/09	0.07	Yes
007FS	Lower Fence	5/14/09	0.07	Yes
177FS	Upper Fence	5/14/09	0.40	Yes
039FS	Upper Fence	5/18/09	0.94	Yes
039FS	Lower Fence	5/18/09	0.40	Yes
043FS	Upper Fence	5/19/09	1.21	Yes
043FS	Lower Fence	5/19/09	0.27	Yes
074FS	Upper Fence	5/19/09	4.17	Yes
074FS	Lower Fence	5/19/09	0.07	Yes
098FS	Upper Fence	5/19/09	4.71	Yes
187FS	Upper Fence	5/19/09	0.34	Yes
196FS	Lower Fence	5/27/09	0.07	Yes
043FS	Upper Fence	5/28/09	0.40	Yes
039FS	Upper Fence	6/3/09	0.13	Yes
048FS	Upper Fence	6/3/09	21.40	Yes
055FS	Upper Fence	6/3/09	10.77	Yes
186FS	Upper Fence	6/3/09	0.07	Yes
186FS	Lower Fence	6/3/09	0.20	Yes
204FS	Upper Fence	6/3/09	0.13	Yes
074FS	Upper Fence	6/9/09	0.54	Yes
083FS	Upper Fence	6/9/09	2.15	Yes
083FS	Lower Fence	6/9/09	0.27	Yes
088FS	Upper Fence	6/9/09	0.81	Yes

Site ID	Location	Date	Volume (ft^3)	Grab Sample
088FS	Lower Fence	6/9/09	0.40	Yes
093FS	Upper Fence	6/9/09	0.67	Yes
103FS	Upper Fence	6/23/09	0.54	Yes
103FS	Lower Fence	6/23/09	0.27	Yes
124FS	Upper Fence	6/23/09	2.69	Yes
055FS	Upper Fence	6/29/09	0.81	Yes
086FS	Upper Fence	6/29/09	3.77	Yes
093FS	Upper Fence	6/29/09	0.40	Yes
105FS	Upper Fence	6/29/09	7.00	Yes
001FS	Upper Fence	7/7/09	0.40	Yes
043FS	Upper Fence	7/7/09	11.84	Yes
048FS	Upper Fence	7/7/09	15.48	Yes
048FS	Lower Fence	7/7/09	0.54	Yes
052FS	Upper Fence	7/7/09	2.15	Yes
055FS	Upper Fence	7/7/09	11.44	Yes
074FS	Upper Fence	7/7/09	7.40	Yes
079FS	Upper Fence	7/7/09	5.38	Yes
079FS	Lower Fence	7/7/09	0.13	Yes
086FS	Upper Fence	7/7/09	0.81	Yes
088FS	Upper Fence	7/7/09	1.28	Yes
098FS	Upper Fence	7/7/09	0.47	Yes
128FS	Upper Fence	7/7/09	1.14	Yes
187FS	Upper Fence	7/7/09	2.56	Yes
203FS	Upper Fence	7/7/09	1.48	Yes
204FS	Upper Fence	7/7/09	2.96	Yes
086FS	Upper Fence	7/14/09	0.40	Yes
088FS	Upper Fence	7/14/09	0.81	Yes
039FS	Lower Fence	7/21/09	0.20	Yes
093FS	Upper Fence	7/21/09	0.27	Yes
103FS	Upper Fence	7/21/09	0.47	Yes
007FS	Upper Fence	7/29/09	0.13	Yes
043FS	Upper Fence	7/29/09	2.56	Yes
048FS	Upper Fence	7/29/09	2.69	Yes
048FS	Lower Fence	7/29/09	0.40	Yes
052FS	Upper Fence	7/29/09	0.87	Yes
055FS	Upper Fence	7/29/09	9.42	Yes
079FS	Upper Fence	7/29/09	2.89	Yes
083FS	Upper Fence	7/29/09	1.82	Yes
083FS	Lower Fence	7/29/09	0.13	Yes

Site ID	Location	Date	Volume (ft^3)	Grab Sample
088FS	Upper Fence	7/29/09	0.47	Yes
093FS	Upper Fence	7/29/09	0.20	Yes
186FS	Upper Fence	7/29/09	3.36	Yes
001FS	Upper Fence	8/4/09	0.47	Yes
074FS	Upper Fence	8/4/09	2.96	Yes
193FS	Upper Fence	8/4/09	1.01	Yes
101FS	Upper Fence	8/13/09	0.47	Yes
101FS	Lower Fence	8/13/09	0.20	Yes
124FS	Upper Fence	8/13/09	0.54	Yes
203FS	Upper Fence	8/13/09	2.83	Yes
048FS	Upper Fence	8/18/09	1.41	Yes
083FS	Upper Fence	8/18/09	1.01	Yes
086FS	Upper Fence	8/18/09	0.81	Yes
086FS	Lower Fence	8/18/09	0.07	Yes
183FS	Upper Fence	8/18/09	1.68	Yes
186FS	Upper Fence	8/18/09	0.54	Yes
043FS	Upper Fence	8/27/09	1.88	Yes
043FS	Lower Fence	8/27/09	0.07	Yes
048FS	Upper Fence	8/27/09	1.28	Yes
055FS	Upper Fence	8/27/09	2.02	Yes
074FS	Upper Fence	8/27/09	1.48	Yes
079FS	Upper Fence	8/27/09	1.14	Yes
187FS	Upper Fence	8/27/09	0.27	Yes
093FS	Lower Fence	9/4/09	0.20	Yes
198FS	Upper Fence	9/4/09	0.34	Yes
198FS	Lower Fence	9/4/09	0.07	Yes
052FS	Upper Fence	9/16/09	0.81	Yes
055FS	Upper Fence	9/16/09	2.83	Yes
083FS	Upper Fence	9/16/09	1.68	Yes
083FS	Lower Fence	9/16/09	0.20	Yes
103FS	Upper Fence	9/16/09	0.27	Yes
186FS	Upper Fence	9/16/09	0.47	Yes
194FS	Upper Fence	9/16/09	0.67	Yes

Appendix F

Cut and Fill Slope

Particle Size Distribution and Graphs

2009

Summary of Cut Slope Particle Size Distribution from Sieve Analysis of Grab Samples on Pikes Peak, 2008 and 2009

			Particle Size Distribution–Grab Samples 2008–2009					
Site Name	**ID**	**Date**	**D15**	**D35**	**D50**	**D84**	**D95**	**D100**
Pikes Peak Highway–Cut Slope	011CS Lower Fence	5/7/2008	1.106	3.851	7.175	14.077	18.483	22.0
Pikes Peak Highway–Cut Slope	011CS Upper Fence	5/7/2008	0.012	0.058	0.183	2.285	4.398	11.0
Pikes Peak Highway–Cut Slope	049CS Lower Fence	5/12/2008	0.253	2.745	6.782	48.897	56.283	60.0
Pikes Peak Highway–Cut Slope	078CS Lower Fence	8/13/2008	0.016	0.099	0.397	4.275	10.232	20.0
Pikes Peak Highway–Cut Slope	087CS Lower Fence	7/29/2008	0.160	1.315	2.557	10.205	35.910	40.0
Pikes Peak Highway–Cut Slope	087CS Upper Fence	7/29/2008	0.036	0.574	1.361	7.923	55.097	48.0
Pikes Peak Highway–Cut Slope	123CS Upper Fence	8/26/2008	0.358	1.686	2.803	6.390	9.878	20.0
Pikes Peak Highway–Cut Slope	192CS Lower Fence	6/17/2008	0.071	1.120	2.542	8.259	13.163	21.0
Pikes Peak Highway–Cut Slope	192CS Lower Fence	8/19/2008	0.037	0.582	1.311	5.967	10.568	15.0
Pikes Peak Highway–Cut Slope	192CS Upper Fence	8/19/2008	0.110	0.952	1.817	5.685	8.653	18.0
Pikes Peak Highway–Cut Slope	011CS Lower Fence	5/11/2009	2.792	7.506	9.932	15.631	17.878	19.0
Pikes Peak Highway–Cut Slope	011CS Upper Fence	5/11/2009	0.052	1.041	1.285	2.287	4.683	14.0
Pikes Peak Highway–Cut Slope	049CS Lower Fence	9/4/2009	0.019	0.151	0.678	6.529	13.693	20.0
Pikes Peak Highway–Cut Slope	059CS Lower Fence	5/14/2009	0.074	0.889	2.099	33.625	37.888	40.0
Pikes Peak Highway–Cut Slope	078CS Lower Fence	7/29/2009	1.019	1.301	1.563	3.577	7.264	15.0
Pikes Peak Highway–Cut Slope	087CS Lower Fence	6/15/2009	1.981	8.247	25.073	53.718	57.962	60.0
Pikes Peak Highway–Cut Slope	141CS Upper Fence	6/23/2009	0.610	1.418	2.150	4.897	8.181	15.0
Pikes Peak Highway–Cut Slope	197CS Lower Fence	5/11/2009	0.092	1.073	2.202	7.737	14.832	20.0
Pikes Peak Highway–Cut Slope	197CS Upper Fence	5/12/2009	0.019	0.153	0.730	4.729	8.760	18.0
Pikes Peak Highway–Cut Slope	197CS Lower Fence	8/18/2009	0.081	0.867	1.641	6.031	11.772	19.0
Pikes Peak Highway–Cut Slope	197CS Upper Fence	8/18/2009	1.002	1.468	1.954	5.259	8.487	15.0

Summary of Fill Slope Particle Size Distribution from Sieve Analysis of Grab Samples on Pikes Peak, 2008 and 2009

			Particle Size Distribution–Grab Samples 2008–2009					
Site Name	**ID**	**Date**	**D15**	**D35**	**D50**	**D84**	**D95**	**D100**
Pikes Peak Highway–Fill Slope	001FS Upper Fence	8/13/2008	0.038	0.570	1.102	3.329	5.581	10.0
Pikes Peak Highway–Fill Slope	039FS Lower Fence	7/29/2008	0.062	0.806	1.535	5.317	9.044	17.0
Pikes Peak Highway–Fill Slope	039FS Upper Fence	7/29/2008	0.244	1.341	2.571	9.456	17.463	22.0
Pikes Peak Highway–Fill Slope	043FS Lower Fence	9/16/2008	0.057	0.667	1.127	3.271	6.423	11.0
Pikes Peak Highway–Fill Slope	043FS Upper Fence	9/16/2008	0.040	0.584	1.074	3.317	7.130	12.0
Pikes Peak Highway–Fill Slope	048FS Lower Fence	5/12/2008	0.112	1.079	1.920	4.726	7.173	15.0
Pikes Peak Highway–Fill Slope	048FS Upper Fence	5/12/2008	0.588	2.199	4.248	12.342	32.384	34.0
Pikes Peak Highway–Fill Slope	052FS Lower Fence	8/19/2008	0.869	3.903	65.730	75.125	78.444	80.0
Pikes Peak Highway–Fill Slope	052FS Upper Fence	8/19/2008	0.179	1.251	2.251	7.205	14.381	25.0
Pikes Peak Highway–Fill Slope	074FS Upper Fence	7/29/2008	0.406	1.369	2.751	25.967	47.840	50.0
Pikes Peak Highway–Fill Slope	088FS Lower Fence	6/2/2008	0.032	0.509	0.962	3.757	7.220	10.0
Pikes Peak Highway–Fill Slope	088FS Upper Fence	6/2/2008	0.379	1.189	2.012	7.290	13.346	20.0
Pikes Peak Highway–Fill Slope	088FS Upper Fence	8/13/2008	0.294	1.097	1.874	5.981	11.017	20.0
Pikes Peak Highway–Fill Slope	098FS Upper Fence	7/17/2008	1.625	3.126	4.392	10.481	19.036	30.0
Pikes Peak Highway–Fill Slope	101FS Lower Fence	9/9/2008	1.022	2.319	3.950	33.160	39.010	42.0
Pikes Peak Highway–Fill Slope	101FS Upper Fence	9/9/2008	0.847	2.277	3.401	7.497	10.723	17.0
Pikes Peak Highway–Fill Slope	103FS Lower Fence	6/9/2008	0.065	0.773	1.343	4.290	23.044	25.0
Pikes Peak Highway–Fill Slope	103FS Upper Fence	6/9/2008	0.734	3.712	6.158	45.390	48.511	50.0
Pikes Peak Highway–Fill Slope	103FS Upper Fence	8/13/2008	0.858	2.194	3.352	8.532	14.793	21.0
Pikes Peak Highway–Fill Slope	105FS Upper Fence	7/22/2008	2.224	3.697	4.954	10.444	24.970	30.0
Pikes Peak Highway–Fill Slope	105FS Upper Fence	9/16/2008	2.553	4.806	6.349	11.034	15.103	30.0
Pikes Peak Highway–Fill Slope	186FS Upper Fence	8/13/2008	0.056	0.720	1.330	4.264	7.841	10.0
Pikes Peak Highway–Fill Slope	187FS Upper Fence	5/12/2008	0.680	1.757	2.633	5.725	8.744	14.0
Pikes Peak Highway–Fill Slope	196FS Upper Fence	9/16/2008	0.177	1.077	1.856	6.046	9.486	20.0
Pikes Peak Highway–Fill Slope	001FS Upper Fence	8/4/2009	0.129	0.996	1.675	6.139	37.454	42.0
Pikes Peak Highway–Fill Slope	007FS Lower Fence	5/14/2009	0.025	0.291	0.875	3.343	6.175	10.0

			Particle Size Distribution–Grab Samples 2008–2009					
Site Name	**ID**	**Date**	**D15**	**D35**	**D50**	**D84**	**D95**	**D100**
Pikes Peak Highway–Fill Slope	007FS Upper Fence	5/14/2009	0.686	2.973	7.404	51.976	56.046	58.0
Pikes Peak Highway–Fill Slope	039FS Lower Fence	7/21/2009	0.040	0.620	1.312	4.508	7.484	19.0
Pikes Peak Highway–Fill Slope	052FS Lower Fence	5/12/2009	0.045	0.614	1.069	3.203	5.962	20.0
Pikes Peak Highway–Fill Slope	052FS Upper Fence	5/12/2009	0.077	0.895	1.691	5.510	10.320	17.0
Pikes Peak Highway–Fill Slope	079FS Lower Fence	7/7/2009	0.319	1.161	1.850	4.754	7.526	13.0
Pikes Peak Highway–Fill Slope	079FS Upper Fence	7/7/2009	0.110	0.826	1.389	4.839	11.158	30.0
Pikes Peak Highway–Fill Slope	083FS Lower Fence	6/9/2009	0.458	1.117	1.704	4.084	6.453	12.0
Pikes Peak Highway–Fill Slope	083FS Upper Fence	6/9/2009	0.155	1.016	1.768	6.401	11.722	27.0
Pikes Peak Highway–Fill Slope	086FS Lower Fence	8/18/2009	0.109	0.910	1.437	3.577	5.536	14.0
Pikes Peak Highway–Fill Slope	086FS Upper Fence	8/18/2009	0.095	0.922	1.814	9.524	17.052	20.0
Pikes Peak Highway–Fill Slope	088FS Lower Fence	6/9/2009	0.026	0.325	0.683	1.859	3.276	8.0
Pikes Peak Highway–Fill Slope	088FS Upper Fence	6/9/2009	1.169	3.239	5.588	30.542	36.596	39.0
Pikes Peak Highway–Fill Slope	093FS Upper Fence	7/21/2009	1.940	9.954	18.519	32.239	34.113	35.0
Pikes Peak Highway–Fill Slope	101FS Lower Fence	8/13/2009	1.168	2.945	4.313	8.732	15.205	27.0
Pikes Peak Highway–Fill Slope	101FS Upper Fence	8/13/2009	0.607	2.147	4.623	14.569	18.879	21.0
Pikes Peak Highway–Fill Slope	103FS Lower Fence	6/23/2009	0.094	0.900	1.446	3.767	9.180	21.0
Pikes Peak Highway–Fill Slope	103FS Upper Fence	6/23/2009	0.761	1.939	3.066	8.713	14.139	47.0
Pikes Peak Highway–Fill Slope	124FS Upper Fence	8/13/2009	0.534	1.677	3.064	11.785	23.199	30.0
Pikes Peak Highway–Fill Slope	128FS Upper Fence	7/7/2009	0.319	0.919	1.371	3.764	7.501	15.0
Pikes Peak Highway–Fill Slope	186FS Upper Fence	7/29/2009	0.164	1.071	1.738	5.289	9.702	14.0
Pikes Peak Highway–Fill Slope	194FS Upper Fence	9/16/2009	0.039	0.595	1.227	3.749	6.408	10.0
Pikes Peak Highway–Fill Slope	203FS Lower Fence	5/6/2009	0.022	0.226	0.855	2.920	3.871	8.0
Pikes Peak Highway–Fill Slope	203FS Upper Fence	5/6/2009	0.109	0.845	1.542	6.215	35.031	40.0

Sieve Analysis Worksheet

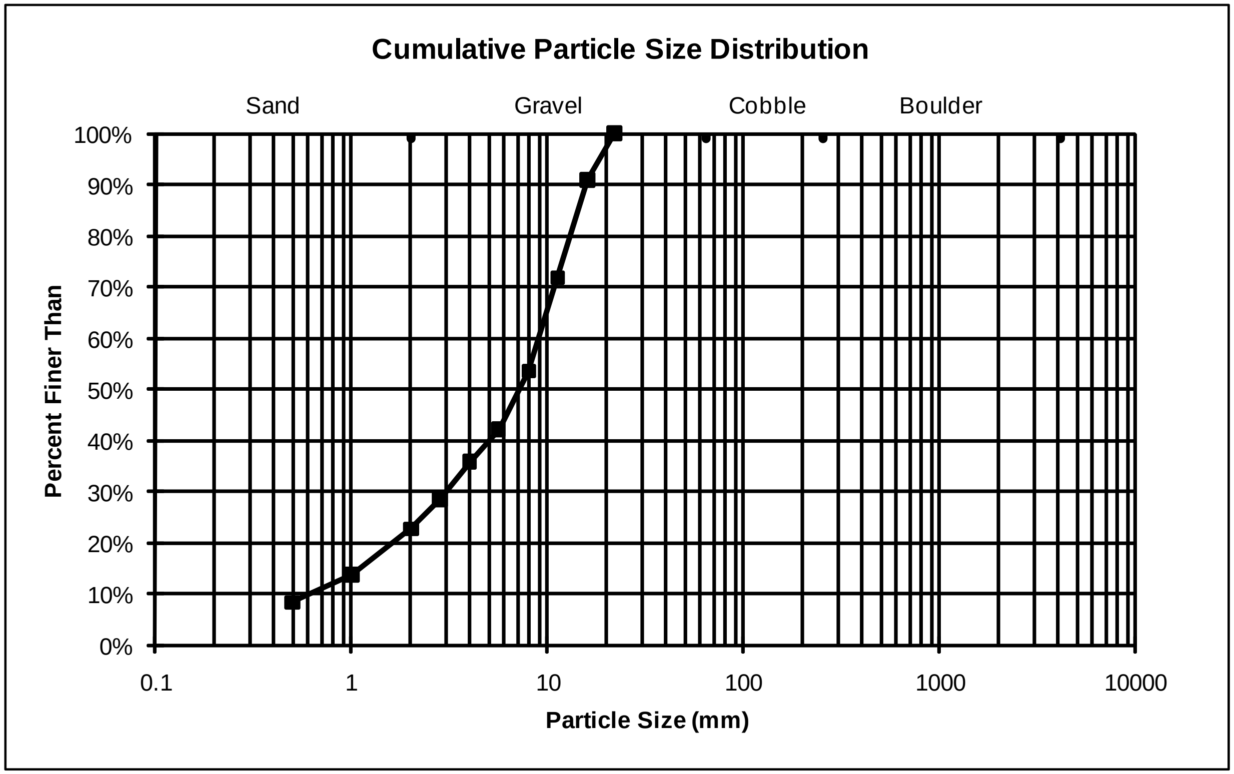
Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	72.30	8.3%	
0.5	46.90	5.4%	8.3%
1.0	78.30	9.0%	13.7%
2.0	49.00	5.6%	22.7%
2.8	65.20	7.5%	28.3%
4.0	54.90	6.3%	35.8%
5.6	99.00	11.4%	42.1%
8.0	159.20	18.3%	53.5%
11.2	166.40	19.1%	71.8%
16.0	79.60	9.1%	90.9%
22.0	*		100.0%
32.0			-
45.0			
64.0			
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	870.80		

*Measured value of the largest particle in the sample and not a sieve weight

COMMENTS: Grab Sample of 2008 Sediment Accumulation

SITE NAME: Pike's Peak Highway - Cut Slope
ID NUMBER: 011CS Lower Fence
DATE: 5/7/2008
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	1.106	3.851	7.175	14.077	18.483	22.0



Sieve Analysis Worksheet

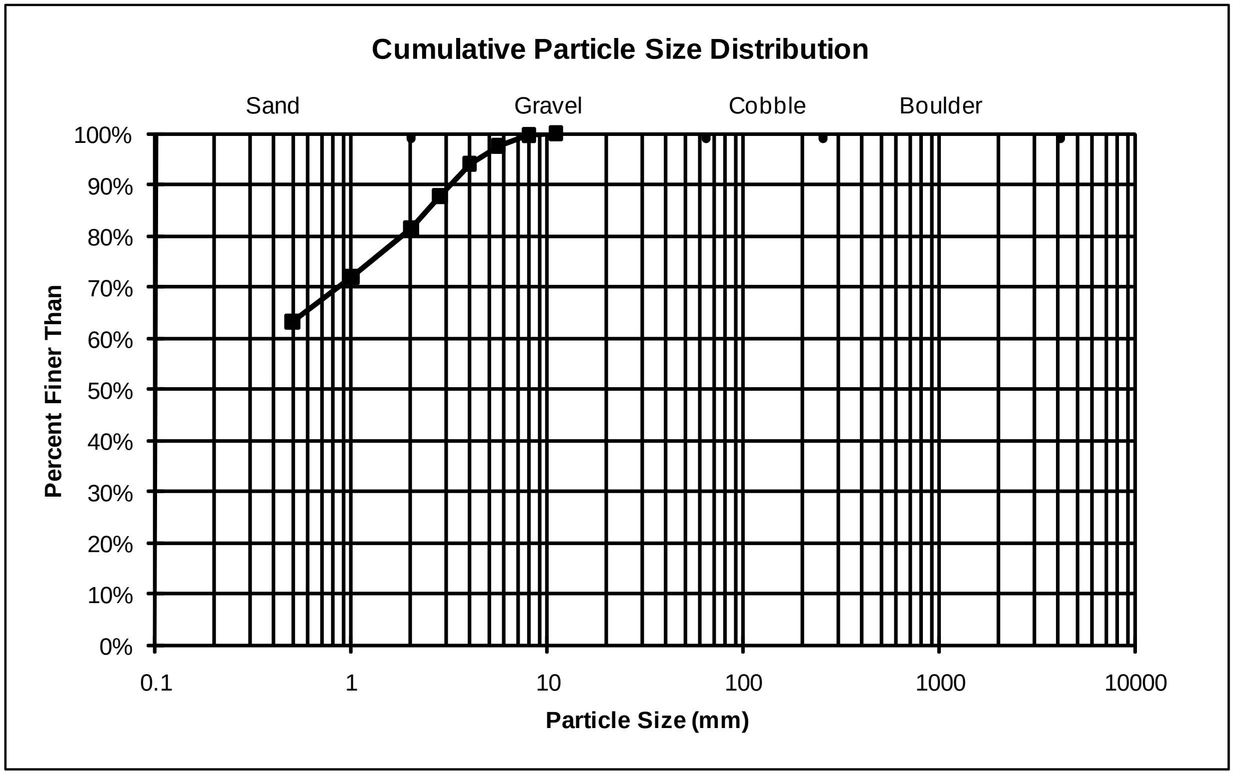
COMMENTS: Grab Sample of 2008 Sediment Accumulation

Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	402.50	63.0%	
0.5	56.00	8.8%	63.0%
1.0	61.90	9.7%	71.8%
2.0	40.00	6.3%	81.5%
2.8	39.90	6.3%	87.8%
4.0	21.90	3.4%	94.0%
5.6	13.30	2.1%	97.5%
8.0	2.90	0.5%	99.5%
11.0	*		100.0%
16.0			-
22.4			
32.0			
45.0			
64.0			
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	638.40		

*Measured value of the largest particle in the sample and not a sieve weight

SITE NAME: Pike's Peak Highway - Cut Slope
ID NUMBER: 011CS Upper Fence
DATE: 5/7/2008
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	0.012	0.058	0.183	2.285	4.398	11.0



Sieve Analysis Worksheet

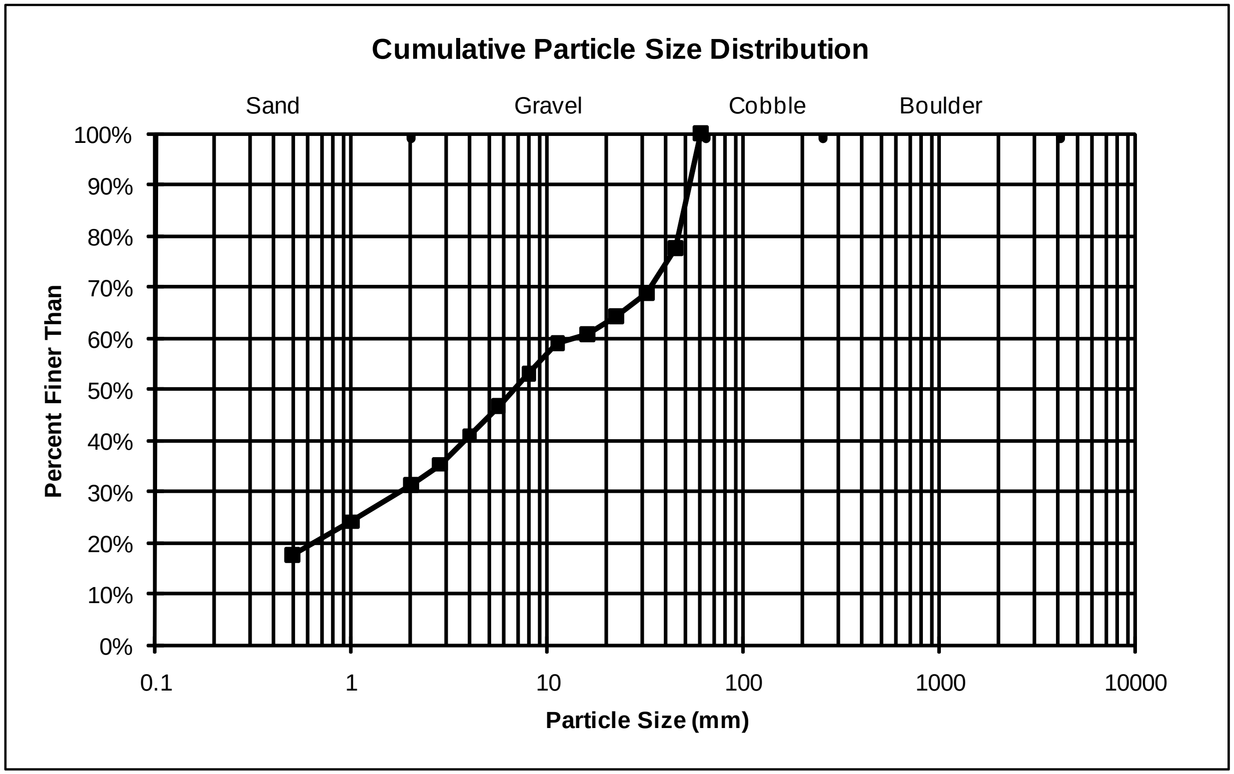
Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	132.10	17.4%	
0.5	50.00	6.6%	17.4%
1.0	53.80	7.1%	24.1%
2.0	30.90	4.1%	31.2%
2.8	43.00	5.7%	35.2%
4.0	43.20	5.7%	40.9%
5.6	47.60	6.3%	46.6%
8.0	45.40	6.0%	52.9%
11.2	12.70	1.7%	58.9%
16.0	27.80	3.7%	60.6%
22.4	33.80	4.5%	64.3%
32.0	66.50	8.8%	68.7%
45.0	170.30	22.5%	77.5%
60.0	*		100.0%
90			-
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	757.10		

*Measured value of the largest particle in the sample and not a sieve weight

COMMENTS: Grab Sample of 2008 Sediment Accumulation

SITE NAME: Pike's Peak Highway - Cut Slope
ID NUMBER: 049CS Lower Fence
DATE: 5/12/2008
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	0.253	2.745	6.782	48.897	56.283	60.0



Sieve Analysis Worksheet

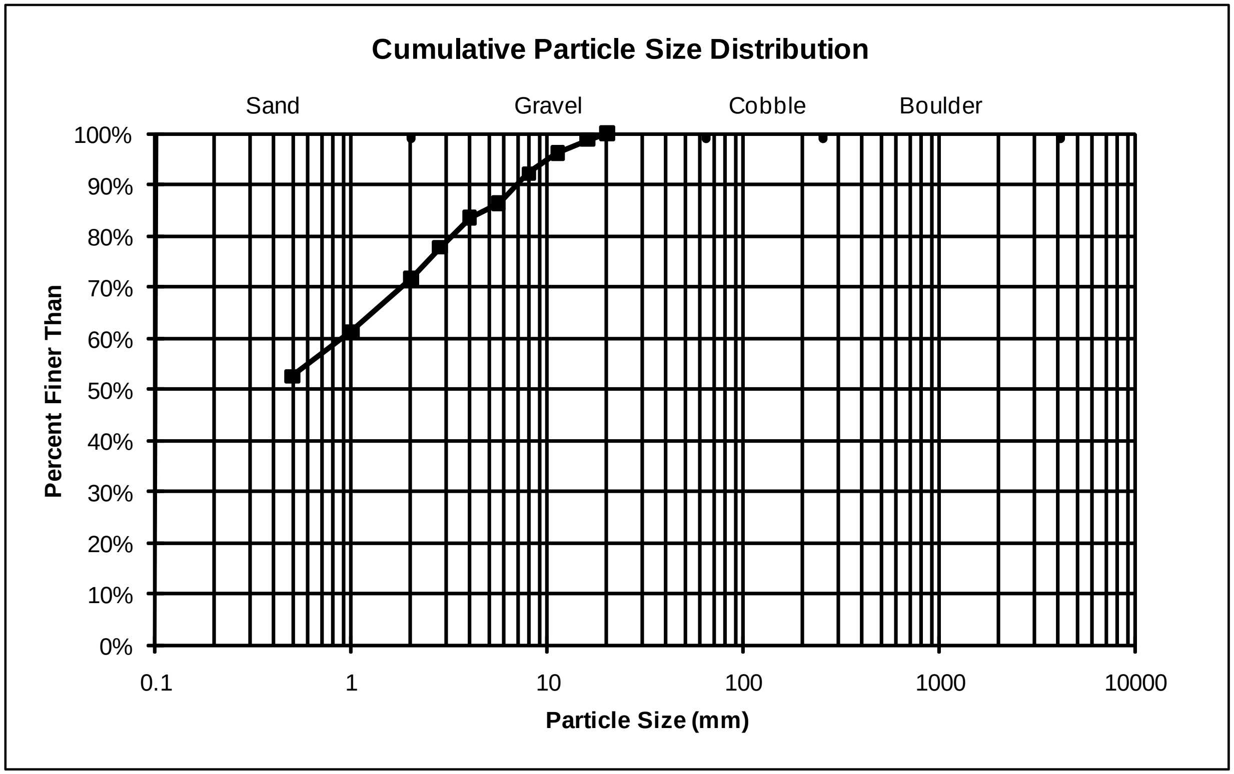
Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	324.00	52.5%	
0.5	53.90	8.7%	52.5%
1.0	64.40	10.4%	61.2%
2.0	37.30	6.0%	71.7%
2.8	35.30	5.7%	77.7%
4.0	17.50	2.8%	83.4%
5.6	36.00	5.8%	86.3%
8.0	24.40	4.0%	92.1%
11.2	16.50	2.7%	96.1%
16.0	7.80	1.3%	98.7%
20.0	*		100.0%
32.0			-
45.0			
64.0			
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	617.10		

*Measured value of the largest particle in the sample and not a sieve weight

COMMENTS: Grab Sample of 2008 Sediment Accumulation

SITE NAME: Pike's Peak Highway - Cut Slope
ID NUMBER: 078CS Lower Fence
DATE: 8/13/2008
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	0.016	0.099	0.397	4.275	10.232	20.0



Sieve Analysis Worksheet

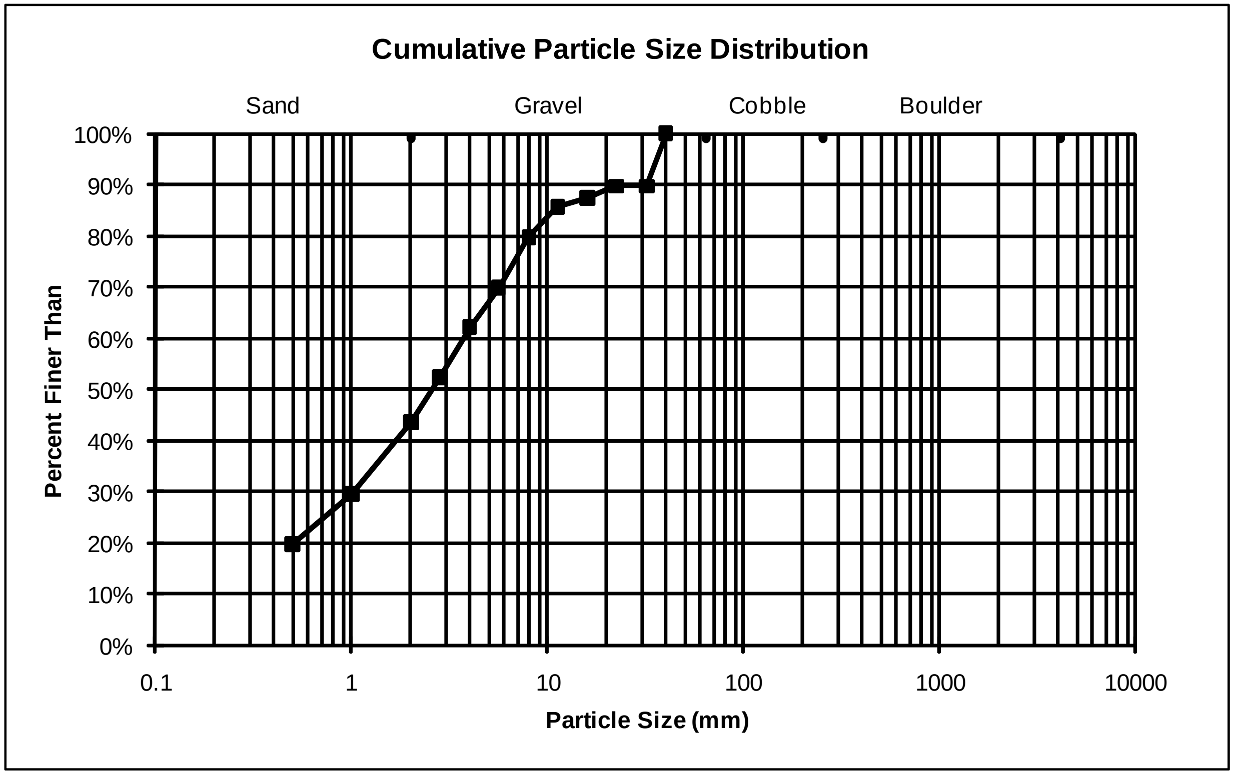
Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	105.20	19.6%	
0.5	52.40	9.8%	19.6%
1.0	76.40	14.2%	29.4%
2.0	46.90	8.7%	43.6%
2.8	52.70	9.8%	52.4%
4.0	41.40	7.7%	62.2%
5.6	52.00	9.7%	69.9%
8.0	32.70	6.1%	79.6%
11.2	9.00	1.7%	85.7%
16.0	12.30	2.3%	87.4%
22.4	0.00	0.0%	89.7%
32.0	55.50	10.3%	89.7%
40.0	*		100.0%
64.0			-
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	536.50		

*Measured value of the largest particle in the sample and not a sieve weight

COMMENTS: Grab Sample of 2008 Sediment Accumulation

SITE NAME: Pike's Peak Highway - Cut Slope
ID NUMBER: 087CS Lower Fence
DATE: 7/29/2008
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	0.160	1.315	2.557	10.205	35.910	40.0



Sieve Analysis Worksheet

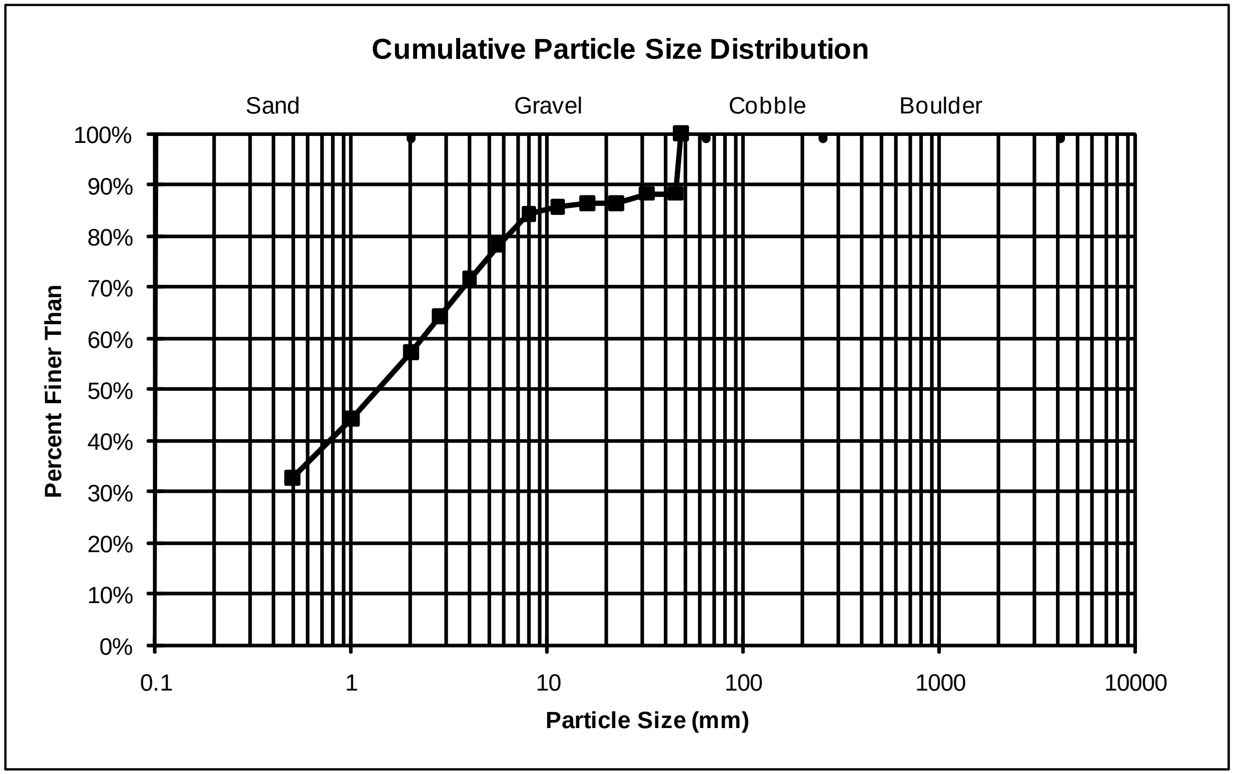
COMMENTS: Grab Sample of 2008 Sediment Accumulation

Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	292.30	32.7%	
0.5	102.70	11.5%	32.7%
1.0	116.70	13.1%	44.2%
2.0	61.90	6.9%	57.2%
2.8	67.10	7.5%	64.2%
4.0	58.80	6.6%	71.7%
5.6	52.80	5.9%	78.3%
8.0	13.20	1.5%	84.2%
11.2	6.20	0.7%	85.6%
16.0	0.00	0.0%	86.3%
22.4	17.10	1.9%	86.3%
32.0	0.00	0.0%	88.2%
45.0	105.10	11.8%	88.2%
48.0	*		100.0%
90			-
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	893.90		

*Measured value of the largest particle in the sample and not a sieve weight

SITE NAME: Pike's Peak Highway - Cut Slope
ID NUMBER: 087CS Upper Fence
DATE: 7/29/2008
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	0.036	0.574	1.361	7.923	46.701	48.0



Sieve Analysis Worksheet

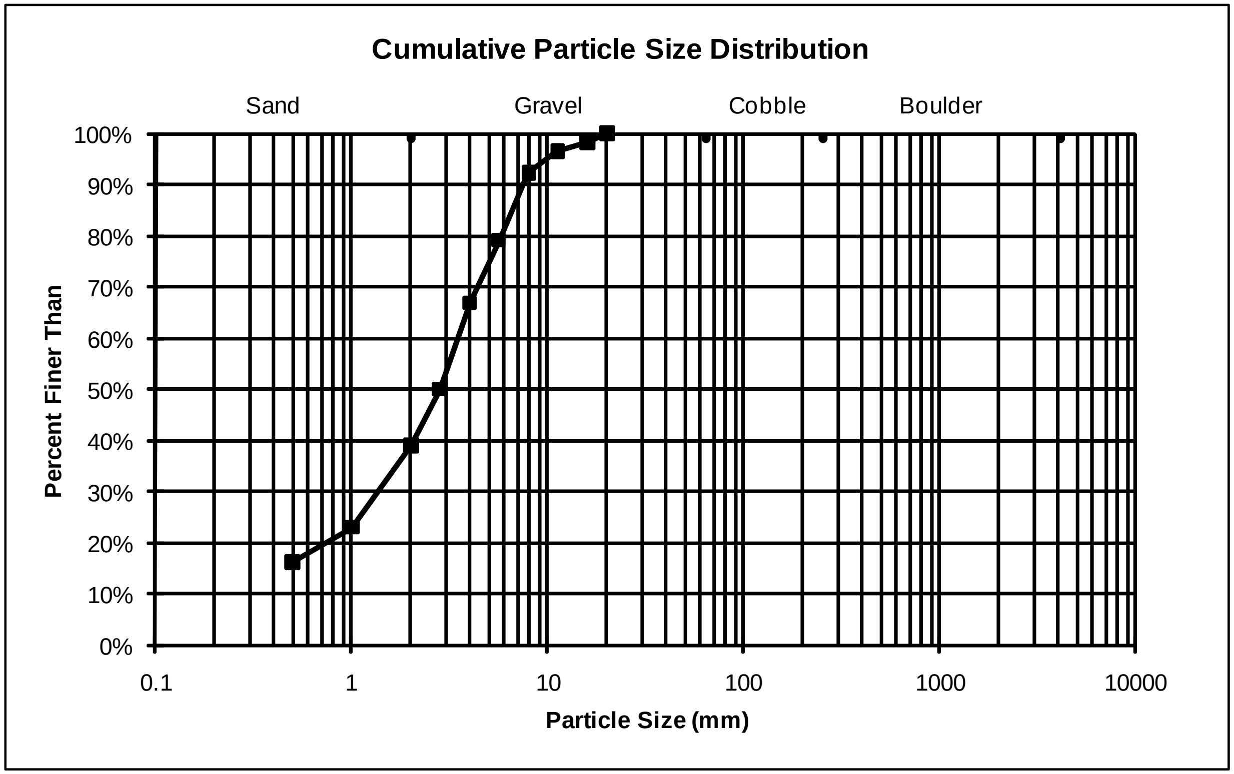
Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	131.40	16.1%	
0.5	55.80	6.8%	16.1%
1.0	130.40	16.0%	23.0%
2.0	89.80	11.0%	38.9%
2.8	138.20	16.9%	50.0%
4.0	99.50	12.2%	66.9%
5.6	108.10	13.3%	79.1%
8.0	34.50	4.2%	92.3%
11.2	13.20	1.6%	96.6%
16.0	14.70	1.8%	98.2%
20.0	*		100.0%
32.0			-
45.0			
64.0			
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	815.60		

*Measured value of the largest particle in the sample and not a sieve weight

COMMENTS: Grab Sample of 2008 Sediment Accumulation

SITE NAME: Pike's Peak Highway - Cut Slope
ID NUMBER: 123CS Upper Fence
DATE: 8/26/2008
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	0.358	1.686	2.803	6.390	9.878	20.0



Sieve Analysis Worksheet

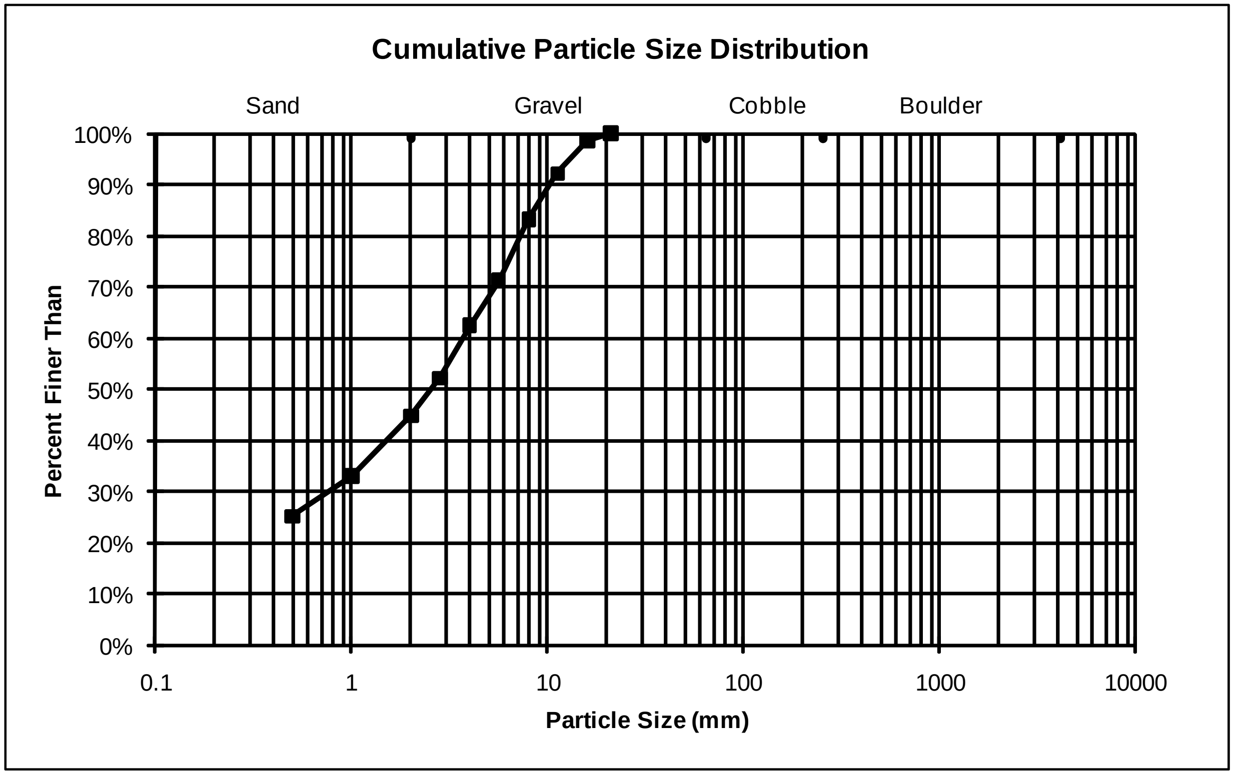
COMMENTS: Grab Sample of 2008 Sediment Accumulation

Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	206.10	25.1%	
0.5	65.60	8.0%	25.1%
1.0	96.20	11.7%	33.1%
2.0	60.10	7.3%	44.8%
2.8	84.50	10.3%	52.1%
4.0	72.50	8.8%	62.4%
5.6	98.00	11.9%	71.2%
8.0	73.70	9.0%	83.2%
11.2	52.20	6.4%	92.1%
16.0	12.50	1.5%	98.5%
21.0	*		100.0%
32.0			-
45.0			
64.0			
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	821.40		

*Measured value of the largest particle in the sample and not a sieve weight

SITE NAME: Pike's Peak Highway - Cut Slope
ID NUMBER: 192CS Lower Fence
DATE: 6/17/2008
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	0.071	1.120	2.542	8.259	13.163	21.0



Sieve Analysis Worksheet

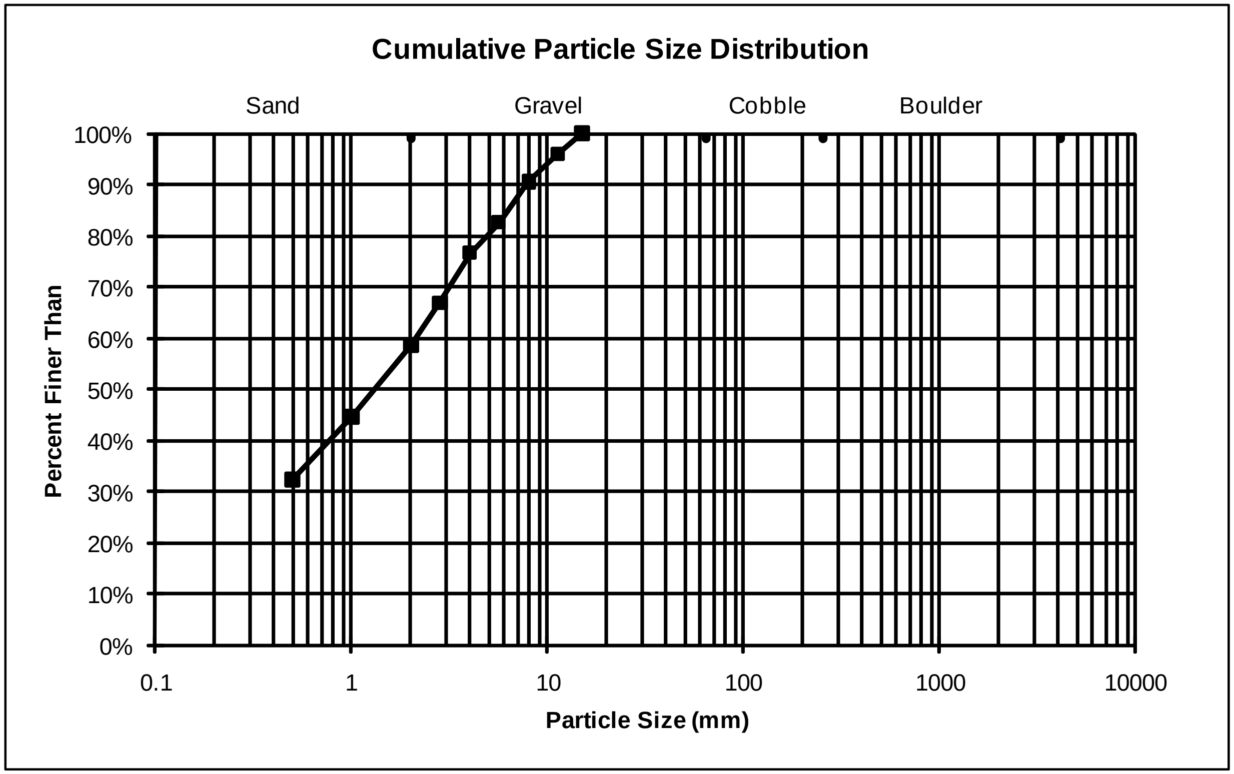
COMMENTS: Grab Sample of 2008 Sediment Accumulation

Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	182.80	32.3%	
0.5	69.50	12.3%	32.3%
1.0	78.30	13.8%	44.6%
2.0	47.80	8.4%	58.4%
2.8	55.00	9.7%	66.9%
4.0	33.90	6.0%	76.6%
5.6	44.30	7.8%	82.6%
8.0	31.20	5.5%	90.4%
11.2	22.90	4.0%	96.0%
15.0	*		100.0%
22.4			-
32.0			
45.0			
64.0			
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	565.70		

*Measured value of the largest particle in the sample and not a sieve weight

SITE NAME: Pike's Peak Highway - Cut Slope
ID NUMBER: 192CS Lower Fence
DATE: 8/19/2008
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	0.037	**0.582**	**1.311**	**5.967**	**10.568**	**15.0**



Sieve Analysis Worksheet

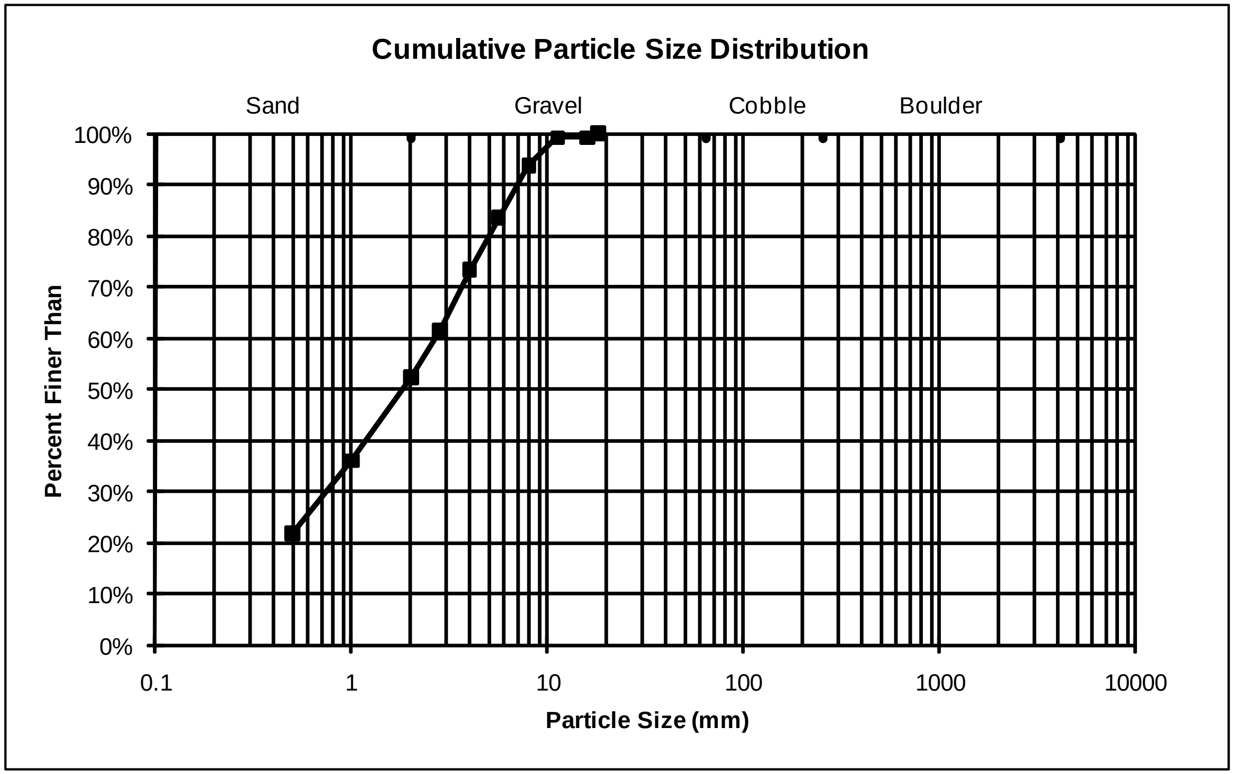
COMMENTS: Grab Sample of 2008 Sediment Accumulation

Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	106.10	21.8%	
0.5	69.20	14.2%	21.8%
1.0	79.10	16.2%	36.0%
2.0	44.60	9.2%	52.2%
2.8	58.20	12.0%	61.4%
4.0	49.70	10.2%	73.4%
5.6	49.50	10.2%	83.6%
8.0	26.40	5.4%	93.7%
11.2	0.00	0.0%	99.2%
16.0	4.10	0.8%	99.2%
18.0	*		100.0%
32.0			-
45.0			
64.0			
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	486.90		

*Measured value of the largest particle in the sample and not a sieve weight

SITE NAME: Pike's Peak Highway - Cut Slope
ID NUMBER: 192CS Upper Fence
DATE: 8/19/2008
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	**D15**	**D35**	**D50**	**D84**	**D95**	**Lpart**
	0.110	**0.952**	**1.817**	**5.685**	**8.653**	**18.0**



Sieve Analysis Worksheet

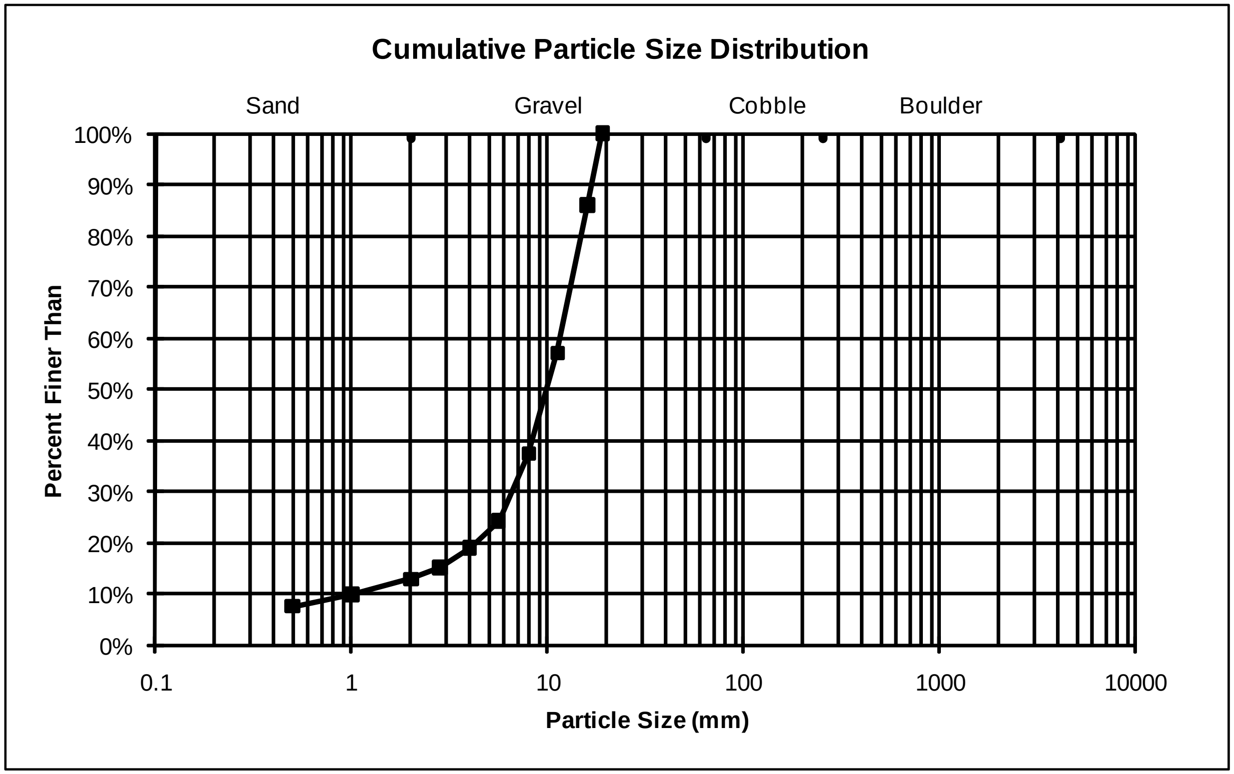
COMMENTS: Grab Sample of 2009 Sediment Accumulation

Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	39.80	7.5%	
0.5	12.40	2.3%	7.5%
1.0	15.80	3.0%	9.8%
2.0	11.70	2.2%	12.8%
2.8	21.20	4.0%	15.0%
4.0	28.00	5.3%	19.0%
5.6	69.20	13.0%	24.3%
8.0	104.60	19.7%	37.3%
11.2	153.10	28.8%	57.0%
16.0	74.90	14.1%	85.9%
19.0	*		100.0%
32.0			-
45.0			
64.0			
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	530.70		

*Measured value of the largest particle in the sample and not a sieve weight

SITE NAME: Pike's Peak Highway - Cut Slope
ID NUMBER: 011CS Lower Fence
DATE: 5/11/2009
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	2.792	7.506	9.932	15.631	17.878	19.0



Sieve Analysis Worksheet

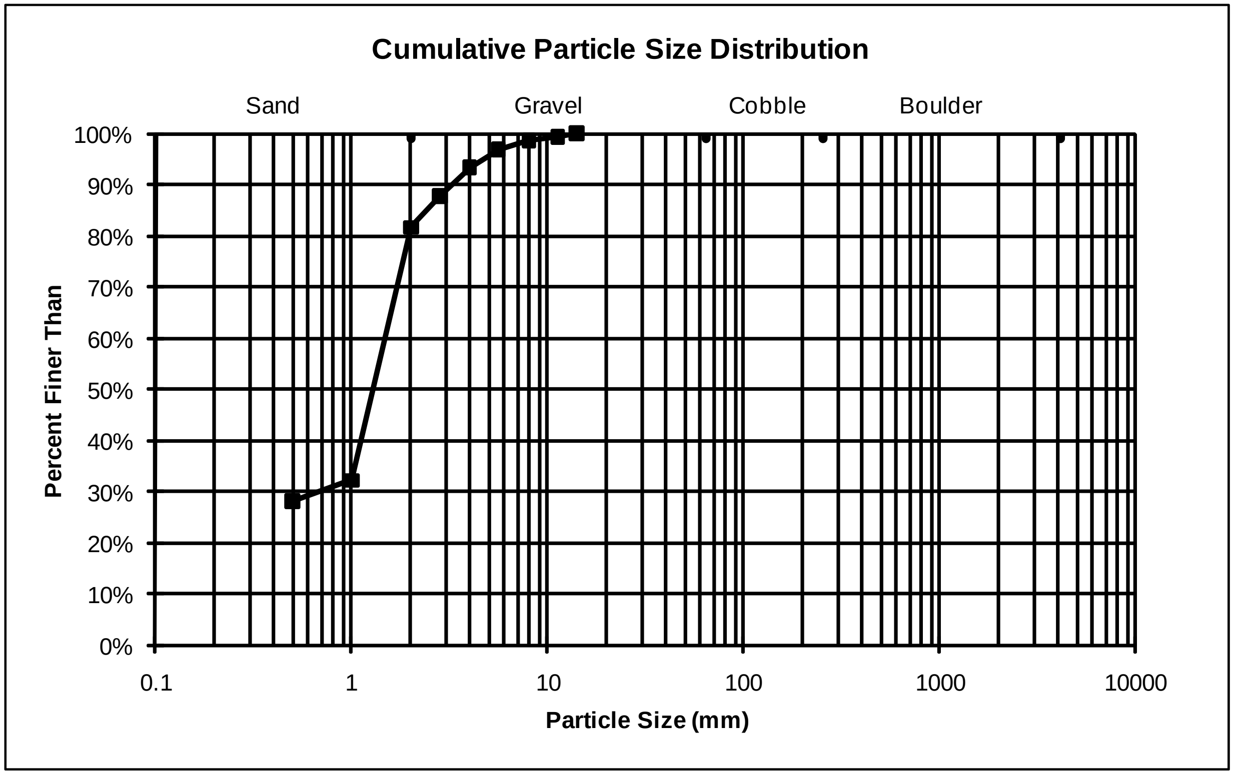
COMMENTS: Grab Sample of 2009 Sediment Accumulation

Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	259.40	28.0%	
0.5	37.70	4.1%	28.0%
1.0	457.60	49.5%	32.1%
2.0	55.70	6.0%	81.6%
2.8	53.30	5.8%	87.6%
4.0	31.90	3.4%	93.4%
5.6	17.30	1.9%	96.8%
8.0	5.10	0.6%	98.7%
11.2	6.90	0.7%	99.3%
14.0	*		100.0%
22.4			-
32.0			
45.0			
64.0			
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	924.90		

*Measured value of the largest particle in the sample and not a sieve weight

SITE NAME: Pike's Peak Highway - Cut Slope
ID NUMBER: 011CS Upper Fence
DATE: 5/11/2009
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	0.052	1.041	1.285	2.287	4.683	14.0



Sieve Analysis Worksheet

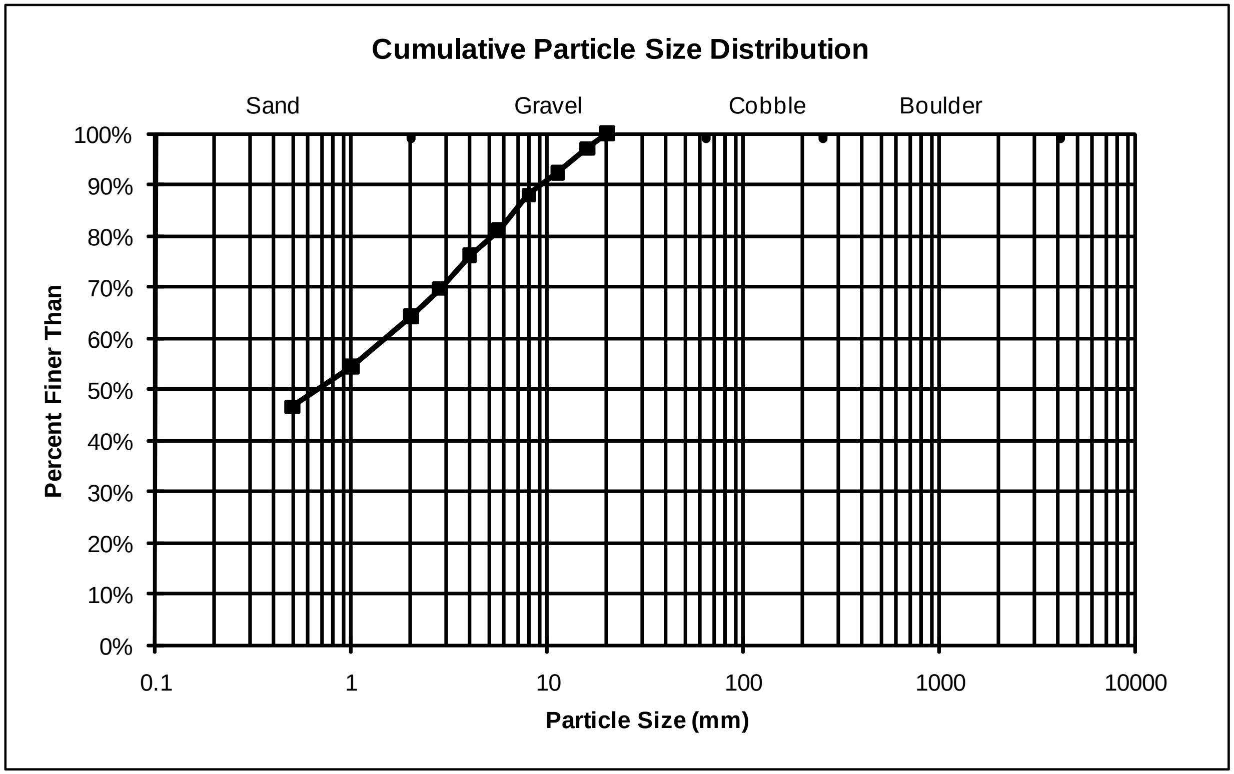
COMMENTS: Grab Sample of 2009 Sediment Accumulation

Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	355.40	46.5%	
0.5	60.90	8.0%	46.5%
1.0	74.10	9.7%	54.5%
2.0	41.50	5.4%	64.2%
2.8	50.30	6.6%	69.6%
4.0	37.00	4.8%	76.2%
5.6	53.00	6.9%	81.0%
8.0	33.60	4.4%	87.9%
11.2	36.00	4.7%	92.3%
16.0	22.50	2.9%	97.1%
20.0	*		100.0%
32.0			-
45.0			
64.0			
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	764.30		

*Measured value of the largest particle in the sample and not a sieve weight

SITE NAME: Pike's Peak Highway - Cut Slope
ID NUMBER: 049CS Lower Fence
DATE: 9/4/2009
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	0.019	0.151	0.678	6.529	13.693	20.0



Sieve Analysis Worksheet

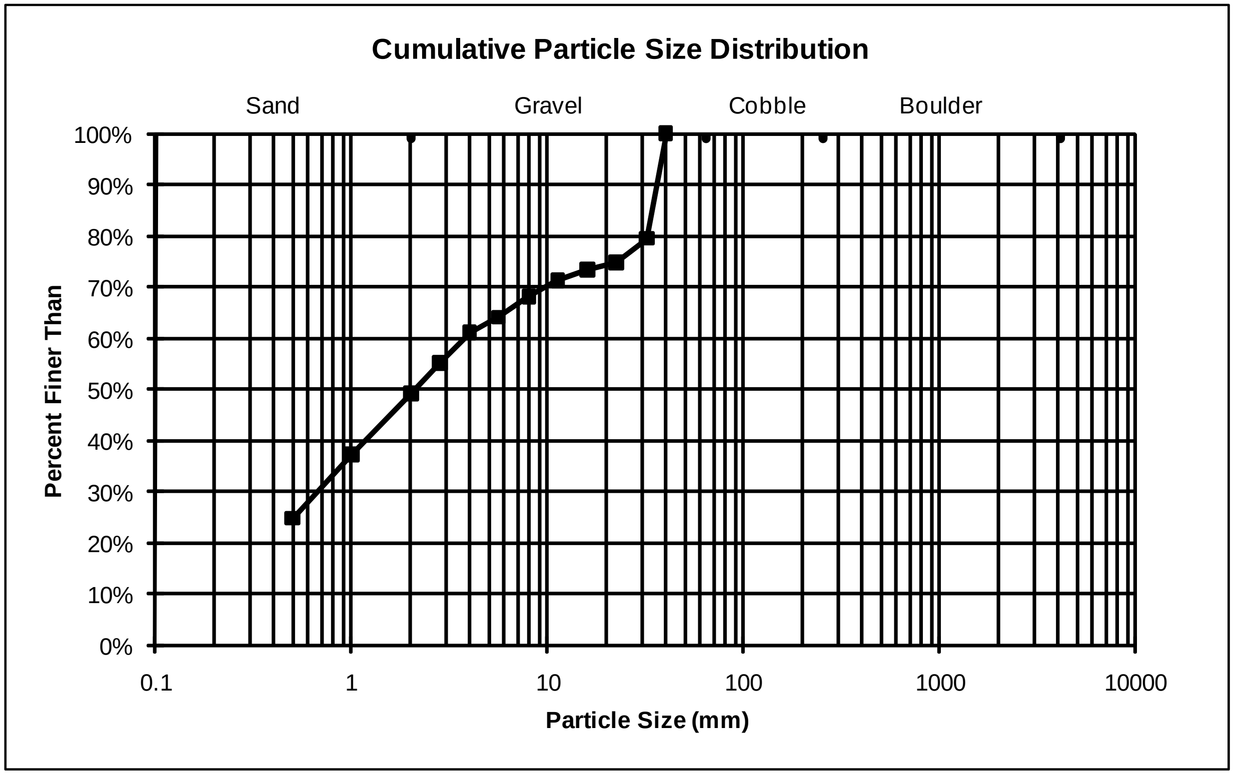
COMMENTS: Grab Sample of 2009 Sediment Accumulation

Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	142.50	24.7%	
0.5	71.50	12.4%	24.7%
1.0	69.40	12.0%	37.1%
2.0	34.40	6.0%	49.1%
2.8	34.90	6.1%	55.1%
4.0	16.90	2.9%	61.2%
5.6	22.90	4.0%	64.1%
8.0	17.90	3.1%	68.1%
11.2	13.00	2.3%	71.2%
16.0	7.50	1.3%	73.4%
22.4	27.20	4.7%	74.7%
32.0	118.60	20.6%	79.4%
40.0	*		100.0%
64.0			-
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	576.70		

*Measured value of the largest particle in the sample and not a sieve weight

SITE NAME: Pike's Peak Highway - Cut Slope
ID NUMBER: 059CS Lower Fence
DATE: 5/14/2009
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	0.074	0.889	2.099	33.625	37.888	40.0



Sieve Analysis Worksheet

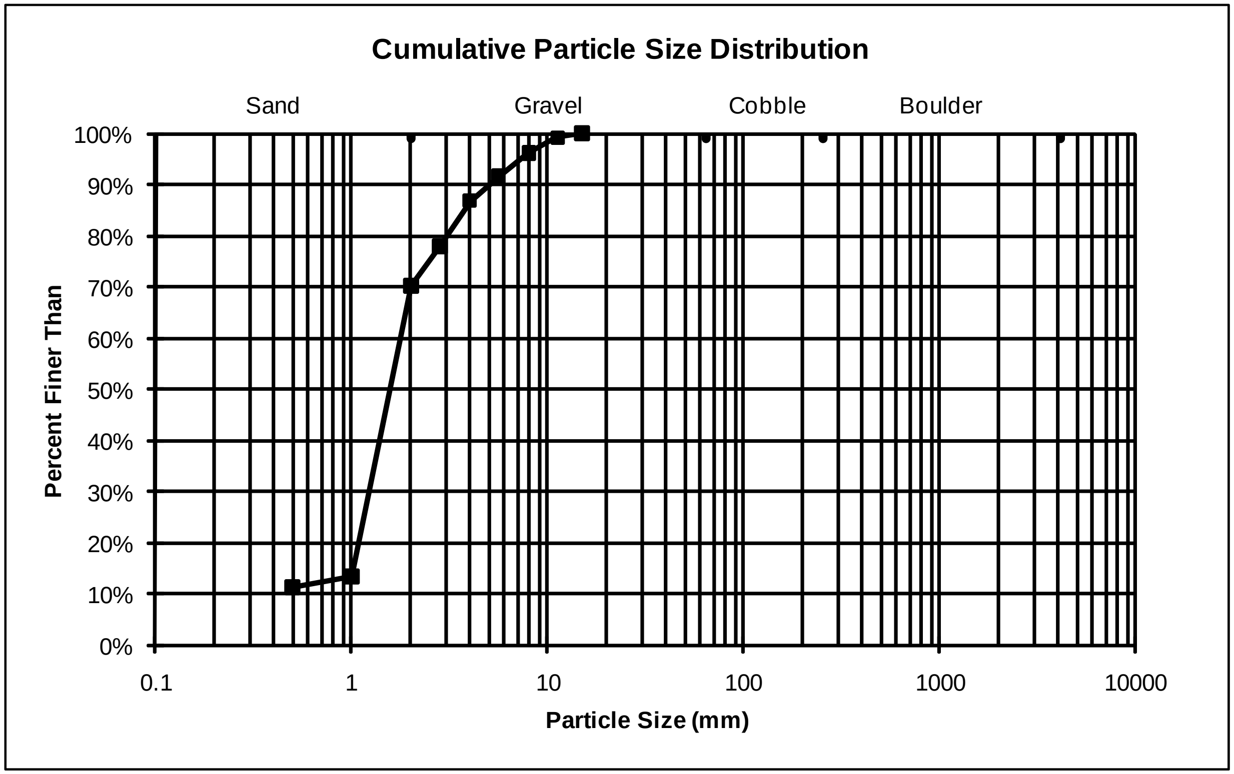
Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	98.60	11.2%	
0.5	19.30	2.2%	11.2%
1.0	499.00	56.8%	13.4%
2.0	67.30	7.7%	70.2%
2.8	78.30	8.9%	77.9%
4.0	42.60	4.8%	86.8%
5.6	40.40	4.6%	91.6%
8.0	25.60	2.9%	96.2%
11.2	7.40	0.8%	99.2%
15.0	*		100.0%
22.4			-
32.0			
45.0			
64.0			
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	878.50		

*Measured value of the largest particle in the sample and not a sieve weight

COMMENTS: Grab Sample of 2009 Sediment Accumulation

SITE NAME: Pike's Peak Highway - Cut Slope
ID NUMBER: 078CS Lower Fence
DATE: 7/29/2009
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	1.019	**1.301**	**1.563**	**3.577**	**7.264**	**15.0**



Sieve Analysis Worksheet

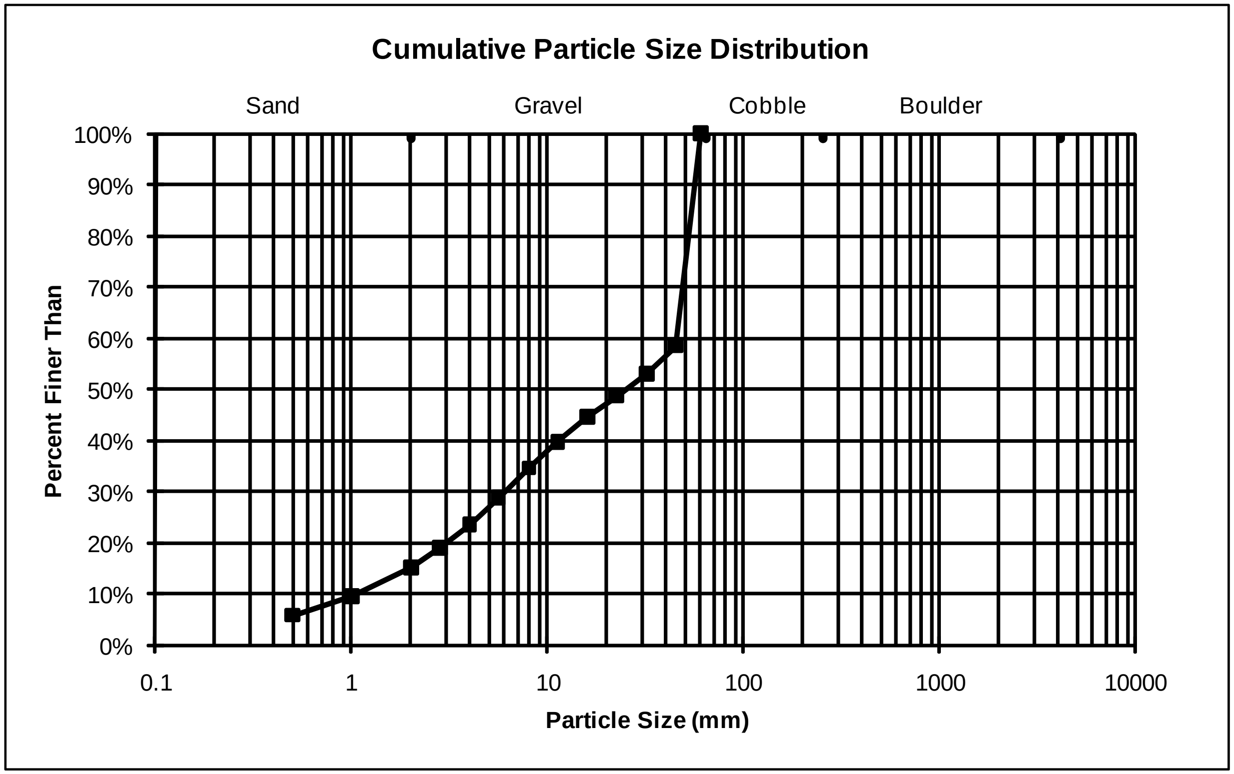
COMMENTS: Grab Sample of 2009 Sediment Accumulation

Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	58.20	5.8%	
0.5	37.10	3.7%	5.8%
1.0	57.00	5.6%	9.4%
2.0	39.00	3.9%	15.1%
2.8	46.50	4.6%	18.9%
4.0	52.60	5.2%	23.5%
5.6	58.40	5.8%	28.7%
8.0	52.30	5.2%	34.5%
11.2	48.80	4.8%	39.7%
16.0	40.80	4.0%	44.5%
22.4	45.40	4.5%	48.6%
32.0	53.60	5.3%	53.1%
45.0	420.40	41.6%	58.4%
60.0	*		100.0%
90			-
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	1010.10		

*Measured value of the largest particle in the sample and not a sieve weight

SITE NAME: Pike's Peak Highway - Cut Slope
ID NUMBER: 087CS Lower Fence
DATE: 6/15/2009
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	1.981	8.247	25.073	53.718	57.962	60.0



Sieve Analysis Worksheet

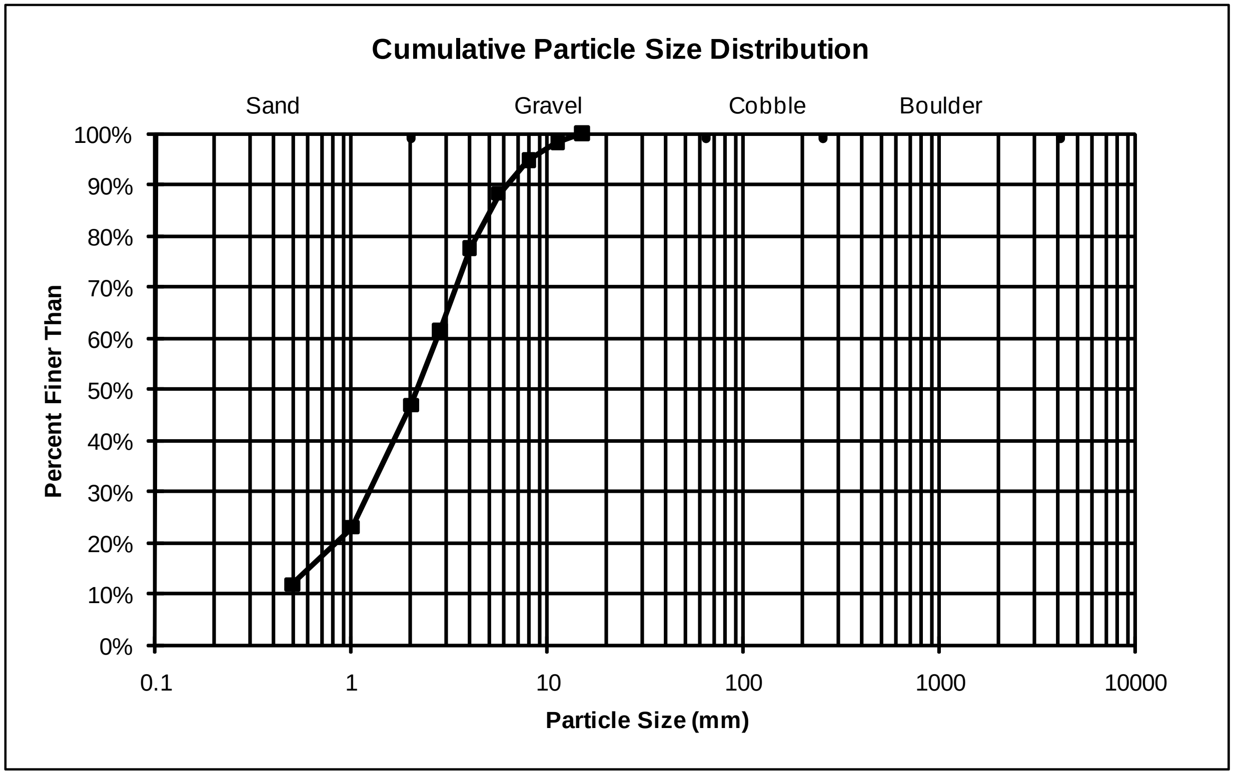
Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	102.50	11.8%	
0.5	96.70	11.1%	11.8%
1.0	207.50	23.9%	22.9%
2.0	127.10	14.6%	46.9%
2.8	140.00	16.1%	61.5%
4.0	92.00	10.6%	77.6%
5.6	56.80	6.5%	88.2%
8.0	30.10	3.5%	94.8%
11.2	15.30	1.8%	98.2%
15.0	*		100.0%
22.4			-
32.0			
45.0			
64.0			
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	868.00		

*Measured value of the largest particle in the sample and not a sieve weight

COMMENTS: Grab Sample of 2009 Sediment Accumulation

SITE NAME: Pike's Peak Highway - Cut Slope
ID NUMBER: 141CS Upper Fence
DATE: 6/23/2009
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	0.610	1.418	2.150	4.897	8.181	15.0



Sieve Analysis Worksheet

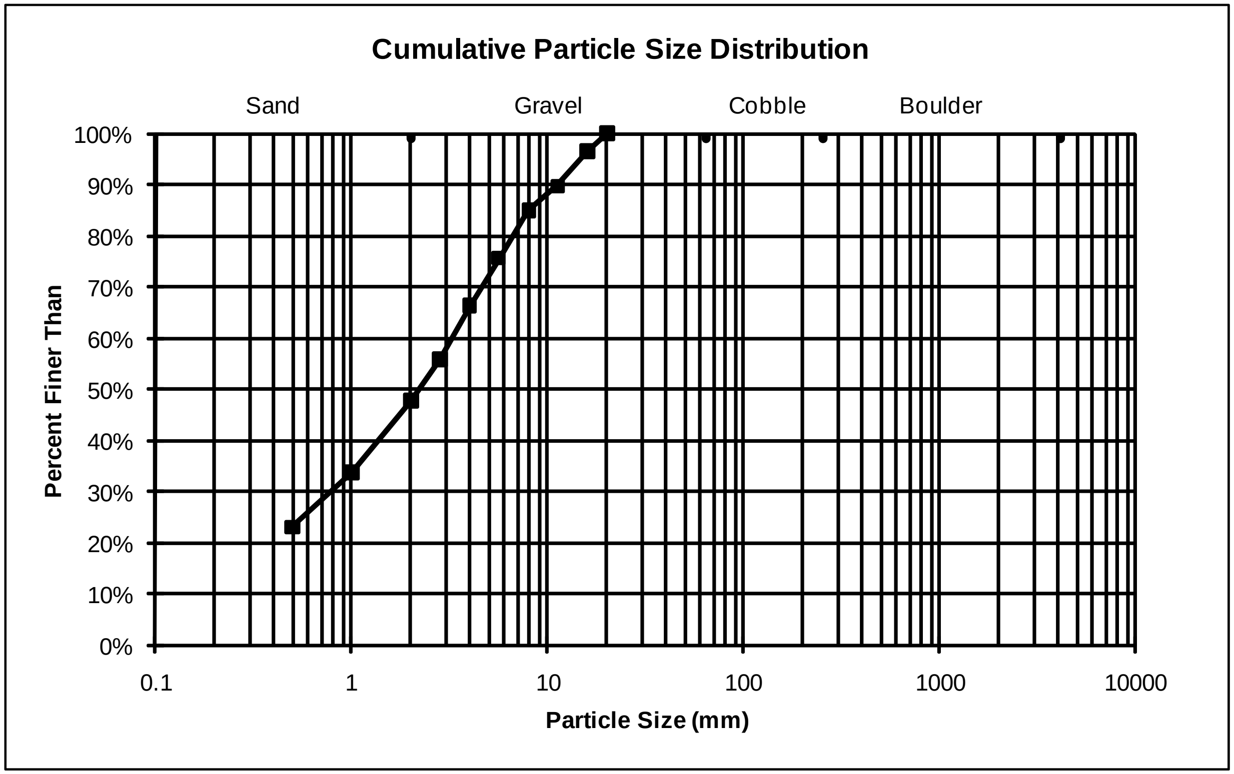
COMMENTS: Grab Sample of 2009 Sediment Accumulation

Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	194.50	23.0%	
0.5	89.40	10.6%	23.0%
1.0	119.00	14.1%	33.6%
2.0	69.70	8.2%	47.6%
2.8	88.90	10.5%	55.9%
4.0	77.40	9.2%	66.4%
5.6	78.80	9.3%	75.6%
8.0	40.50	4.8%	84.9%
11.2	57.30	6.8%	89.7%
16.0	30.10	3.6%	96.4%
20.0	*		100.0%
32.0			-
45.0			
64.0			
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	845.60		

*Measured value of the largest particle in the sample and not a sieve weight

SITE NAME: Pike's Peak Highway - Cut Slope
ID NUMBER: 197CS Lower Fence
DATE: 5/11/2009
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	0.092	1.073	2.202	7.737	14.832	20.0



Sieve Analysis Worksheet

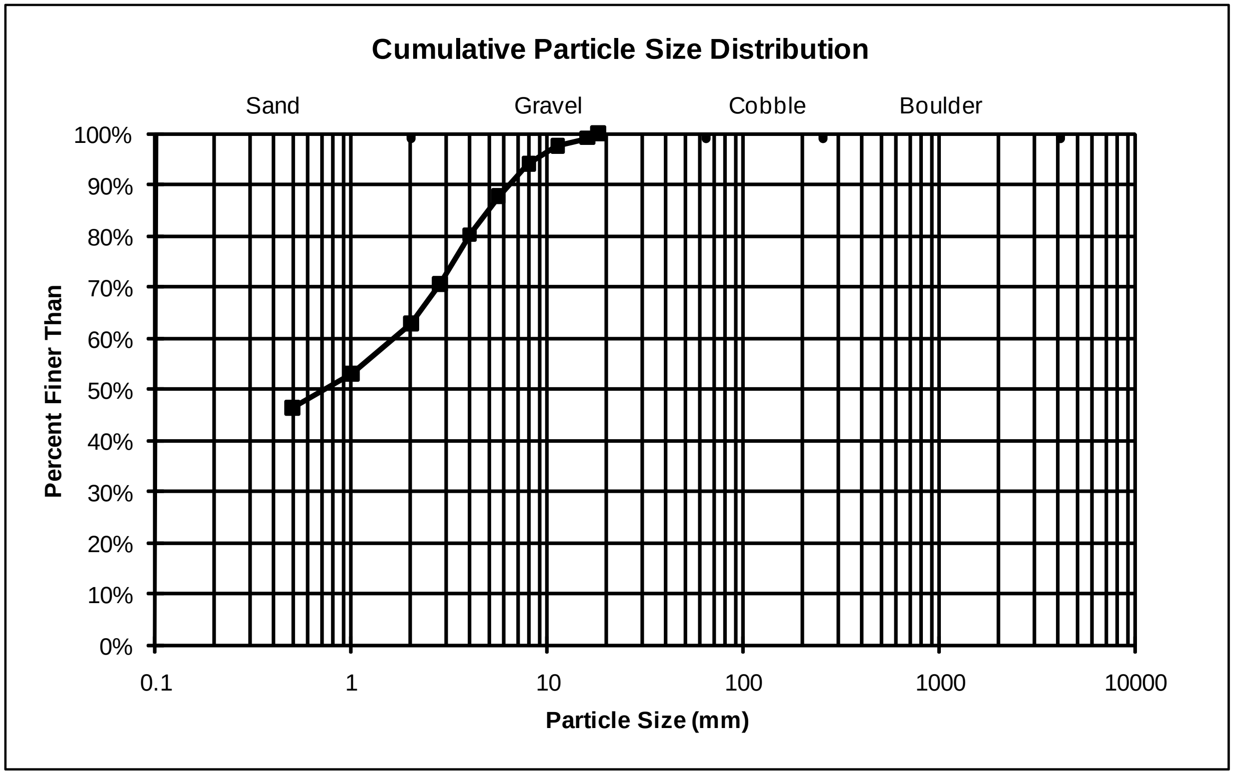
Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	307.30	46.3%	
0.5	44.80	6.8%	46.3%
1.0	64.20	9.7%	53.1%
2.0	52.00	7.8%	62.7%
2.8	64.00	9.6%	70.6%
4.0	50.50	7.6%	80.2%
5.6	41.20	6.2%	87.8%
8.0	23.80	3.6%	94.0%
11.2	9.80	1.5%	97.6%
16.0	6.00	0.9%	99.1%
18.0	*		100.0%
32.0			-
45.0			
64.0			
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	663.60		

*Measured value of the largest particle in the sample and not a sieve weight

COMMENTS: Grab Sample of 2009 Sediment Accumulation

SITE NAME: Pike's Peak Highway - Cut Slope
ID NUMBER: 197CS Upper Fence
DATE: 5/12/2009
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	0.019	0.153	0.730	4.729	8.760	18.0



Sieve Analysis Worksheet

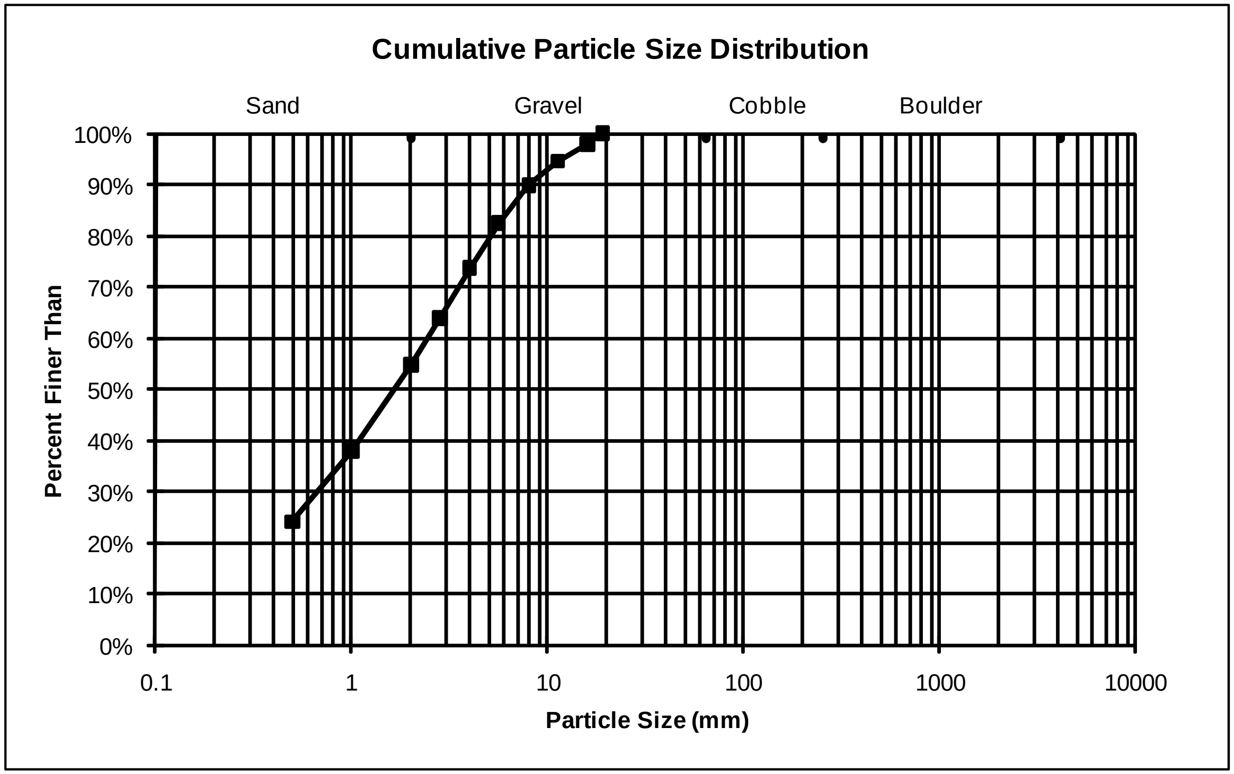
COMMENTS: Grab Sample of 2009 Sediment Accumulation

Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	152.80	24.0%	
0.5	87.80	13.8%	24.0%
1.0	108.10	17.0%	37.8%
2.0	56.90	9.0%	54.9%
2.8	63.50	10.0%	63.8%
4.0	55.10	8.7%	73.8%
5.6	47.10	7.4%	82.5%
8.0	29.60	4.7%	89.9%
11.2	21.60	3.4%	94.5%
16.0	13.20	2.1%	97.9%
19.0	*		100.0%
32.0			-
45.0			
64.0			
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	635.70		

*Measured value of the largest particle in the sample and not a sieve weight

SITE NAME: Pike's Peak Highway - Cut Slope
ID NUMBER: 197CS Lower Fence
DATE: 8/18/2009
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	0.081	0.867	1.641	6.031	11.772	19.0



Sieve Analysis Worksheet

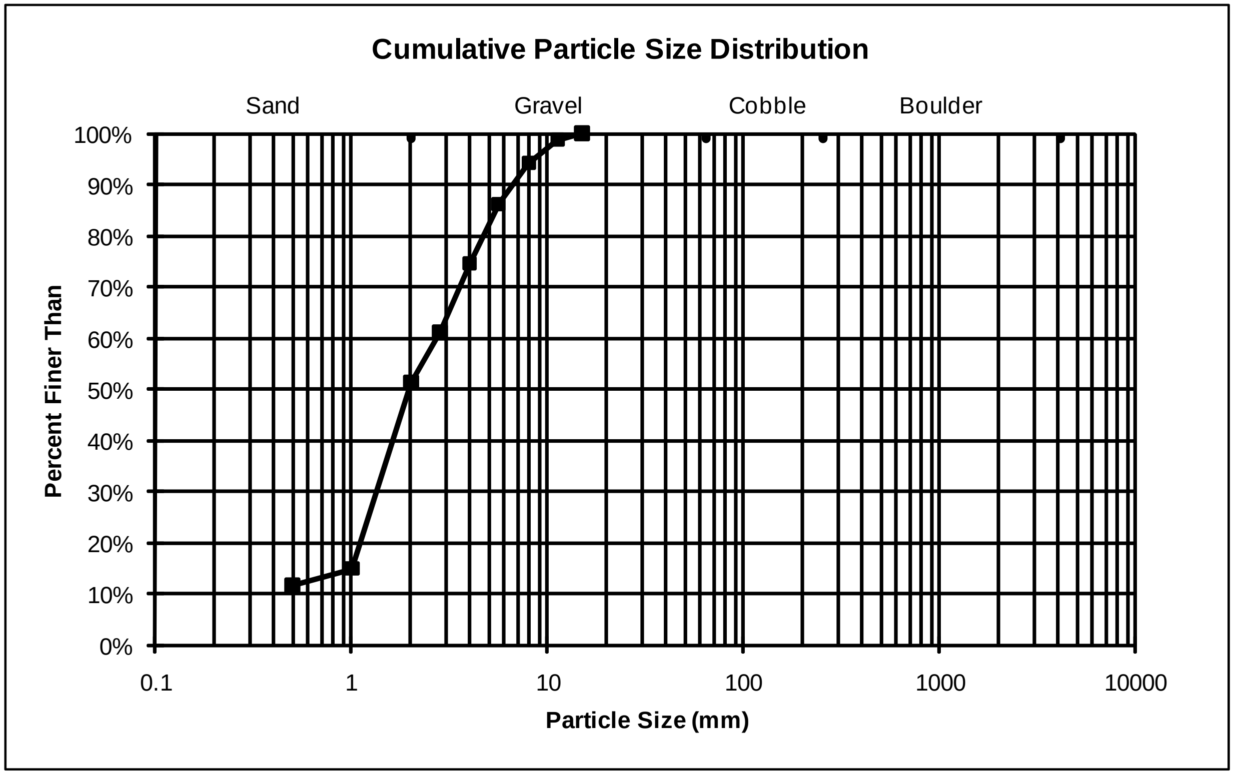
COMMENTS: Grab Sample of 2009 Sediment Accumulation

Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	119.60	11.5%	
0.5	35.40	3.4%	11.5%
1.0	378.10	36.3%	14.9%
2.0	101.90	9.8%	51.2%
2.8	141.40	13.6%	61.0%
4.0	120.20	11.5%	74.6%
5.6	83.70	8.0%	86.2%
8.0	47.60	4.6%	94.2%
11.2	12.80	1.2%	98.8%
15.0	*		100.0%
22.4			-
32.0			
45.0			
64.0			
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	1040.70		

*Measured value of the largest particle in the sample and not a sieve weight

SITE NAME: Pike's Peak Highway - Cut Slope
ID NUMBER: 197CS Upper Fence
DATE: 8/18/2009
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	1.002	**1.468**	**1.954**	**5.259**	**8.487**	**15.0**



Sieve Analysis Worksheet

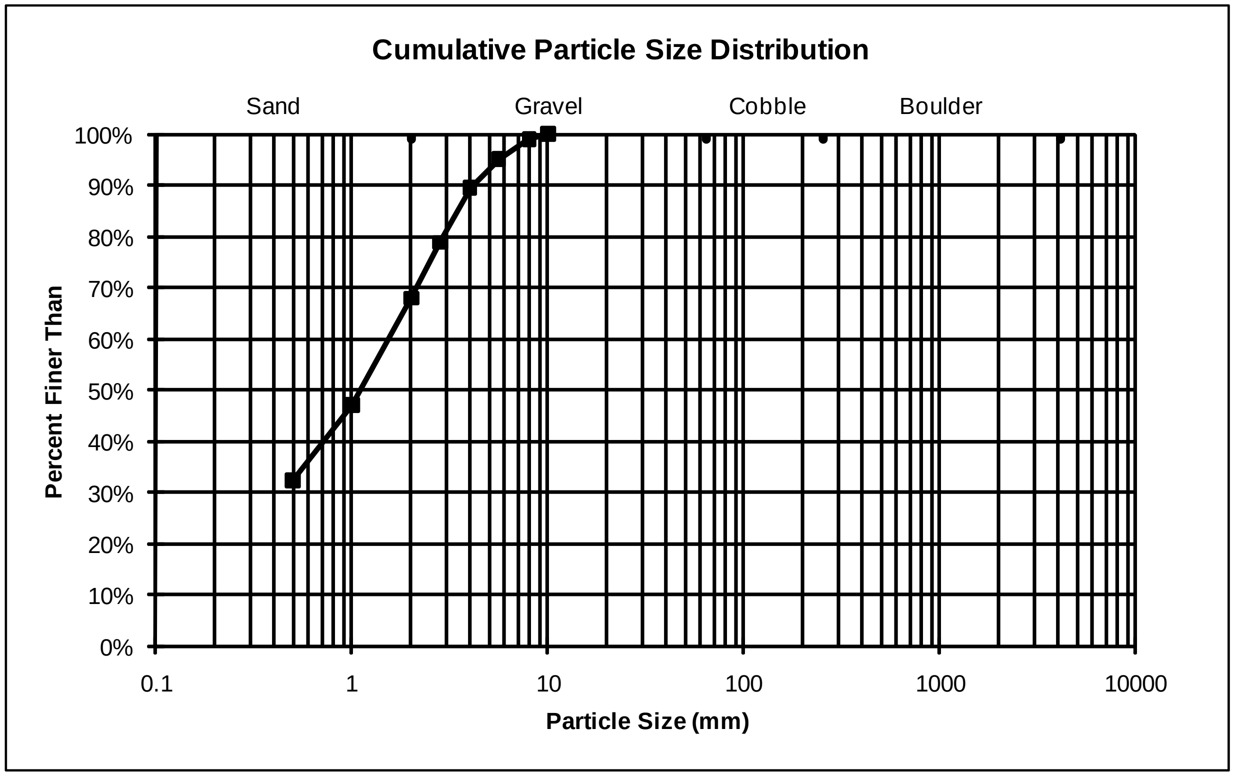
COMMENTS: Grab Sample of 2008 Sediment Accumulation

Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	282.40	32.2%	
0.5	130.90	14.9%	32.2%
1.0	182.90	20.8%	47.1%
2.0	95.80	10.9%	67.9%
2.8	93.80	10.7%	78.8%
4.0	48.80	5.6%	89.5%
5.6	35.00	4.0%	95.1%
8.0	8.40	1.0%	99.0%
10.0	*		100.0%
16.0			-
22.4			
32.0			
45.0			
64.0			
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	878.00		

*Measured value of the largest particle in the sample and not a sieve weight

SITE NAME: Pike's Peak Highway - Fill Slope
ID NUMBER: 001FS Upper Fence
DATE: 8/13/2008
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	0.038	0.570	1.102	3.329	5.581	10.0



Sieve Analysis Worksheet

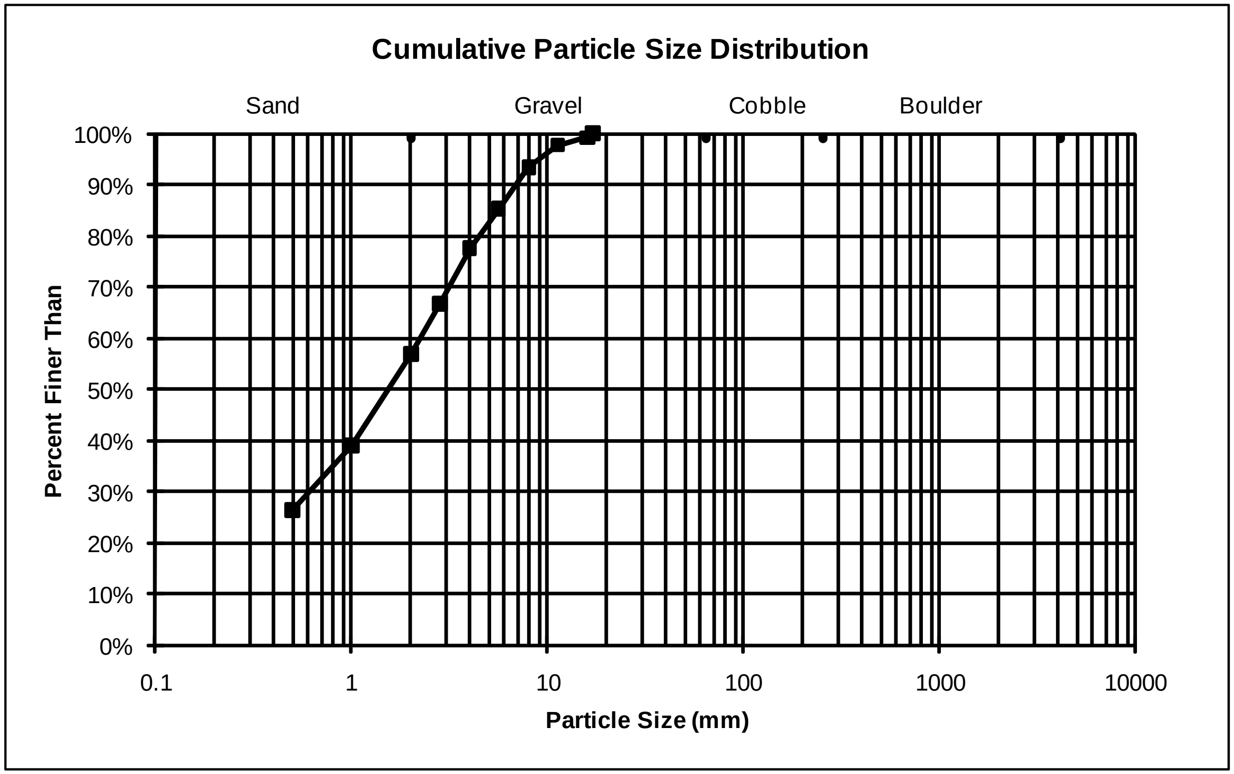
COMMENTS: Grab Sample of 2008 Sediment Accumulation

Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	329.90	26.3%	
0.5	159.00	12.7%	26.3%
1.0	224.90	17.9%	38.9%
2.0	122.90	9.8%	56.8%
2.8	136.40	10.9%	66.6%
4.0	96.70	7.7%	77.5%
5.6	103.70	8.3%	85.2%
8.0	53.50	4.3%	93.4%
11.2	17.90	1.4%	97.7%
16.0	10.90	0.9%	99.1%
17.0	*		100.0%
32.0			-
45.0			
64.0			
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	1255.80		

*Measured value of the largest particle in the sample and not a sieve weight

SITE NAME: Pike's Peak Highway - Fill Slope
ID NUMBER: 039FS Lower Fence
DATE: 7/29/2008
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	0.062	0.806	1.535	5.317	9.044	17.0



Sieve Analysis Worksheet

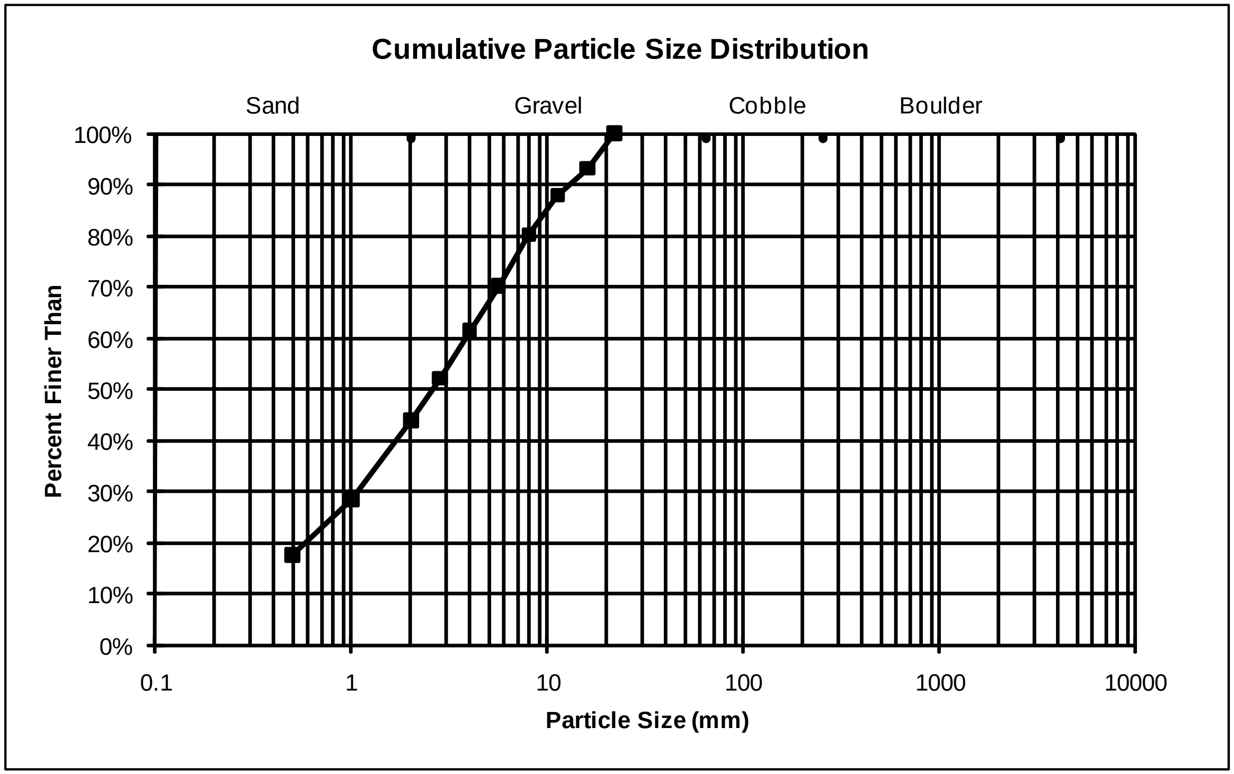
Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	100.60	17.6%	
0.5	62.10	10.9%	17.6%
1.0	88.10	15.4%	28.5%
2.0	46.80	8.2%	43.9%
2.8	53.70	9.4%	52.1%
4.0	50.10	8.8%	61.5%
5.6	56.80	9.9%	70.2%
8.0	44.00	7.7%	80.2%
11.2	29.90	5.2%	87.9%
16.0	39.40	6.9%	93.1%
22.0	*		100.0%
32.0			-
45.0			
64.0			
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	571.50		

*Measured value of the largest particle in the sample and not a sieve weight

COMMENTS: Grab Sample of 2008 Sediment Accumulation

SITE NAME: Pike's Peak Highway - Fill Slope
ID NUMBER: 039FS Upper Fence
DATE: 7/29/2008
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	0.244	**1.341**	**2.571**	**9.456**	**17.463**	**22.0**



Sieve Analysis Worksheet

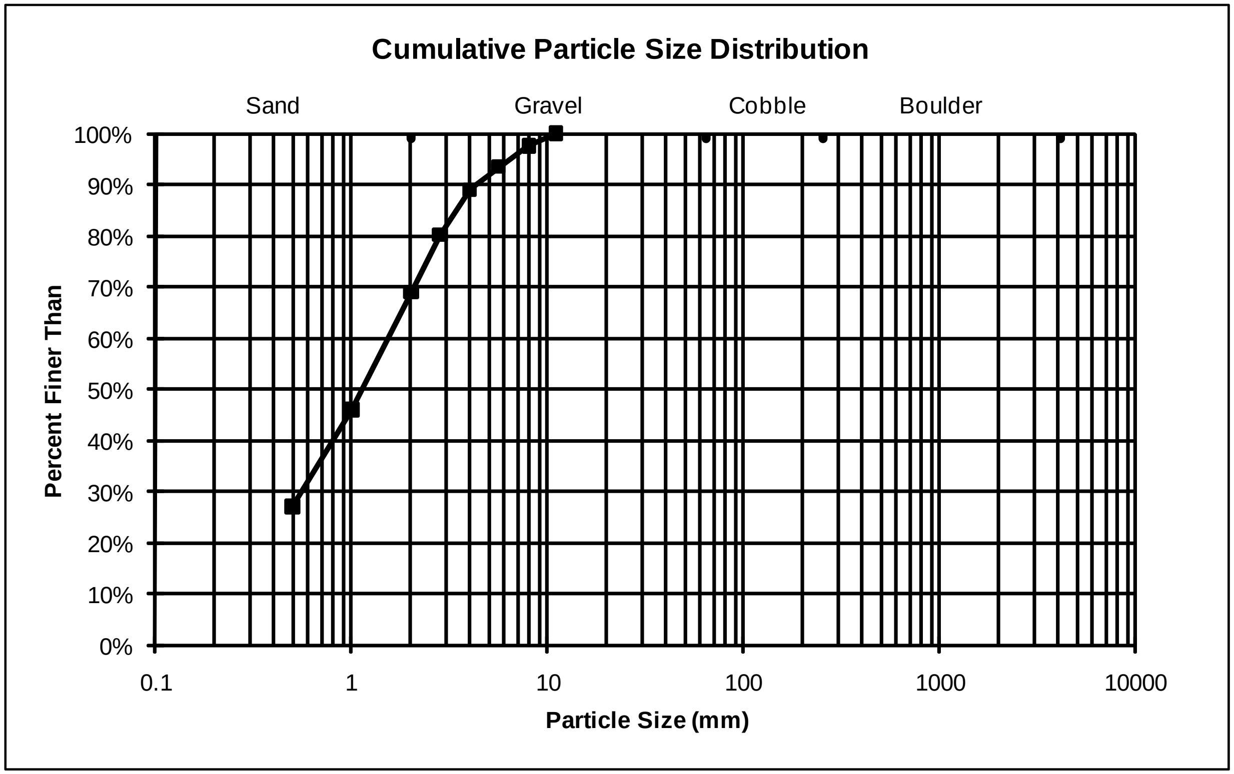
Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	121.90	27.1%	
0.5	85.10	18.9%	27.1%
1.0	102.90	22.9%	46.0%
2.0	50.40	11.2%	68.9%
2.8	39.80	8.9%	80.1%
4.0	20.10	4.5%	89.0%
5.6	18.00	4.0%	93.5%
8.0	11.40	2.5%	97.5%
11.0	*		100.0%
16.0			-
22.4			
32.0			
45.0			
64.0			
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	449.60		

*Measured value of the largest particle in the sample and not a sieve weight

COMMENTS: Grab Sample of 2008 Sediment Accumulation

SITE NAME: Pike's Peak Highway - Fill Slope
ID NUMBER: 043FS Lower Fence
DATE: 9/16/2008
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	0.057	0.667	1.127	3.271	6.423	11.0



Sieve Analysis Worksheet

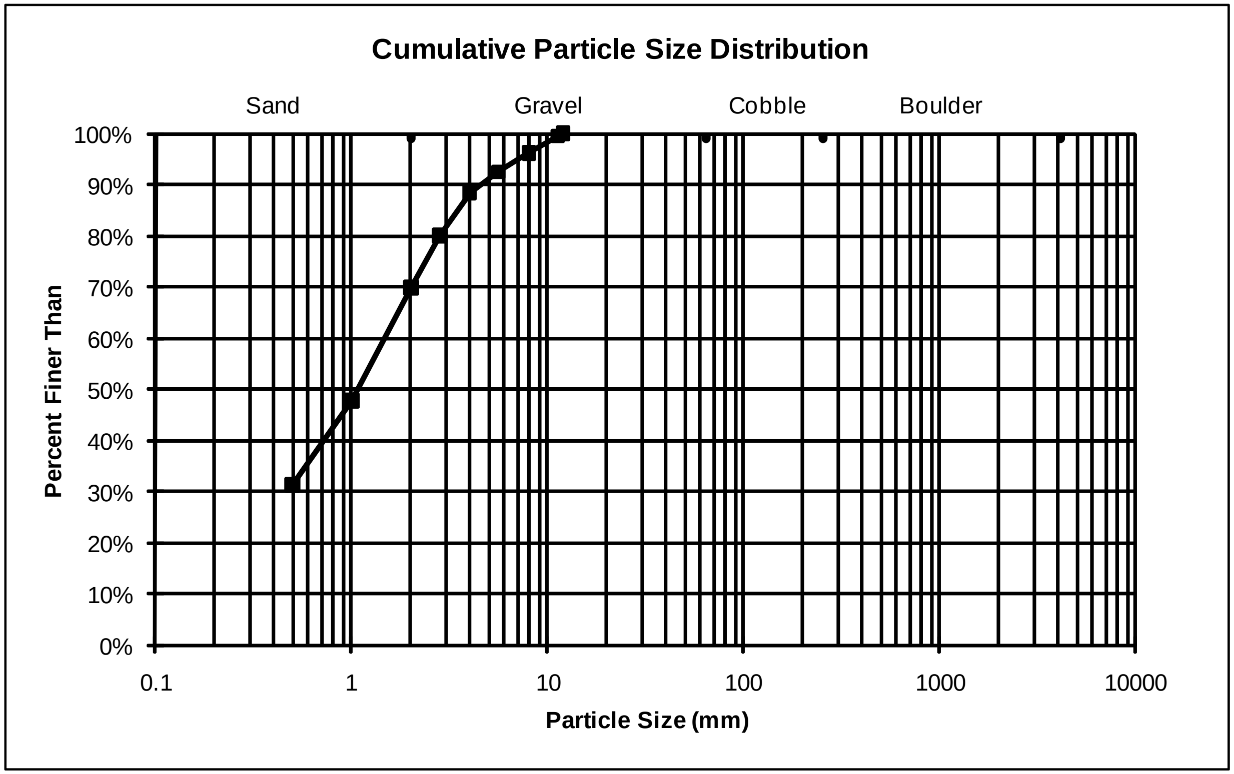
Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	188.10	31.3%	
0.5	98.60	16.4%	31.3%
1.0	132.90	22.1%	47.7%
2.0	60.40	10.1%	69.9%
2.8	51.60	8.6%	79.9%
4.0	24.00	4.0%	88.5%
5.6	22.10	3.7%	92.5%
8.0	19.70	3.3%	96.2%
11.2	3.20	0.5%	99.5%
12.0	*		100.0%
22.4			-
32.0			
45.0			
64.0			
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	600.60		

*Measured value of the largest particle in the sample and not a sieve weight

COMMENTS: Grab Sample of 2008 Sediment Accumulation

SITE NAME: Pike's Peak Highway - Fill Slope
ID NUMBER: 043FS Upper Fence
DATE: 9/16/2008
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	0.040	0.584	1.074	3.317	7.130	12.0



Sieve Analysis Worksheet

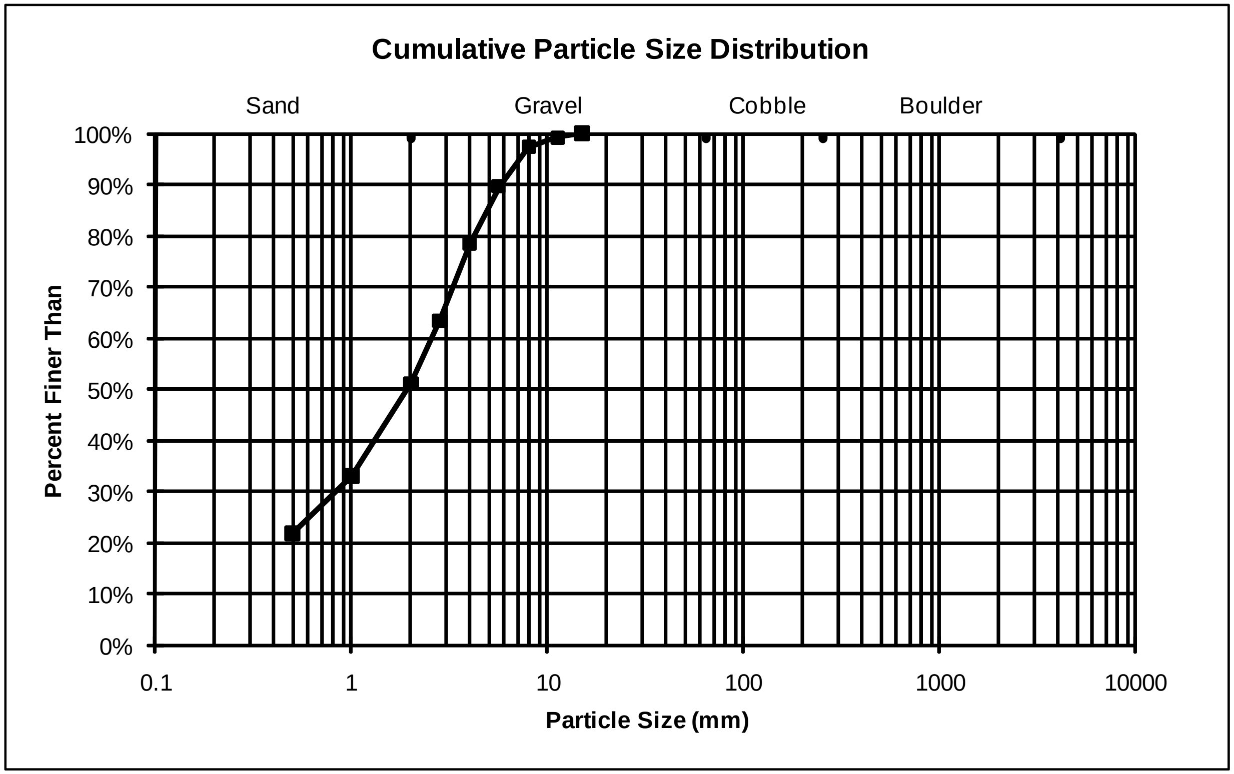
Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	109.30	21.7%	
0.5	57.30	11.4%	21.7%
1.0	91.10	18.1%	33.0%
2.0	62.00	12.3%	51.1%
2.8	76.30	15.1%	63.3%
4.0	56.40	11.2%	78.5%
5.6	39.00	7.7%	89.6%
8.0	9.00	1.8%	97.4%
11.2	4.30	0.9%	99.1%
15.0	*		100.0%
22.4			-
32.0			
45.0			
64.0			
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	504.70		

*Measured value of the largest particle in the sample and not a sieve weight

COMMENTS: Grab Sample of 2008 Sediment Accumulation

SITE NAME: Pike's Peak Highway - Fill Slope
ID NUMBER: 048FS Lower Fence
DATE: 5/12/2008
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	**D15**	**D35**	**D50**	**D84**	**D95**	**Lpart**
	0.112	**1.079**	**1.920**	**4.726**	**7.173**	**15.0**



Sieve Analysis Worksheet

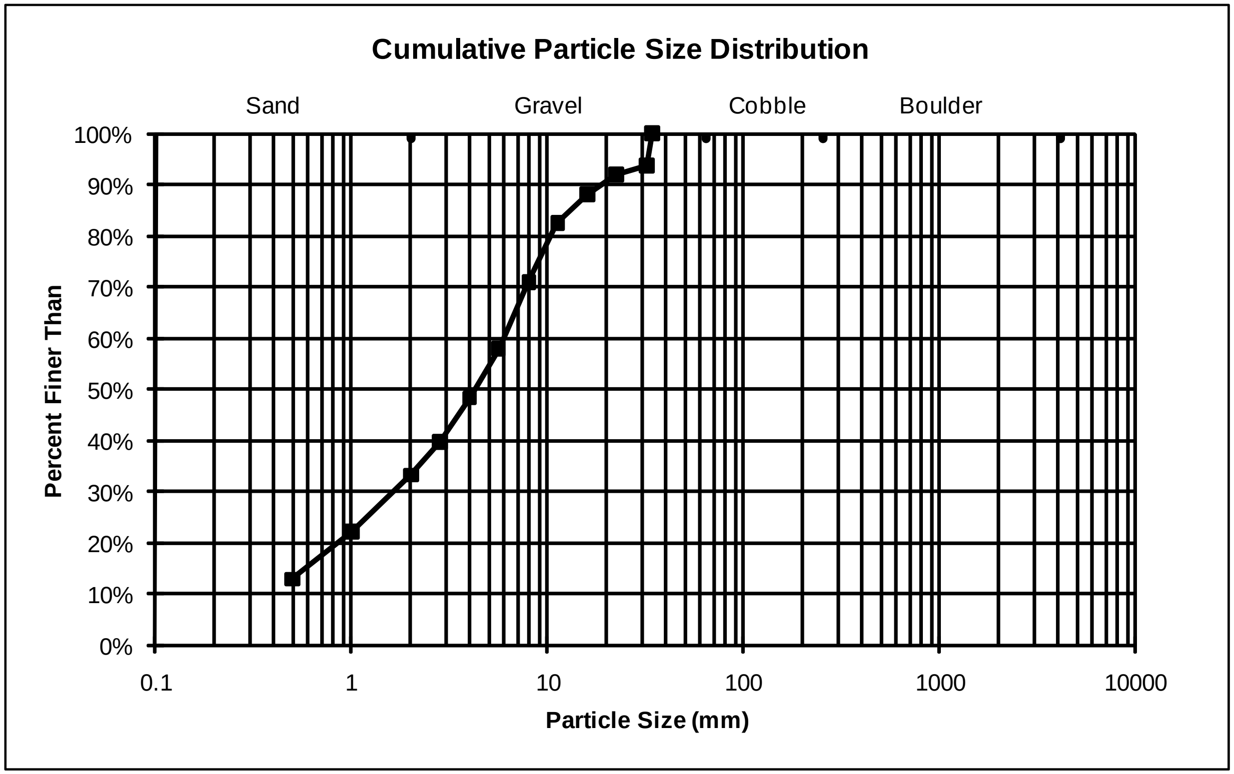
Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	88.20	12.8%	
0.5	63.90	9.3%	12.8%
1.0	76.10	11.1%	22.1%
2.0	44.40	6.5%	33.2%
2.8	59.30	8.6%	39.6%
4.0	66.80	9.7%	48.3%
5.6	89.20	13.0%	58.0%
8.0	79.10	11.5%	70.9%
11.2	39.20	5.7%	82.4%
16.0	25.20	3.7%	88.1%
22.4	13.50	2.0%	91.8%
32.0	42.80	6.2%	93.8%
34.0	*		100.0%
64.0			-
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	687.70		

*Measured value of the largest particle in the sample and not a sieve weight

COMMENTS: Grab Sample of 2008 Sediment Accumulation

SITE NAME: Pike's Peak Highway - Fill Slope
ID NUMBER: 048FS Upper Fence
DATE: 5/12/2008
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	0.588	2.199	4.248	12.342	32.384	34.0



Sieve Analysis Worksheet

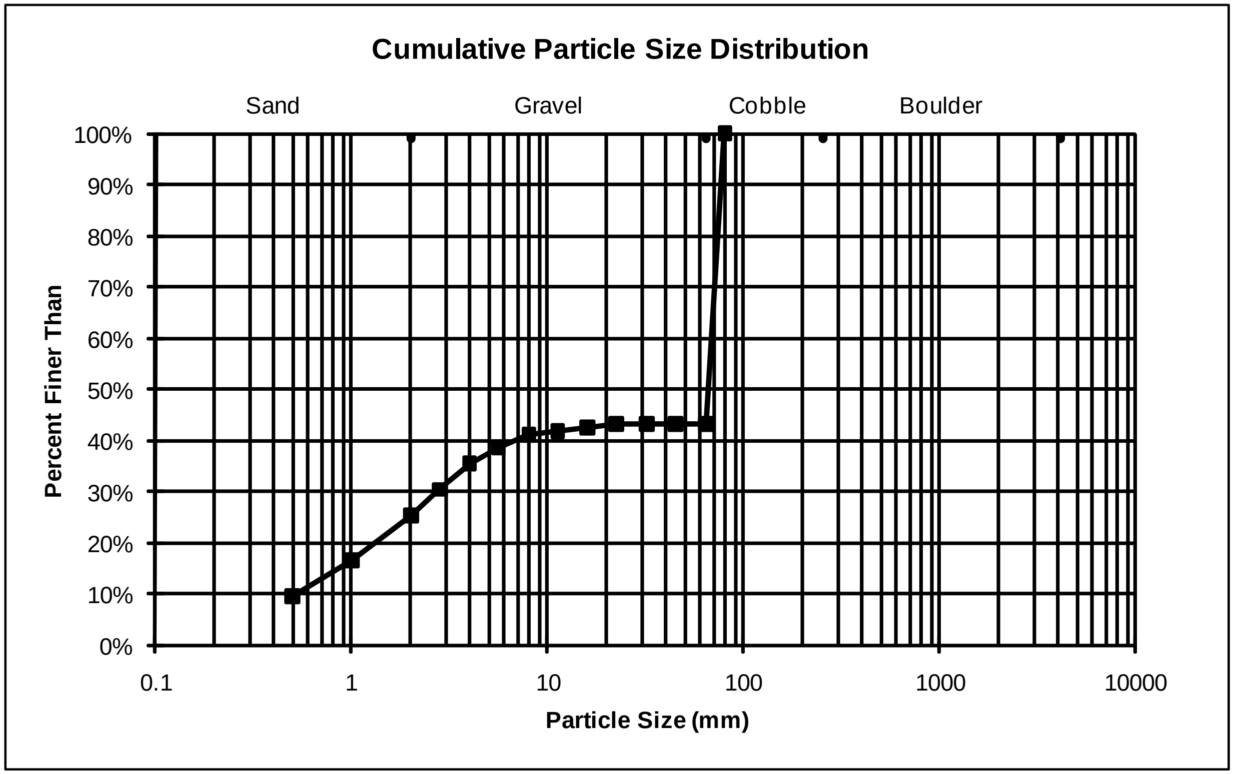
Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	114.40	9.5%	
0.5	84.20	7.0%	9.5%
1.0	108.00	8.9%	16.4%
2.0	60.70	5.0%	25.3%
2.8	60.40	5.0%	30.4%
4.0	39.40	3.3%	35.3%
5.6	29.80	2.5%	38.6%
8.0	9.20	0.8%	41.1%
11.2	8.90	0.7%	41.8%
16.0	7.90	0.7%	42.6%
22.4	0.00	0.0%	43.2%
32.0	0.00	0.0%	43.2%
45.0	0.00	0.0%	43.2%
64.0	687.20	56.8%	43.2%
80	*		100.0%
128			-
181			
256			
362			
512			
1024			
2048			
4096			
Total	1210.10		

*Measured value of the largest particle in the sample and not a sieve weight

COMMENTS: Grab Sample of 2008 Sediment Accumulation

SITE NAME: Pike's Peak Highway - Fill Slope
ID NUMBER: 052FS Lower Fence
DATE: 8/19/2008
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	**D15**	**D35**	**D50**	**D84**	**D95**	**Lpart**
	0.869	**3.903**	**65.730**	**75.125**	**78.444**	**80.0**



Sieve Analysis Worksheet

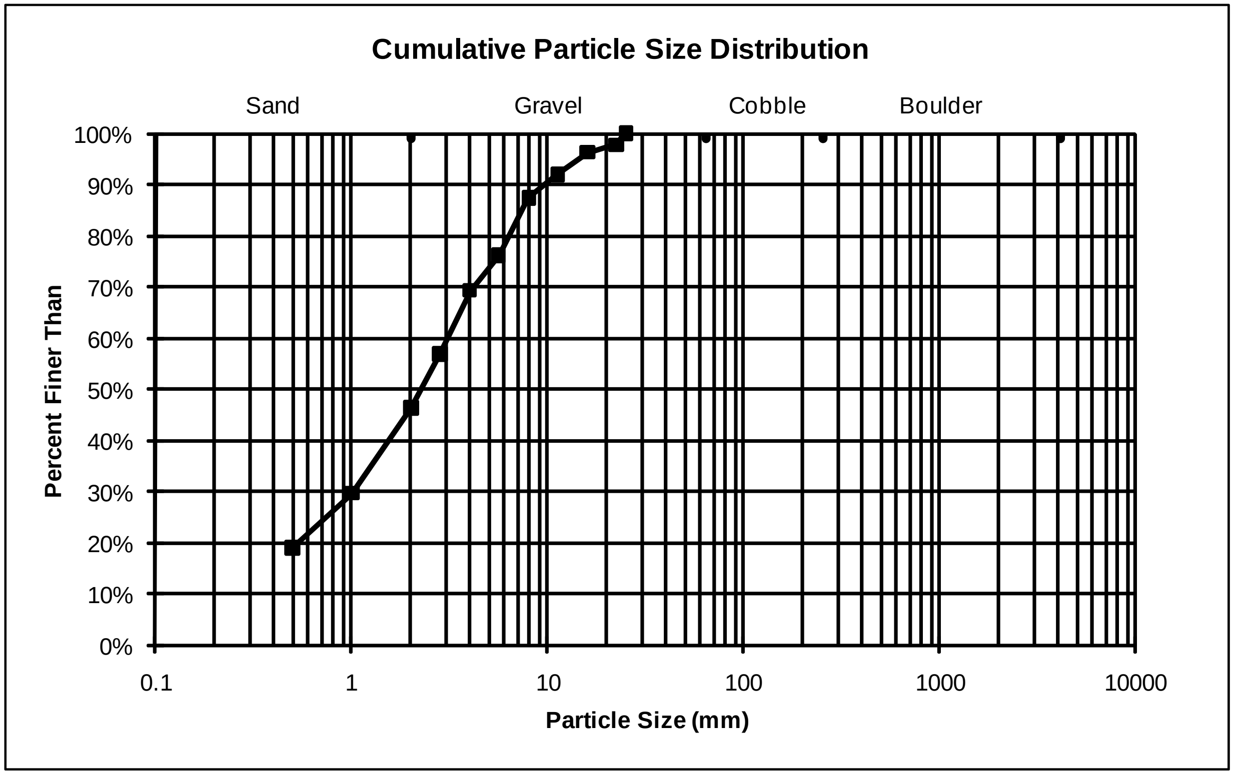
Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	171.00	19.0%	
0.5	95.00	10.6%	19.0%
1.0	150.00	16.7%	29.6%
2.0	95.00	10.6%	46.3%
2.8	111.70	12.4%	56.9%
4.0	60.70	6.8%	69.3%
5.6	101.20	11.3%	76.0%
8.0	41.90	4.7%	87.3%
11.2	38.90	4.3%	92.0%
16.0	13.10	1.5%	96.3%
22.4	20.20	2.2%	97.8%
25.0	*		100.0%
45.0			-
64.0			
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	898.70		

*Measured value of the largest particle in the sample and not a sieve weight

COMMENTS: Grab Sample of 2008 Sediment Accumulation

SITE NAME: Pike's Peak Highway - Fill Slope
ID NUMBER: 052FS Upper Fence
DATE: 8/19/2008
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	0.179	1.251	2.251	7.205	14.381	25.0



Sieve Analysis Worksheet

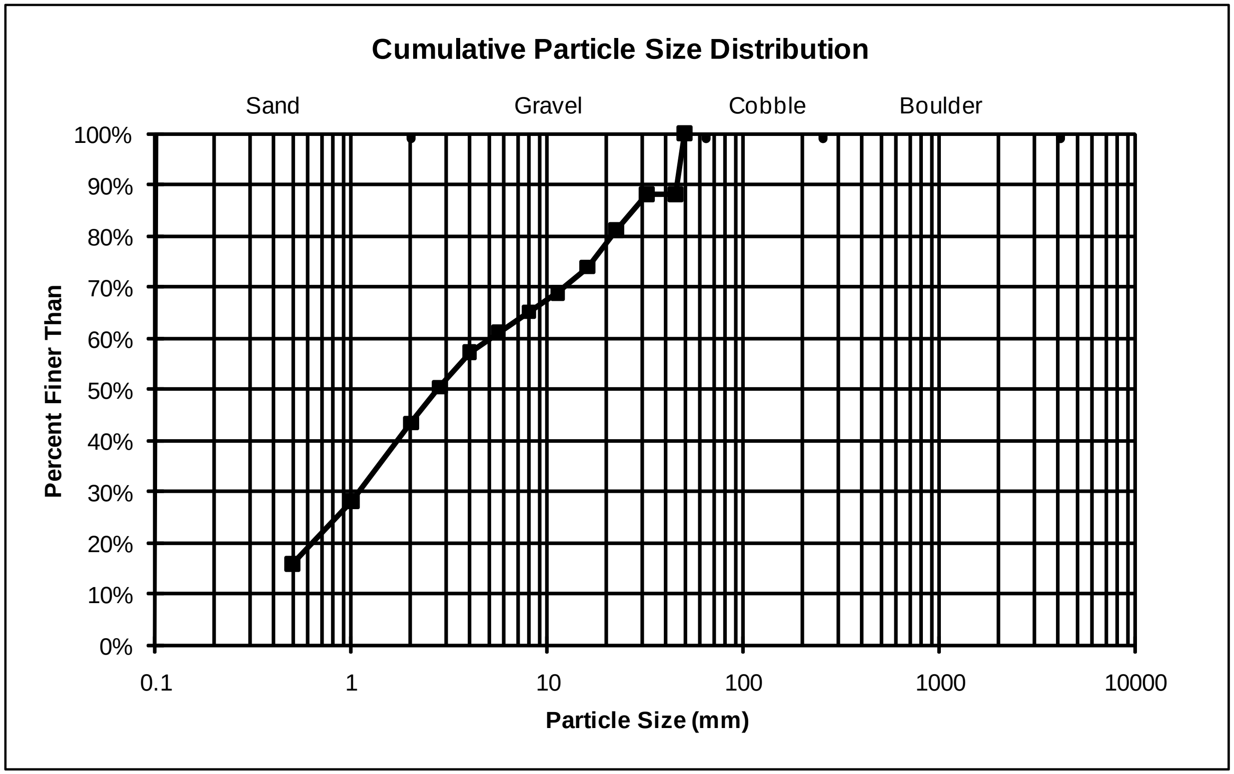
Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	188.40	15.7%	
0.5	148.90	12.4%	15.7%
1.0	183.90	15.3%	28.1%
2.0	84.20	7.0%	43.4%
2.8	80.70	6.7%	50.4%
4.0	46.90	3.9%	57.1%
5.6	48.80	4.1%	61.0%
8.0	45.10	3.8%	65.0%
11.2	60.50	5.0%	68.8%
16.0	87.60	7.3%	73.8%
22.4	83.50	6.9%	81.1%
32.0	0.00	0.0%	88.1%
45.0	143.40	11.9%	88.1%
50.0	*		100.0%
90			-
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	1201.90		

*Measured value of the largest particle in the sample and not a sieve weight

COMMENTS: Grab Sample of 2008 Sediment Accumulation

SITE NAME: Pike's Peak Highway - Fill Slope
ID NUMBER: 074FS Upper Fence
DATE: 7/29/2008
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	0.406	1.369	2.751	25.967	47.840	50.0



Sieve Analysis Worksheet

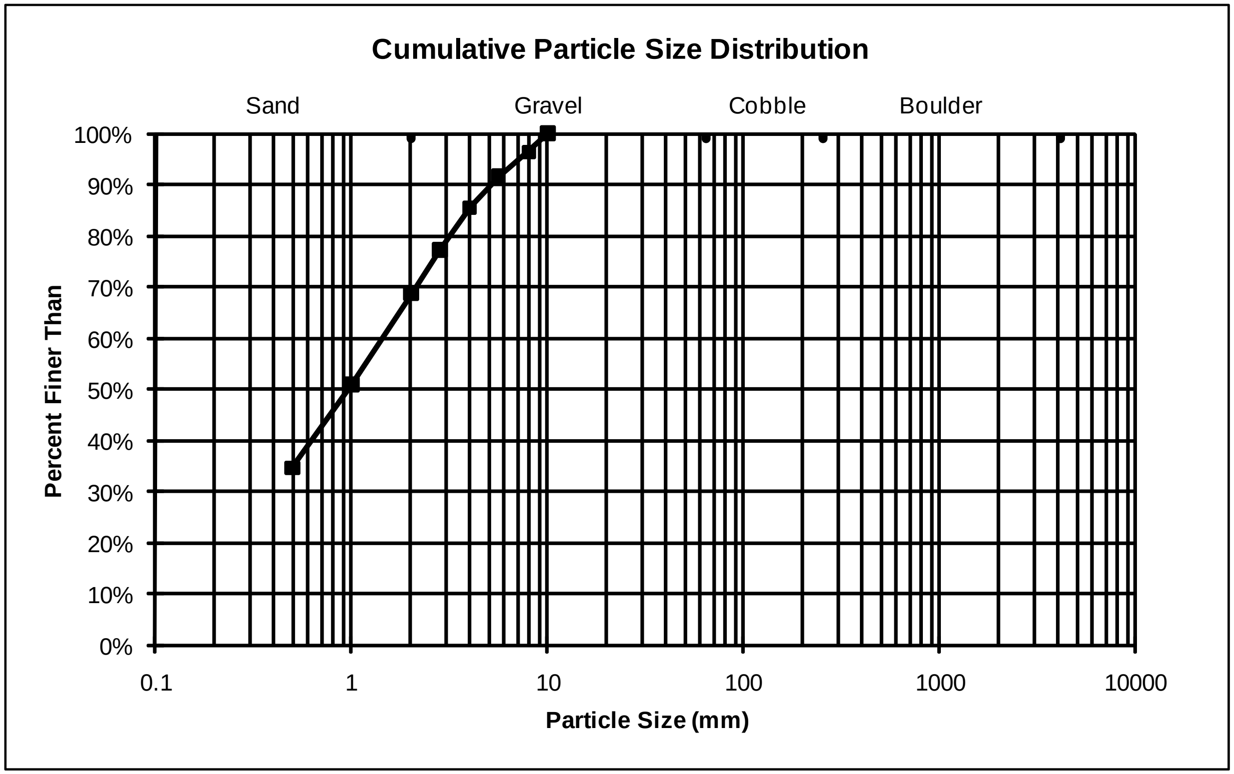
Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	182.60	34.6%	
0.5	86.40	16.4%	34.6%
1.0	93.20	17.6%	50.9%
2.0	45.30	8.6%	68.6%
2.8	44.00	8.3%	77.1%
4.0	32.50	6.2%	85.5%
5.6	25.10	4.8%	91.6%
8.0	19.20	3.6%	96.4%
10.0	*		100.0%
16.0			-
22.4			
32.0			
45.0			
64.0			
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	528.30		

*Measured value of the largest particle in the sample and not a sieve weight

COMMENTS: Grab Sample of 2008 Sediment Accumulation

SITE NAME: Pike's Peak Highway - Fill Slope
ID NUMBER: 088FS Lower Fence
DATE: 6/2/2008
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	0.032	0.509	0.962	3.757	7.220	10.0



Sieve Analysis Worksheet

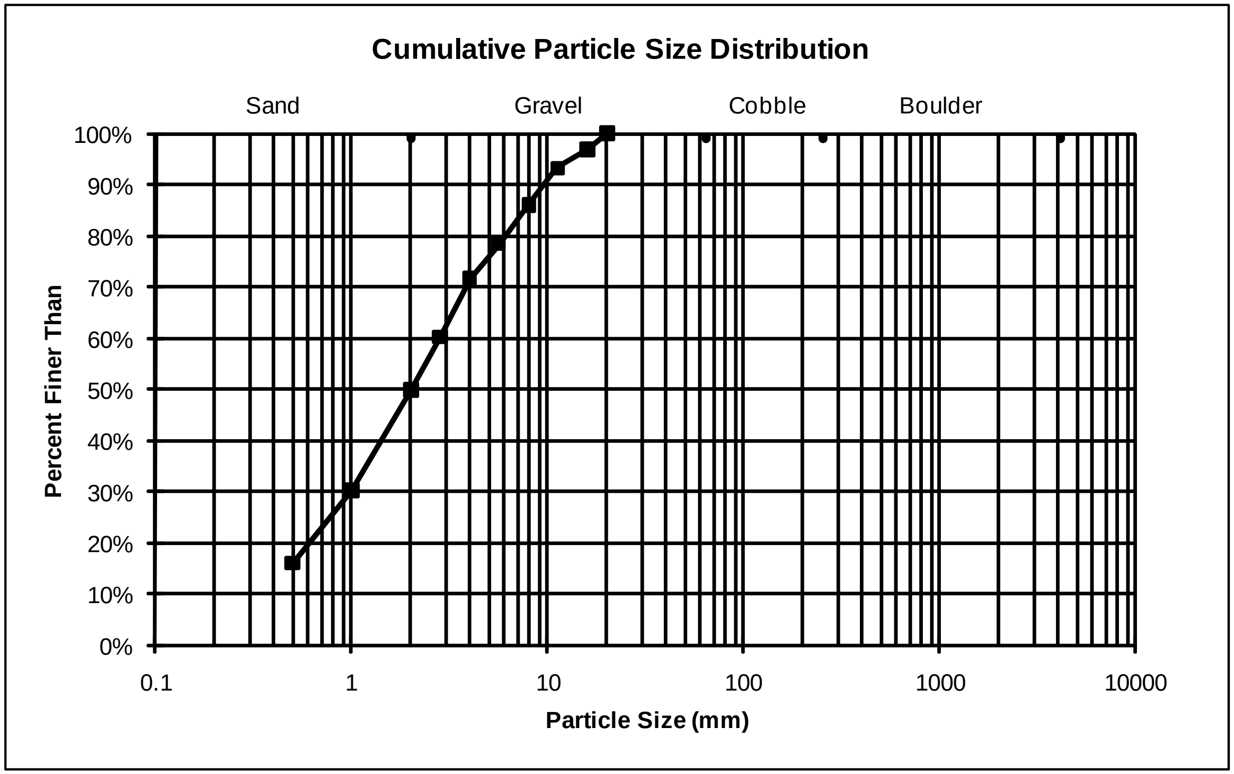
COMMENTS: Grab Sample of 2008 Sediment Accumulation

Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	80.70	15.9%	
0.5	71.80	14.2%	15.9%
1.0	100.20	19.8%	30.1%
2.0	52.30	10.3%	49.8%
2.8	58.20	11.5%	60.1%
4.0	34.30	6.8%	71.6%
5.6	38.60	7.6%	78.4%
8.0	36.50	7.2%	86.0%
11.2	18.80	3.7%	93.2%
16.0	15.80	3.1%	96.9%
20.0	*		100.0%
32.0			-
45.0			
64.0			
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	507.20		

*Measured value of the largest particle in the sample and not a sieve weight

SITE NAME: Pike's Peak Highway - Fill Slope
ID NUMBER: 088FS Upper Fence
DATE: 6/2/2008
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	0.379	1.189	2.012	7.290	13.346	20.0



Sieve Analysis Worksheet

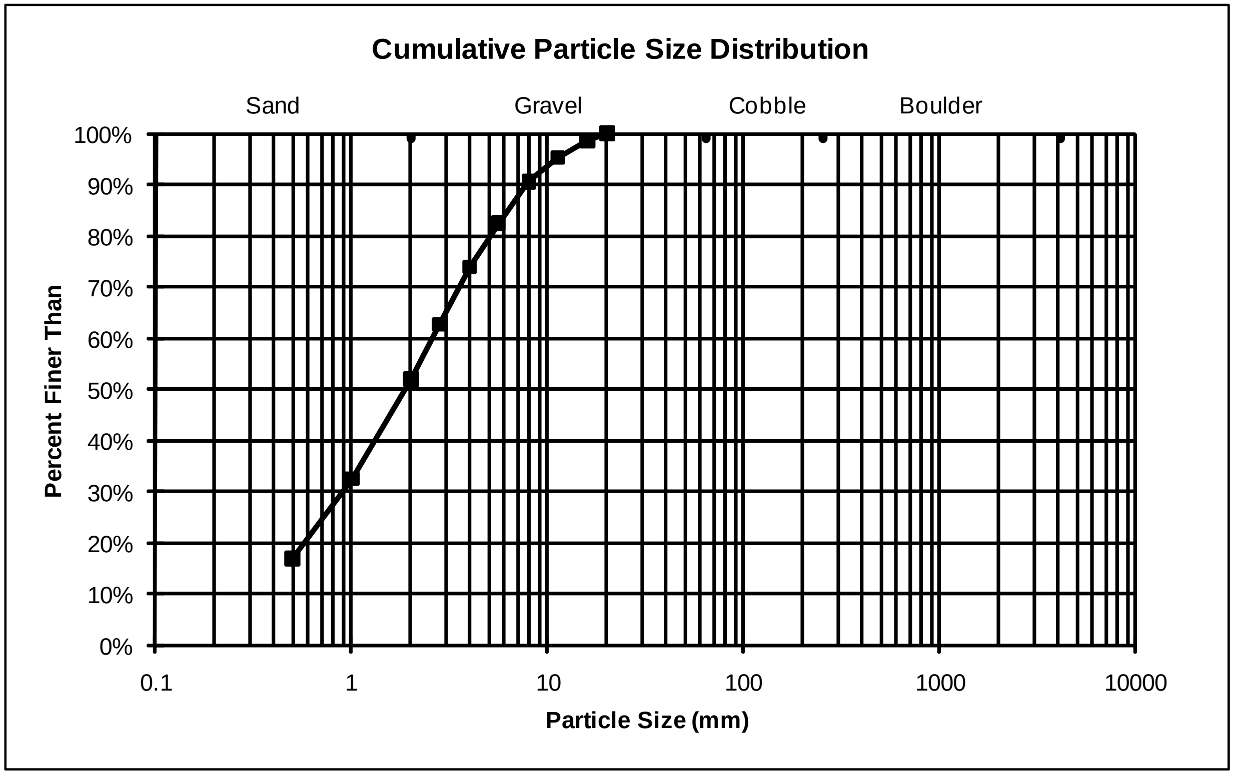
COMMENTS: Grab Sample of 2008 Sediment Accumulation

Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	145.00	16.8%	
0.5	134.20	15.6%	16.8%
1.0	167.10	19.4%	32.4%
2.0	93.10	10.8%	51.8%
2.8	97.10	11.3%	62.6%
4.0	74.10	8.6%	73.9%
5.6	69.40	8.1%	82.5%
8.0	40.10	4.7%	90.6%
11.2	27.60	3.2%	95.2%
16.0	13.50	1.6%	98.4%
20.0	*		100.0%
32.0			-
45.0			
64.0			
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	861.20		

*Measured value of the largest particle in the sample and not a sieve weight

SITE NAME: Pike's Peak Highway - Fill Slope
ID NUMBER: 088FS Upper Fence
DATE: 8/13/2008
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	0.294	1.097	1.874	5.981	11.017	20.0



Sieve Analysis Worksheet

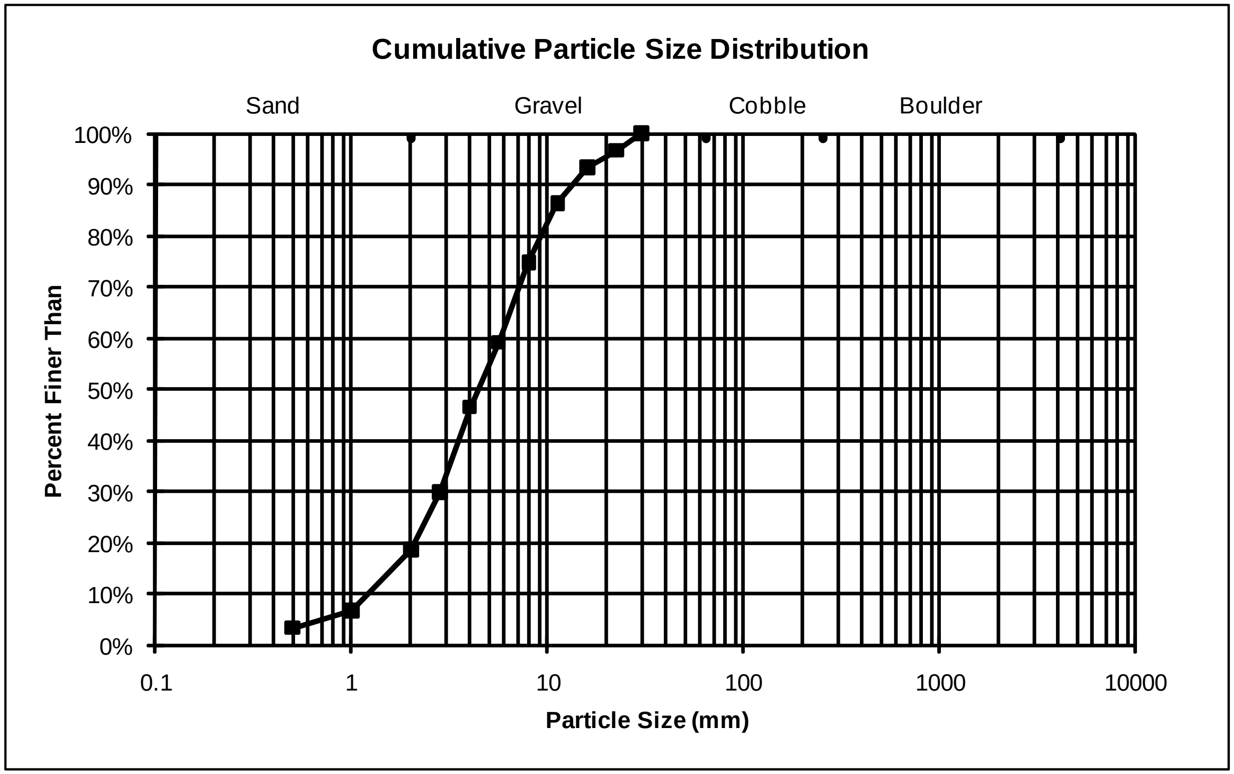
Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	27.70	3.3%	
0.5	29.00	3.4%	3.3%
1.0	99.70	11.8%	6.7%
2.0	95.60	11.3%	18.5%
2.8	140.20	16.6%	29.9%
4.0	106.80	12.7%	46.5%
5.6	132.00	15.6%	59.1%
8.0	96.80	11.5%	74.8%
11.2	59.00	7.0%	86.3%
16.0	28.50	3.4%	93.3%
22.4	28.40	3.4%	96.6%
30.0	*		100.0%
45.0			-
64.0			
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	843.70		

*Measured value of the largest particle in the sample and not a sieve weight

COMMENTS: Grab Sample of 2008 Sediment Accumulation

SITE NAME: Pike's Peak Highway - Fill Slope
ID NUMBER: 098FS Upper Fence
DATE: 7/17/2008
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	**D15**	**D35**	**D50**	**D84**	**D95**	**Lpart**
	1.625	**3.126**	**4.392**	**10.481**	**19.036**	**30.0**



Sieve Analysis Worksheet

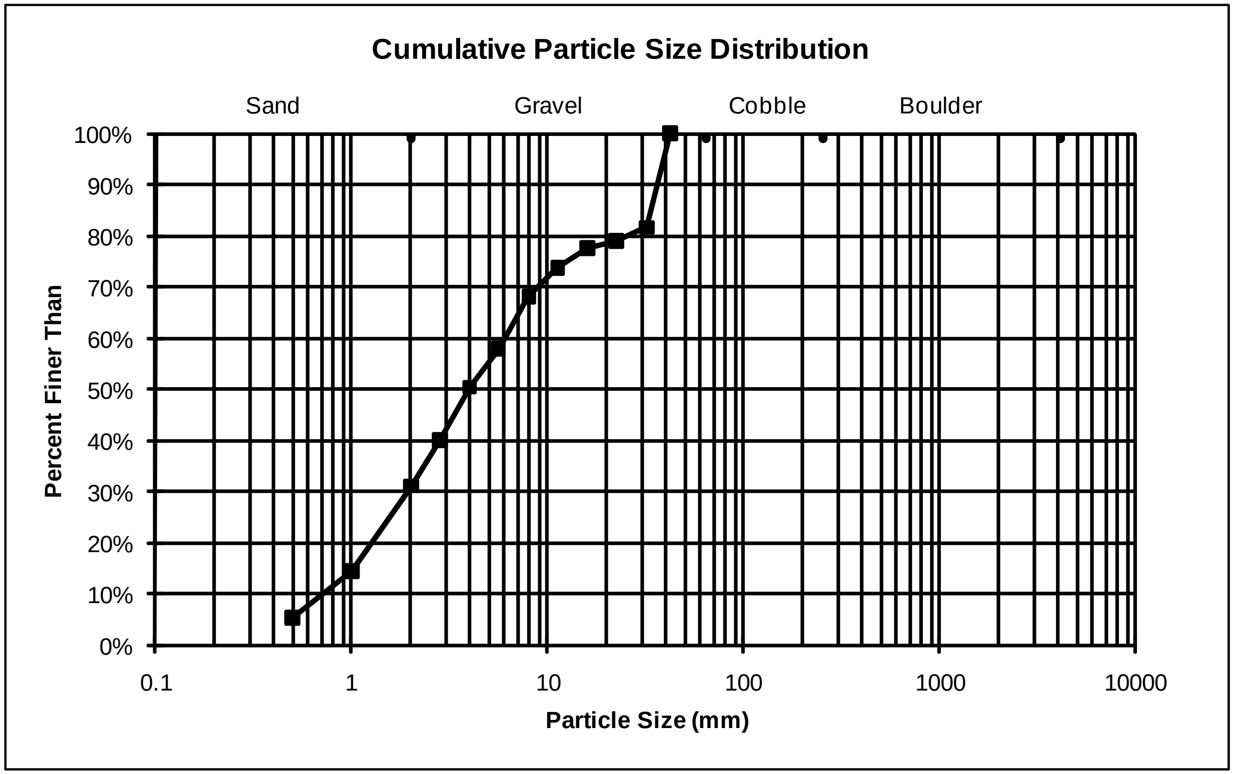
COMMENTS: Grab Sample of 2008 Sediment Accumulation

Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	35.50	5.2%	
0.5	64.10	9.3%	5.2%
1.0	113.90	16.6%	14.5%
2.0	61.70	9.0%	31.1%
2.8	71.10	10.3%	40.0%
4.0	51.00	7.4%	50.4%
5.6	70.20	10.2%	57.8%
8.0	39.60	5.8%	68.0%
11.2	25.60	3.7%	73.7%
16.0	9.50	1.4%	77.5%
22.4	18.80	2.7%	78.9%
32.0	126.60	18.4%	81.6%
42.0	*		100.0%
64.0			-
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	687.60		

*Measured value of the largest particle in the sample and not a sieve weight

SITE NAME: Pike's Peak Highway - Fill Slope
ID NUMBER: 101FS Lower Fence
DATE: 9/9/2008
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	1.022	**2.319**	**3.950**	**33.160**	**39.010**	**42.0**



Sieve Analysis Worksheet

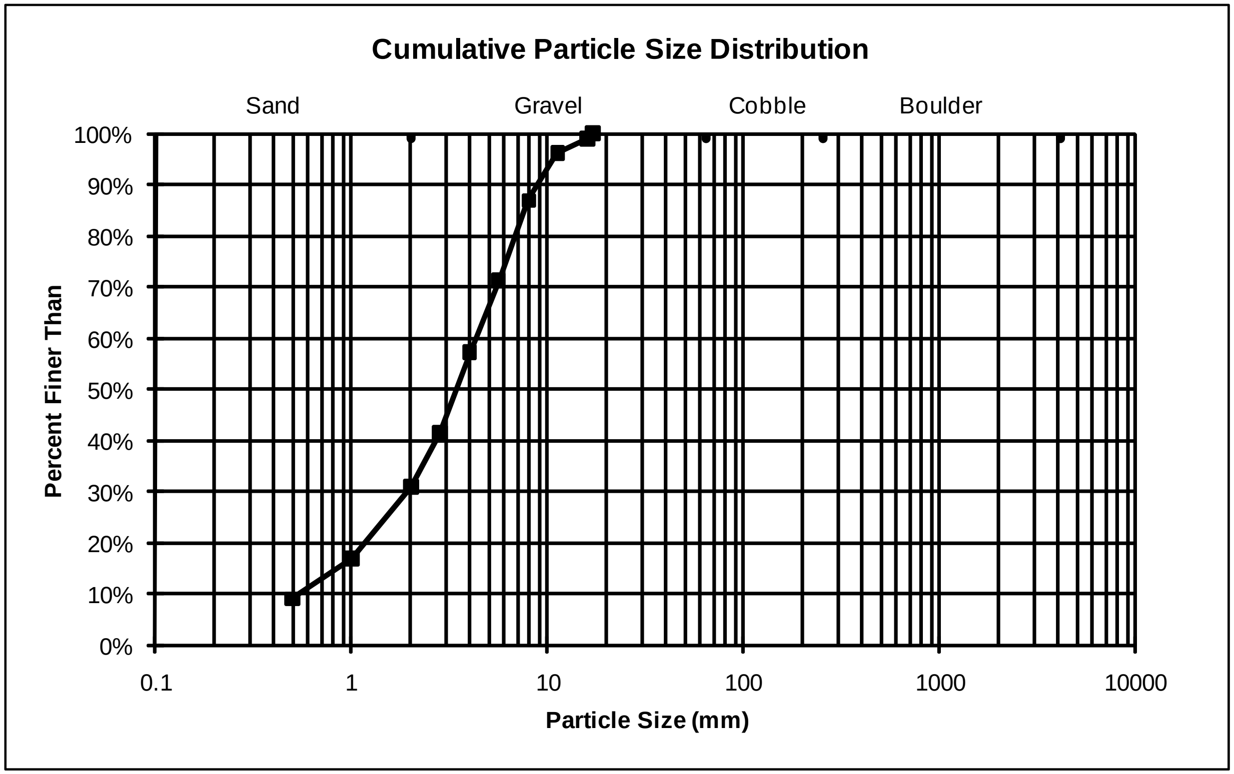
Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	60.90	9.0%	
0.5	53.70	7.9%	9.0%
1.0	95.50	14.1%	16.9%
2.0	70.60	10.4%	31.0%
2.8	107.10	15.8%	41.4%
4.0	95.20	14.0%	57.2%
5.6	105.90	15.6%	71.2%
8.0	63.50	9.4%	86.8%
11.2	18.10	2.7%	96.2%
16.0	7.60	1.1%	98.9%
17.0	*		100.0%
32.0			-
45.0			
64.0			
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	678.10		

*Measured value of the largest particle in the sample and not a sieve weight

COMMENTS: Grab Sample of 2008 Sediment Accumulation

SITE NAME: Pike's Peak Highway - Fill Slope
ID NUMBER: 101FS Upper Fence
DATE: 9/9/2008
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	0.847	2.277	3.401	7.497	10.723	17.0



Sieve Analysis Worksheet

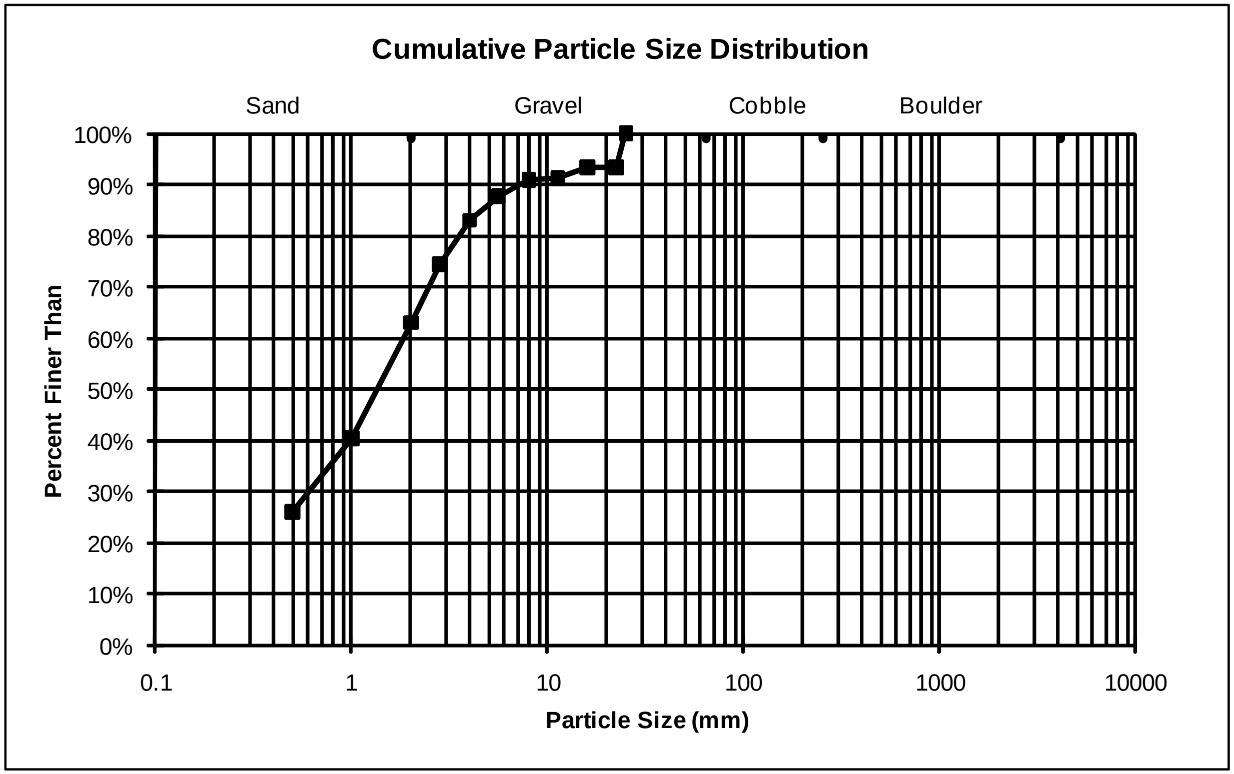
Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	95.60	25.9%	
0.5	53.60	14.5%	25.9%
1.0	83.40	22.6%	40.4%
2.0	42.40	11.5%	63.0%
2.8	31.70	8.6%	74.4%
4.0	17.30	4.7%	83.0%
5.6	11.60	3.1%	87.7%
8.0	1.70	0.5%	90.9%
11.2	7.20	1.9%	91.3%
16.0	0.00	0.0%	93.3%
22.4	24.90	6.7%	93.3%
25.0	*		100.0%
45.0			-
64.0			
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	369.40		

*Measured value of the largest particle in the sample and not a sieve weight

COMMENTS: Grab Sample of 2008 Sediment Accumulation

SITE NAME: Pike's Peak Highway - Fill Slope
ID NUMBER: 103FS Lower Fence
DATE: 6/9/2008
CREW: Derengowski/VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	0.065	0.773	1.343	4.290	23.044	25.0



Sieve Analysis Worksheet

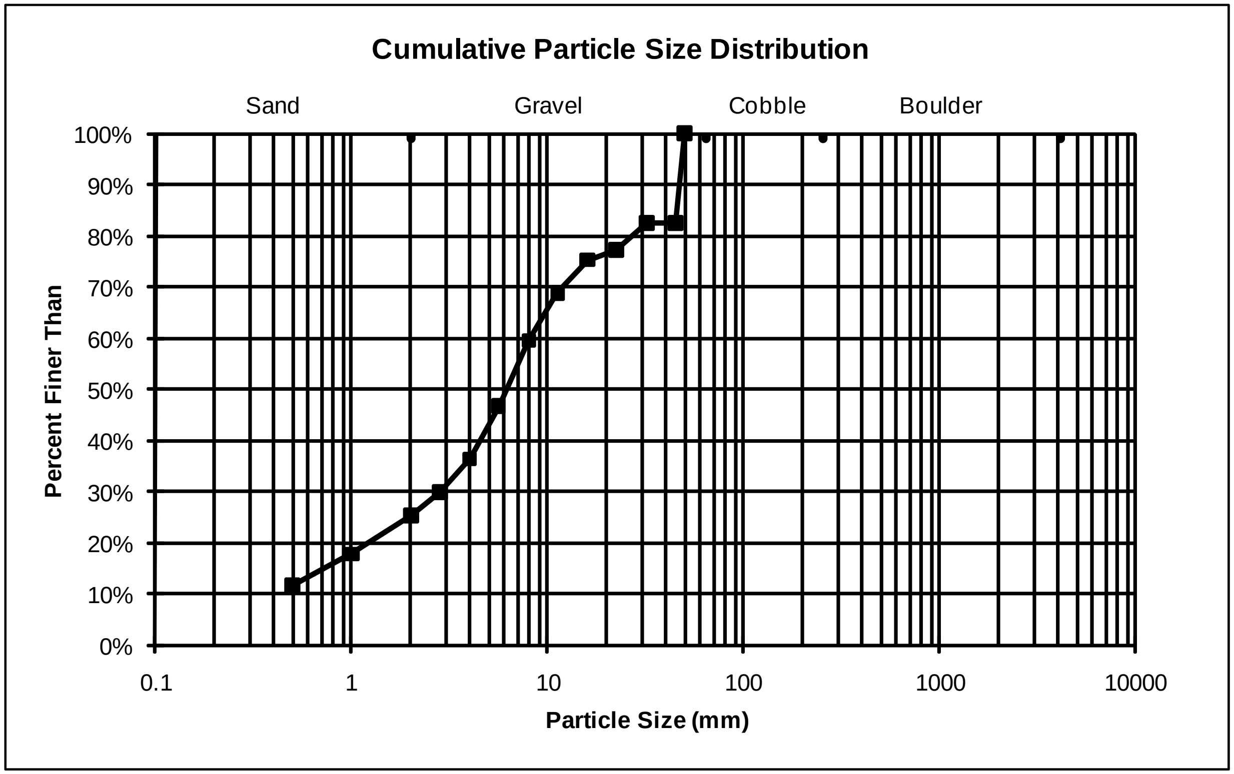
COMMENTS: Grab Sample of 2008 Sediment Accumulation

Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	69.60	11.6%	
0.5	36.70	6.1%	11.6%
1.0	44.60	7.4%	17.7%
2.0	27.80	4.6%	25.2%
2.8	39.40	6.6%	29.8%
4.0	61.10	10.2%	36.4%
5.6	77.40	12.9%	46.6%
8.0	56.40	9.4%	59.5%
11.2	38.20	6.4%	68.9%
16.0	11.40	1.9%	75.3%
22.4	32.50	5.4%	77.2%
32.0	0.00	0.0%	82.6%
45.0	104.50	17.4%	82.6%
50.0	*		100.0%
90			-
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	599.60		

*Measured value of the largest particle in the sample and not a sieve weight

SITE NAME: Pike's Peak Highway - Fill Slope
ID NUMBER: 103FS Upper Fence
DATE: 6/9/2008
CREW: Derengowski/VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	0.734	3.712	6.158	45.390	48.511	50.0



Sieve Analysis Worksheet

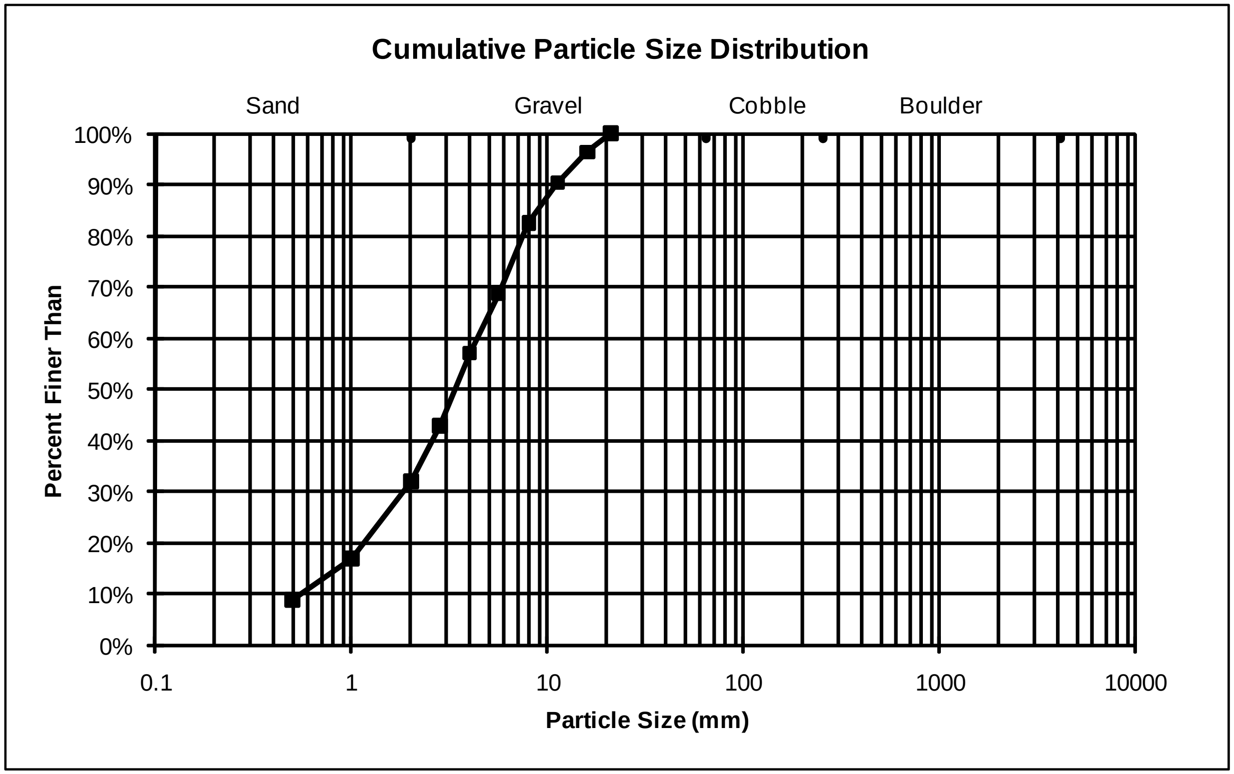
Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	44.40	8.8%	
0.5	39.70	7.9%	8.8%
1.0	76.80	15.3%	16.7%
2.0	54.40	10.8%	32.0%
2.8	71.20	14.2%	42.9%
4.0	59.50	11.8%	57.0%
5.6	68.50	13.6%	68.9%
8.0	39.30	7.8%	82.5%
11.2	30.10	6.0%	90.3%
16.0	18.50	3.7%	96.3%
21.0	*		100.0%
32.0			-
45.0			
64.0			
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	502.40		

*Measured value of the largest particle in the sample and not a sieve weight

COMMENTS: Grab Sample of 2008 Sediment Accumulation

SITE NAME: Pike's Peak Highway - Fill Slope
ID NUMBER: 103FS Upper Fence
DATE: 8/13/2008
CREW: Derengowski/VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	0.858	2.194	3.352	8.532	14.793	21.0



Sieve Analysis Worksheet

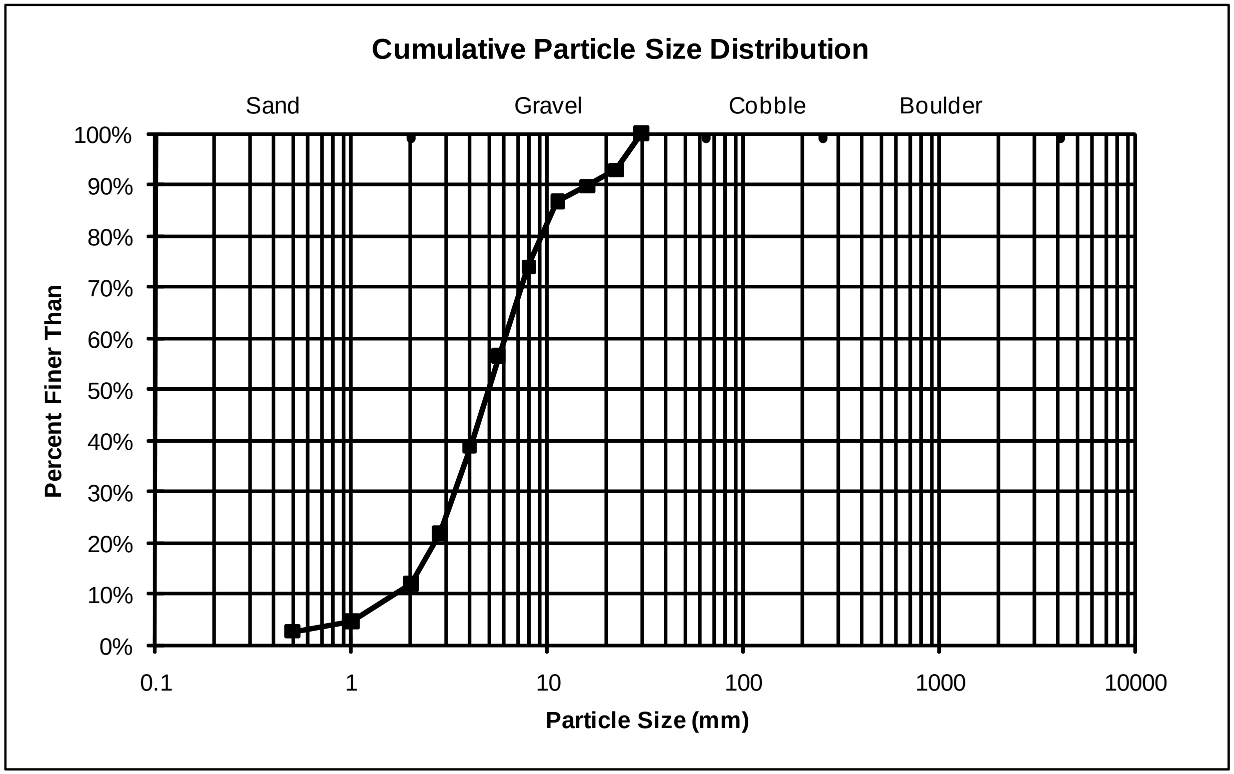
COMMENTS: Grab Sample of 2008 Sediment Accumulation

Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	15.20	2.6%	
0.5	12.00	2.1%	2.6%
1.0	42.10	7.2%	4.7%
2.0	57.50	9.9%	11.9%
2.8	99.10	17.0%	21.8%
4.0	103.00	17.7%	38.8%
5.6	101.70	17.5%	56.4%
8.0	74.40	12.8%	73.9%
11.2	17.50	3.0%	86.7%
16.0	18.40	3.2%	89.7%
22.4	41.90	7.2%	92.8%
30.0	*		100.0%
45.0			-
64.0			
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	582.80		

*Measured value of the largest particle in the sample and not a sieve weight

SITE NAME: Pike's Peak Highway - Fill Slope
ID NUMBER: 105FS Upper Fence
DATE: 7/22/2008
CREW: Derengowski/VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	2.224	**3.697**	**4.954**	**10.444**	**24.484**	**30.0**



Sieve Analysis Worksheet

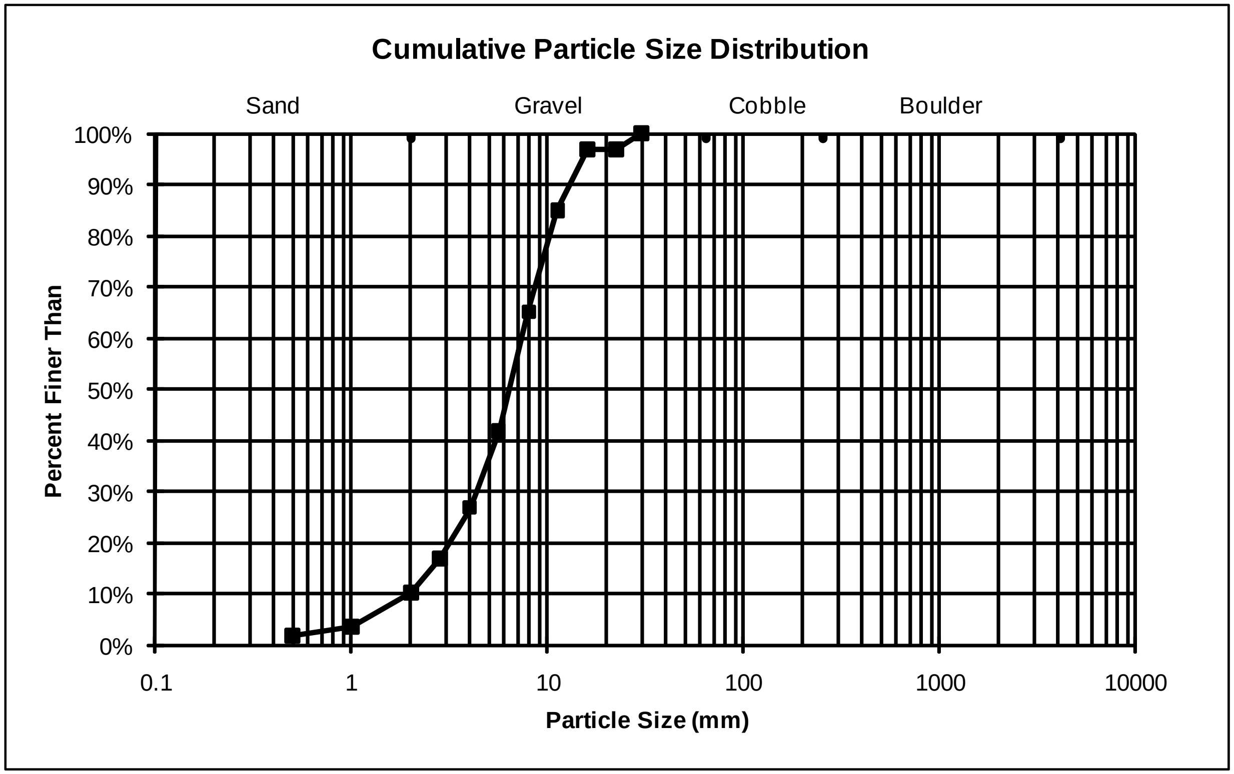
COMMENTS: Grab Sample of 2008 Sediment Accumulation

Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	10.60	1.9%	
0.5	9.50	1.7%	1.9%
1.0	37.50	6.6%	3.5%
2.0	38.70	6.8%	10.1%
2.8	57.00	10.0%	16.9%
4.0	85.50	15.0%	26.8%
5.6	133.20	23.3%	41.8%
8.0	112.90	19.8%	65.1%
11.2	69.00	12.1%	84.9%
16.0	0.00	0.0%	97.0%
22.4	17.40	3.0%	97.0%
30.0	*		100.0%
45.0			-
64.0			
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	571.30		

*Measured value of the largest particle in the sample and not a sieve weight

SITE NAME: Pike's Peak Highway - Fill Slope
ID NUMBER: 105FS Upper Fence
DATE: 9/16/2008
CREW: Derengowski/VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	2.553	4.806	6.349	11.034	15.103	30.0



Sieve Analysis Worksheet

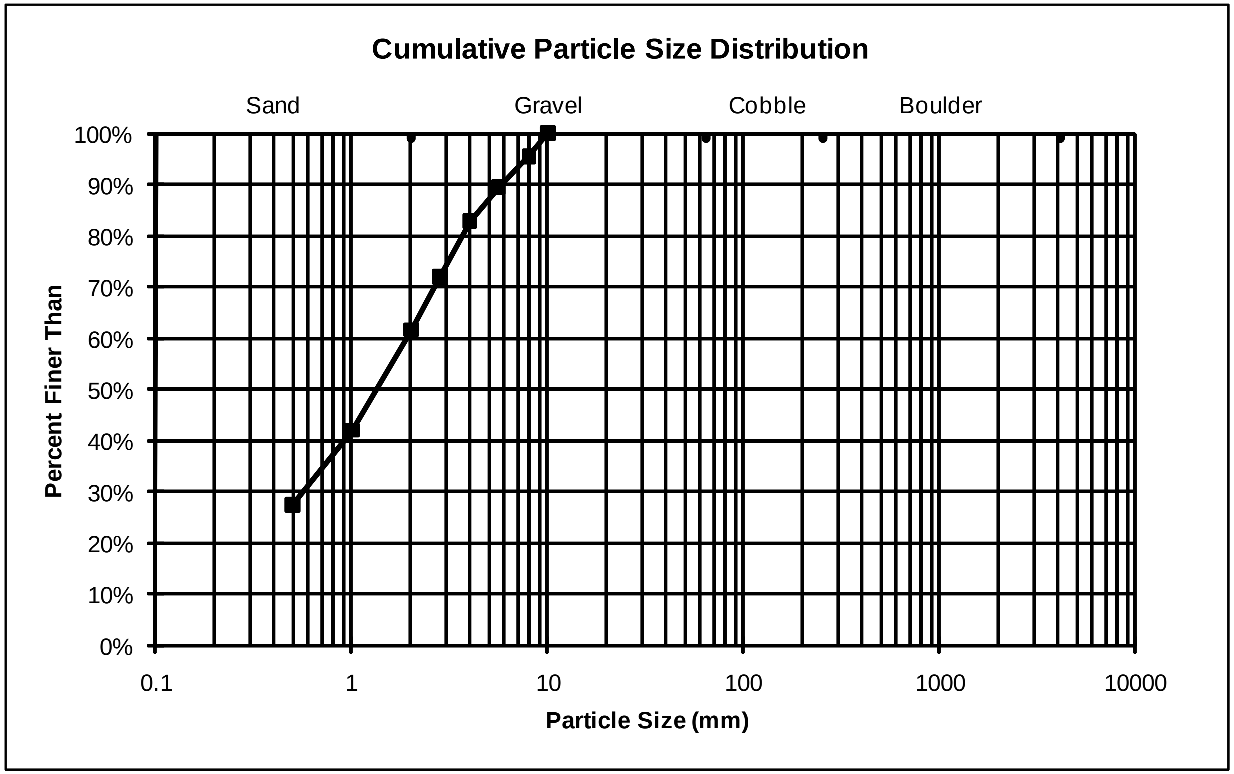
Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	187.90	27.3%	
0.5	100.50	14.6%	27.3%
1.0	135.00	19.6%	41.9%
2.0	71.60	10.4%	61.5%
2.8	74.10	10.8%	72.0%
4.0	46.00	6.7%	82.7%
5.6	40.70	5.9%	89.4%
8.0	32.10	4.7%	95.3%
10.0	*		100.0%
16.0			-
22.4			
32.0			
45.0			
64.0			
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	687.90		

*Measured value of the largest particle in the sample and not a sieve weight

COMMENTS: Grab Sample of 2008 Sediment Accumulation

SITE NAME: Pike's Peak Highway - Fill Slope
ID NUMBER: 186FS Upper Fence
DATE: 8/13/2008
CREW: Derengowski/VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	0.056	0.720	1.330	4.264	7.841	10.0



Sieve Analysis Worksheet

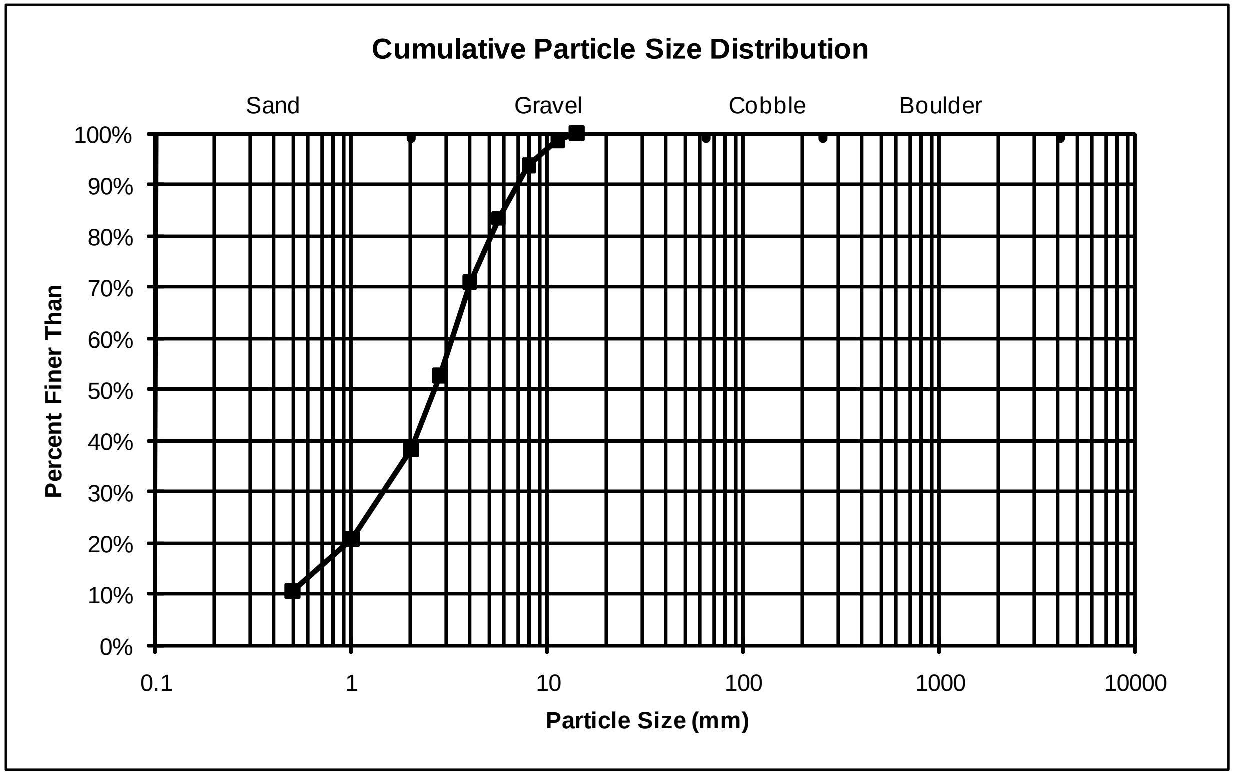
COMMENTS: Grab Sample of 2008 Sediment Accumulation

Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	92.20	10.5%	
0.5	89.80	10.2%	10.5%
1.0	155.10	17.6%	20.7%
2.0	126.10	14.3%	38.3%
2.8	160.90	18.3%	52.6%
4.0	109.80	12.5%	70.9%
5.6	90.80	10.3%	83.4%
8.0	44.20	5.0%	93.7%
11.2	11.50	1.3%	98.7%
14.0	*		100.0%
22.4			-
32.0			
45.0			
64.0			
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	880.40		

*Measured value of the largest particle in the sample and not a sieve weight

SITE NAME: Pike's Peak Highway - Fill Slope
ID NUMBER: 187FS Upper Fence
DATE: 5/12/2008
CREW: Derengowski/VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	0.680	1.757	2.633	5.725	8.744	14.0



Sieve Analysis Worksheet

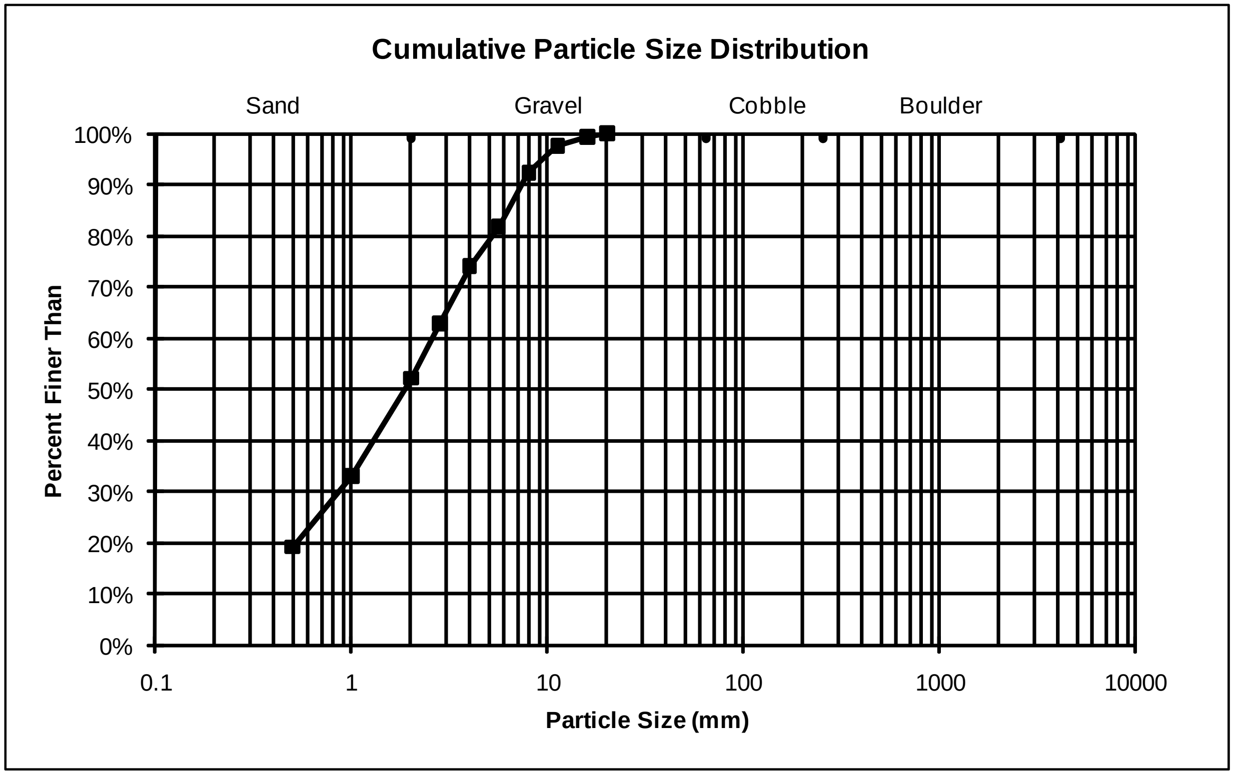
Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	167.70	19.1%	
0.5	122.10	13.9%	19.1%
1.0	167.90	19.1%	33.0%
2.0	93.60	10.6%	52.1%
2.8	99.90	11.4%	62.7%
4.0	67.20	7.6%	74.1%
5.6	93.20	10.6%	81.7%
8.0	46.50	5.3%	92.3%
11.2	14.80	1.7%	97.6%
16.0	6.20	0.7%	99.3%
20.0	*		100.0%
32.0			-
45.0			
64.0			
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	879.10		

*Measured value of the largest particle in the sample and not a sieve weight

COMMENTS: Grab Sample of 2008 Sediment Accumulation

SITE NAME: Pike's Peak Highway - Fill Slope
ID NUMBER: 196FS Upper Fence
DATE: 9/16/2008
CREW: Derengowski/VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	0.177	1.077	1.856	6.046	9.486	20.0



Sieve Analysis Worksheet

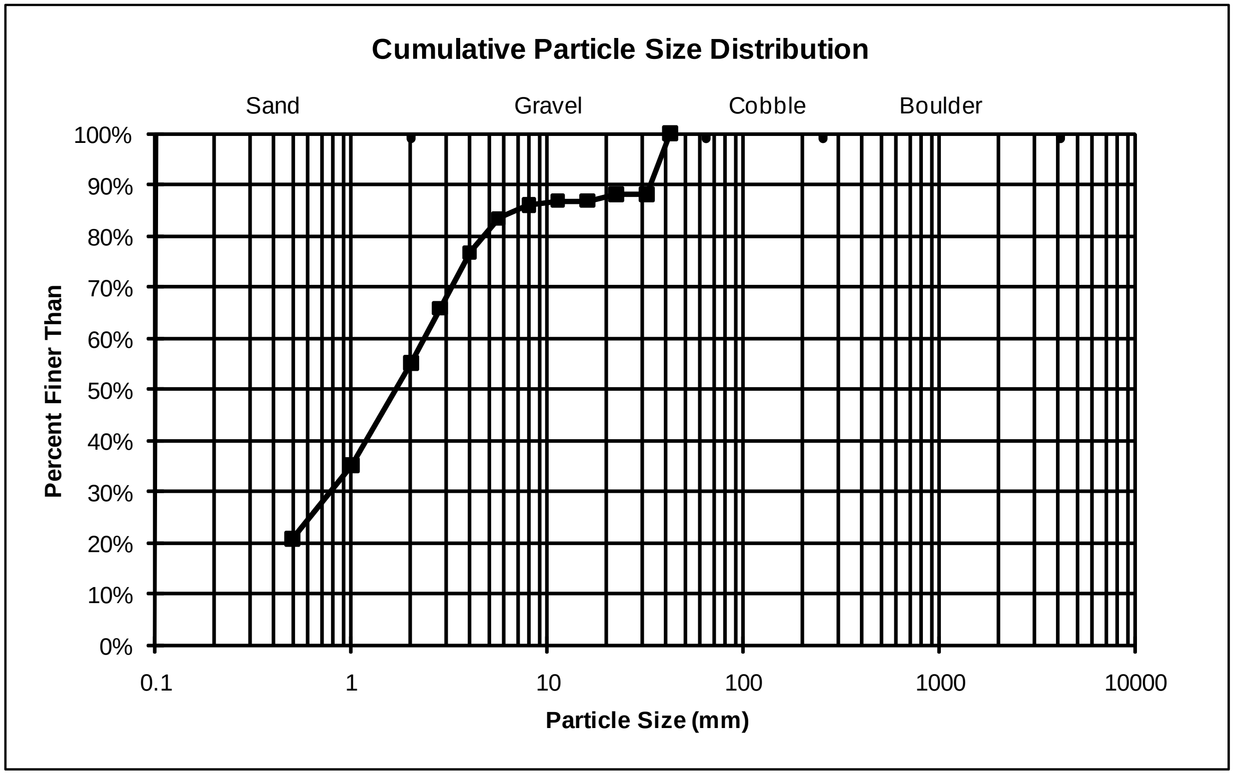
COMMENTS: Grab Sample of 2009 Sediment Accumulation

Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	112.60	20.8%	
0.5	77.20	14.3%	20.8%
1.0	108.40	20.0%	35.1%
2.0	57.50	10.6%	55.1%
2.8	59.00	10.9%	65.8%
4.0	36.10	6.7%	76.7%
5.6	13.80	2.6%	83.3%
8.0	5.10	0.9%	85.9%
11.2	0.00	0.0%	86.8%
16.0	7.00	1.3%	86.8%
22.4	0.00	0.0%	88.1%
32.0	64.20	11.9%	88.1%
42.0	*		100.0%
64.0			-
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	540.90		

*Measured value of the largest particle in the sample and not a sieve weight

SITE NAME: Pike's Peak Highway - Fill Slope
ID NUMBER: 001FS Upper Fence
DATE: 8/4/2009
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	0.129	0.996	1.675	6.139	37.454	42.0



Sieve Analysis Worksheet

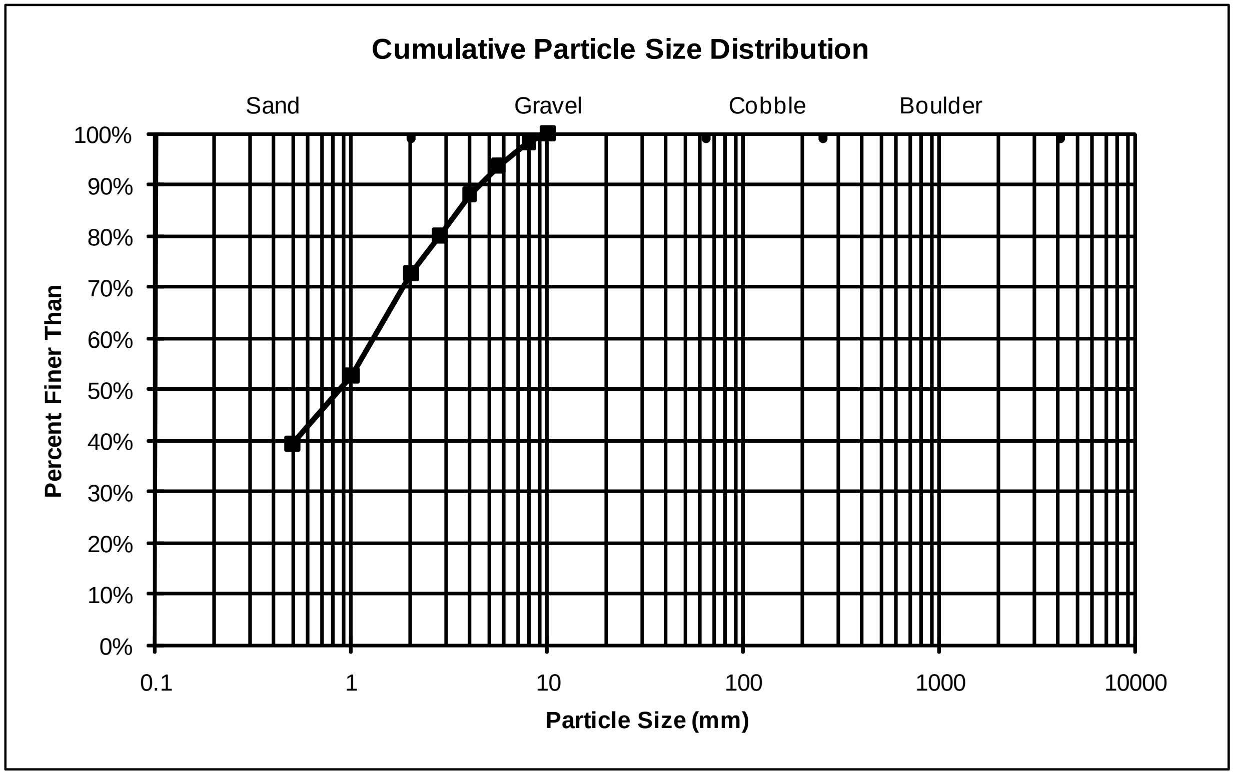
COMMENTS: Grab Sample of 2009 Sediment Accumulation

Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	237.60	39.4%	
0.5	79.20	13.1%	39.4%
1.0	121.40	20.1%	52.5%
2.0	44.00	7.3%	72.6%
2.8	49.30	8.2%	79.9%
4.0	34.00	5.6%	88.1%
5.6	27.50	4.6%	93.8%
8.0	10.20	1.7%	98.3%
10.0	*		100.0%
16.0			-
22.4			
32.0			
45.0			
64.0			
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	603.20		

*Measured value of the largest particle in the sample and not a sieve weight

SITE NAME: Pike's Peak Highway - Fill Slope
ID NUMBER: 007FS Lower Fence
DATE: 5/14/2009
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	0.025	0.291	0.875	3.343	6.175	10.0



Sieve Analysis Worksheet

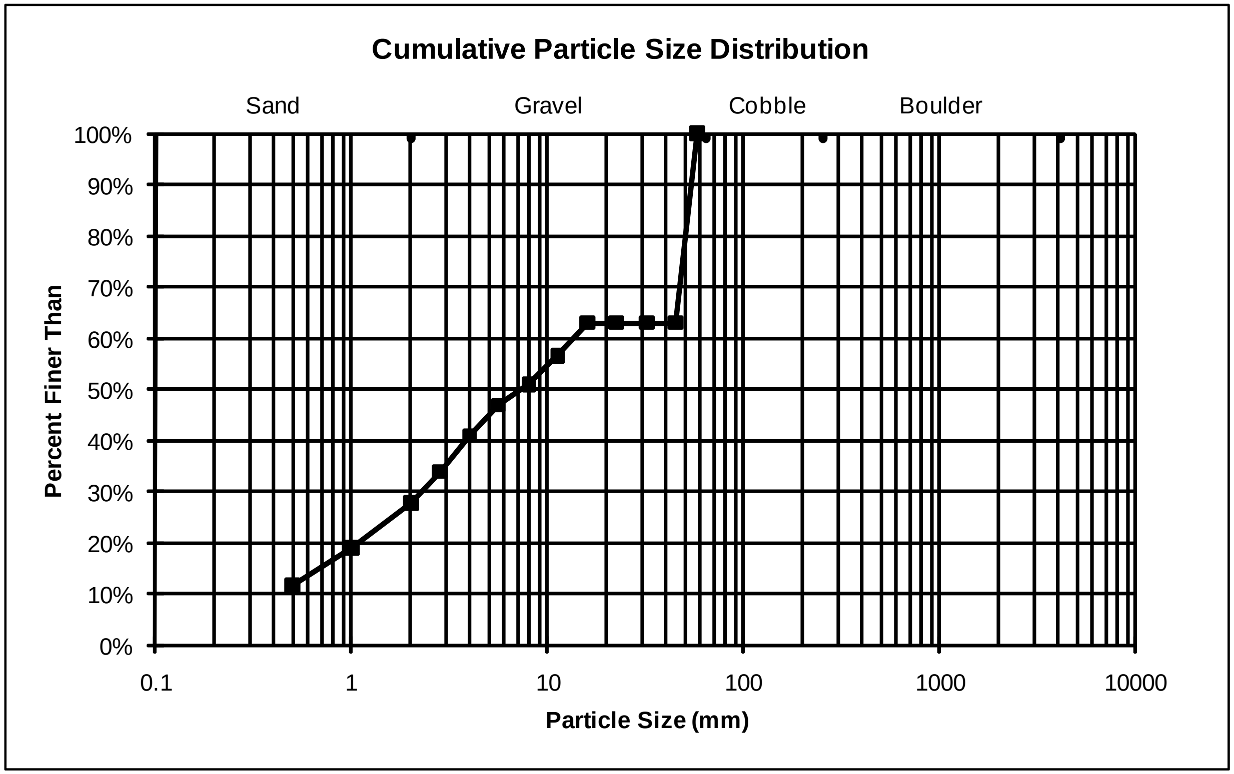
COMMENTS: Grab Sample of 2009 Sediment Accumulation

Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	59.90	11.7%	
0.5	37.10	7.2%	11.7%
1.0	45.30	8.8%	18.9%
2.0	30.90	6.0%	27.8%
2.8	36.30	7.1%	33.8%
4.0	30.60	6.0%	40.9%
5.6	20.50	4.0%	46.9%
8.0	28.80	5.6%	50.9%
11.2	33.20	6.5%	56.5%
16.0	0.00	0.0%	63.0%
22.4	0.00	0.0%	63.0%
32.0	0.00	0.0%	63.0%
45.0	189.70	37.0%	63.0%
58.0	*		100.0%
90			-
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	512.30		

*Measured value of the largest particle in the sample and not a sieve weight

SITE NAME: Pike's Peak Highway - Fill Slope
ID NUMBER: 007FS Upper Fence
DATE: 5/14/2009
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	0.686	2.973	7.404	51.976	56.046	58.0



Sieve Analysis Worksheet

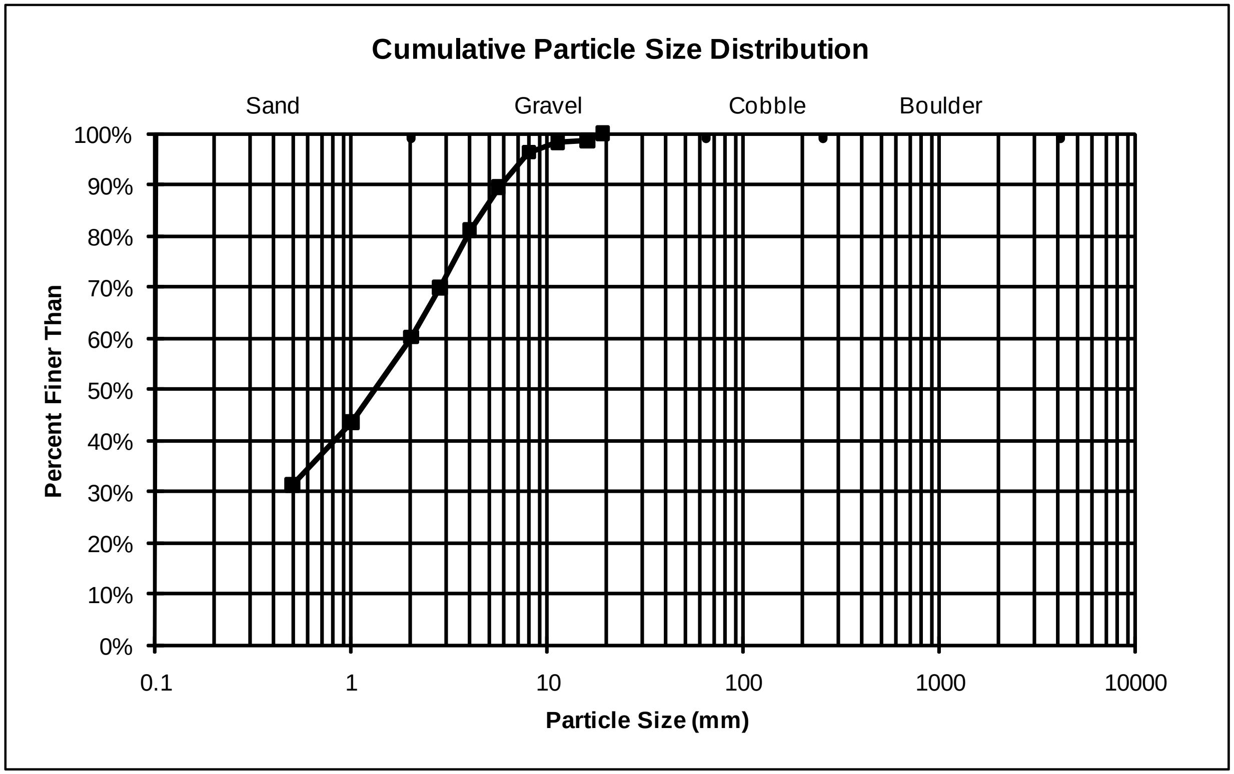
Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	192.40	31.2%	
0.5	75.40	12.2%	31.2%
1.0	103.00	16.7%	43.4%
2.0	59.20	9.6%	60.2%
2.8	69.40	11.3%	69.8%
4.0	51.70	8.4%	81.0%
5.6	42.40	6.9%	89.4%
8.0	12.80	2.1%	96.3%
11.2	1.90	0.3%	98.4%
16.0	8.20	1.3%	98.7%
19.0	*		100.0%
32.0			-
45.0			
64.0			
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	616.40		

*Measured value of the largest particle in the sample and not a sieve weight

COMMENTS: Grab Sample of 2009 Sediment Accumulation

SITE NAME: Pike's Peak Highway - Fill Slope
ID NUMBER: 039FS Lower Fence
DATE: 7/21/2009
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	0.040	0.620	1.312	4.508	7.484	19.0



Sieve Analysis Worksheet

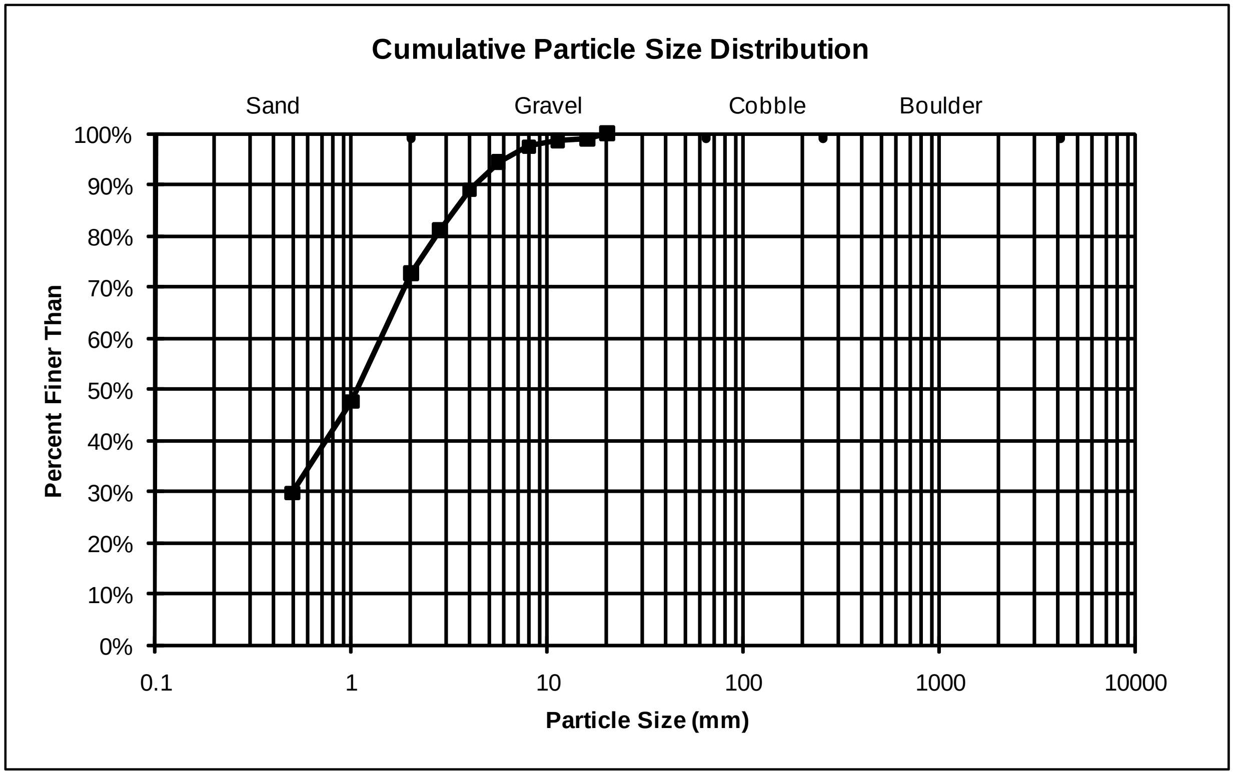
COMMENTS: Grab Sample of 2009 Sediment Accumulation

Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	239.30	29.7%	
0.5	144.20	17.9%	29.7%
1.0	201.20	25.0%	47.6%
2.0	67.90	8.4%	72.6%
2.8	64.10	8.0%	81.0%
4.0	44.60	5.5%	89.0%
5.6	23.40	2.9%	94.5%
8.0	9.40	1.2%	97.4%
11.2	1.90	0.2%	98.6%
16.0	9.70	1.2%	98.8%
20.0	*		100.0%
32.0			-
45.0			
64.0			
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	805.70		

*Measured value of the largest particle in the sample and not a sieve weight

SITE NAME: Pike's Peak Highway - Fill Slope
ID NUMBER: 052FS Lower Fence
DATE: 5/12/2009
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	0.045	0.614	1.069	3.203	5.962	20.0



Sieve Analysis Worksheet

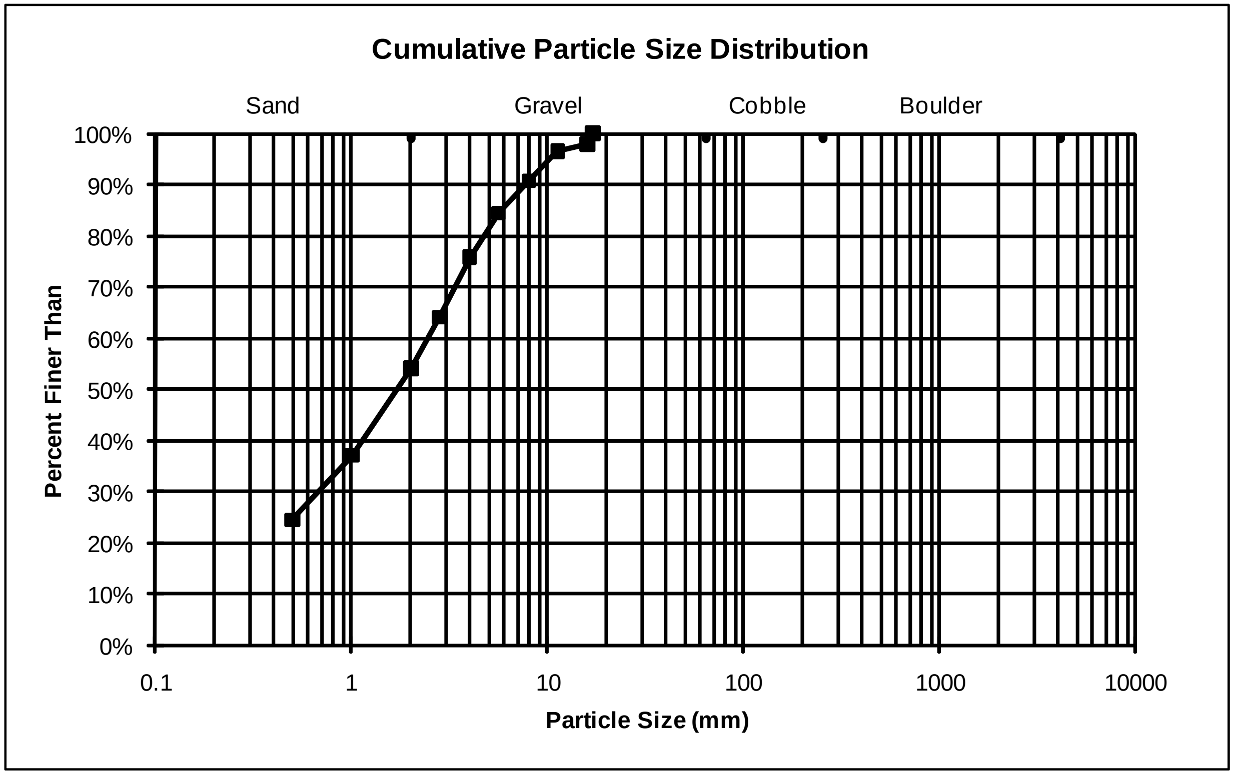
Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	192.90	24.4%	
0.5	99.60	12.6%	24.4%
1.0	135.40	17.1%	37.0%
2.0	78.20	9.9%	54.1%
2.8	93.70	11.9%	64.0%
4.0	67.30	8.5%	75.9%
5.6	49.40	6.3%	84.4%
8.0	45.30	5.7%	90.7%
11.2	11.30	1.4%	96.4%
16.0	17.20	2.2%	97.8%
17.0	*		100.0%
32.0			-
45.0			
64.0			
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	790.30		

*Measured value of the largest particle in the sample and not a sieve weight

COMMENTS: Grab Sample of 2009 Sediment Accumulation

SITE NAME: Pike's Peak Highway - Fill Slope
ID NUMBER: 052FS Upper Fence
DATE: 5/12/2009
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	0.077	0.895	1.691	5.510	10.320	17.0



Sieve Analysis Worksheet

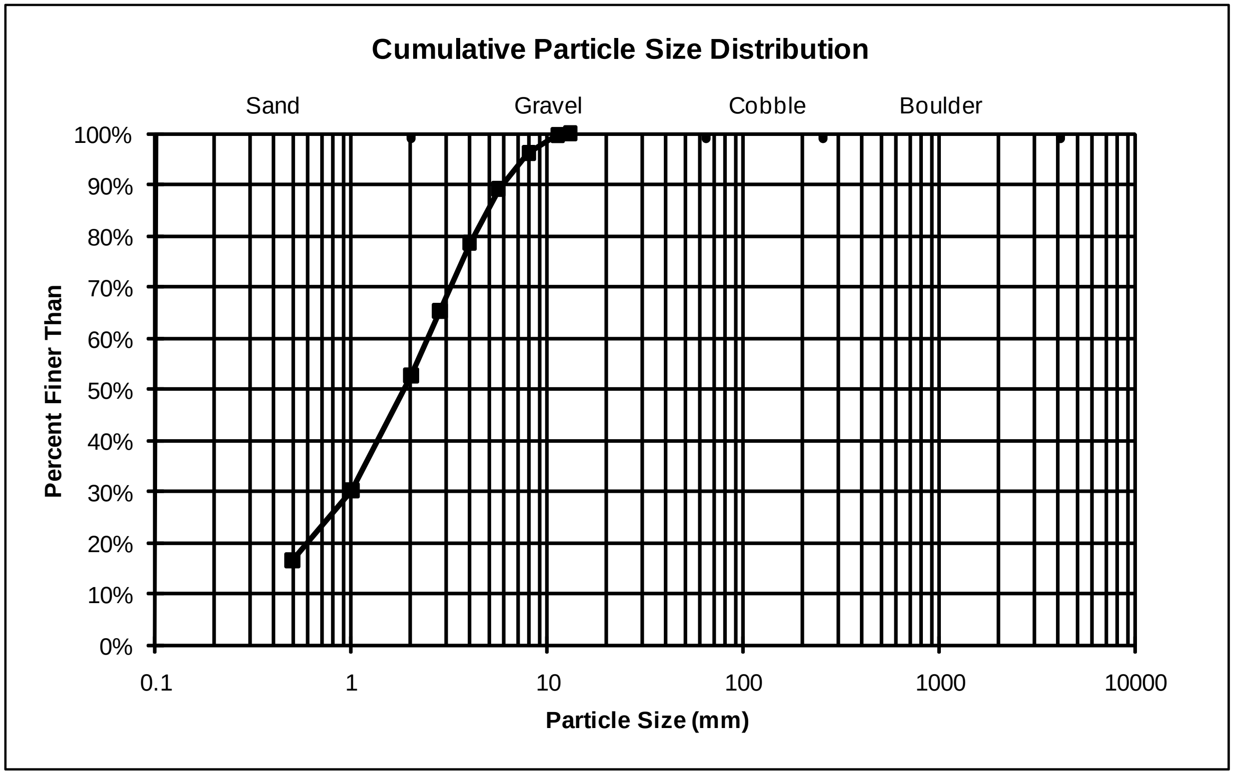
Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	135.00	16.5%	
0.5	111.50	13.7%	16.5%
1.0	182.30	22.3%	30.2%
2.0	104.60	12.8%	52.5%
2.8	108.90	13.3%	65.3%
4.0	84.90	10.4%	78.7%
5.6	58.50	7.2%	89.1%
8.0	28.60	3.5%	96.2%
11.2	2.20	0.3%	99.7%
13.0	*		100.0%
22.4			-
32.0			
45.0			
64.0			
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	816.50		

*Measured value of the largest particle in the sample and not a sieve weight

COMMENTS: Grab Sample of 2009 Sediment Accumulation

SITE NAME: Pike's Peak Highway - Fill Slope
ID NUMBER: 079FS Lower Fence
DATE: 7/7/2009
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	0.319	1.161	1.850	4.754	7.526	13.0



Sieve Analysis Worksheet

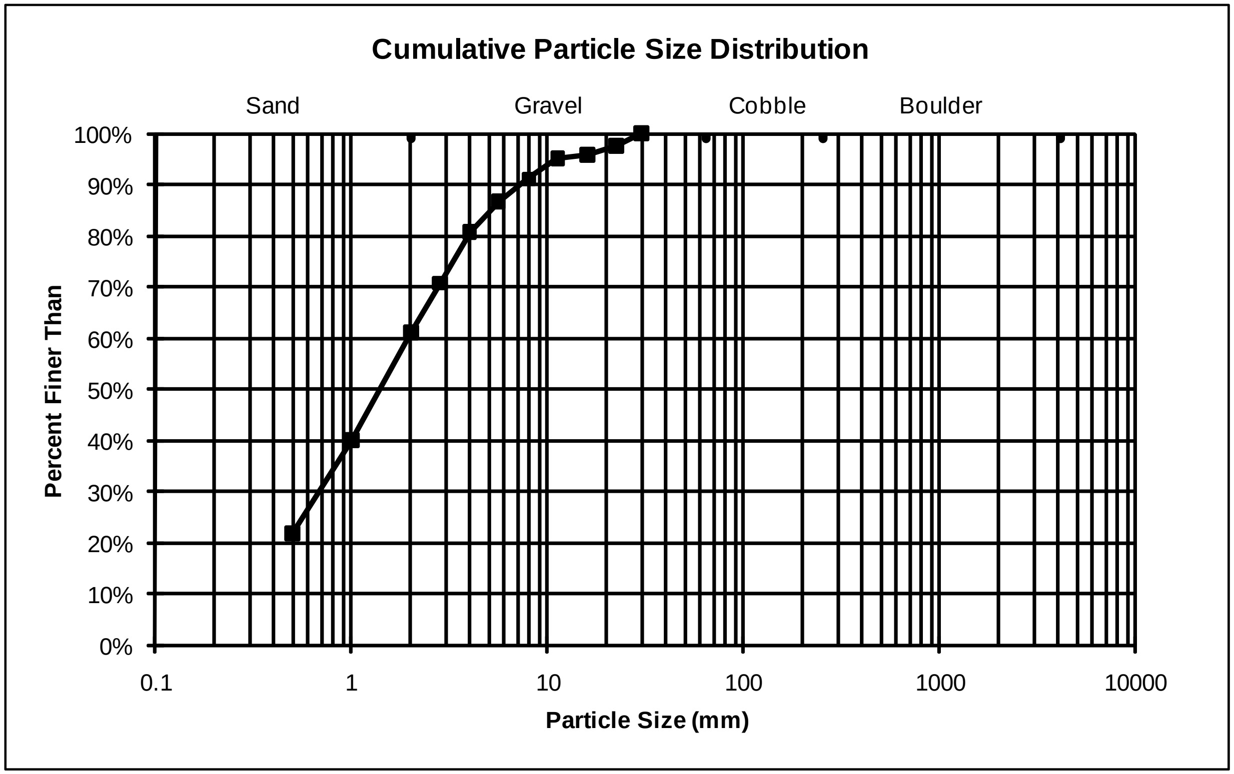
Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	121.70	21.8%	
0.5	102.10	18.3%	21.8%
1.0	117.40	21.0%	40.0%
2.0	53.90	9.6%	61.0%
2.8	55.30	9.9%	70.7%
4.0	33.70	6.0%	80.6%
5.6	24.90	4.5%	86.6%
8.0	22.20	4.0%	91.1%
11.2	4.10	0.7%	95.0%
16.0	9.90	1.8%	95.8%
22.4	13.70	2.5%	97.5%
30.0	*		100.0%
45.0			-
64.0			
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	558.90		

*Measured value of the largest particle in the sample and not a sieve weight

COMMENTS: Grab Sample of 2009 Sediment Accumulation

SITE NAME: Pike's Peak Highway - Fill Slope
ID NUMBER: 079FS Upper Fence
DATE: 7/7/2009
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	0.110	0.826	1.389	4.839	11.158	30.0



Sieve Analysis Worksheet

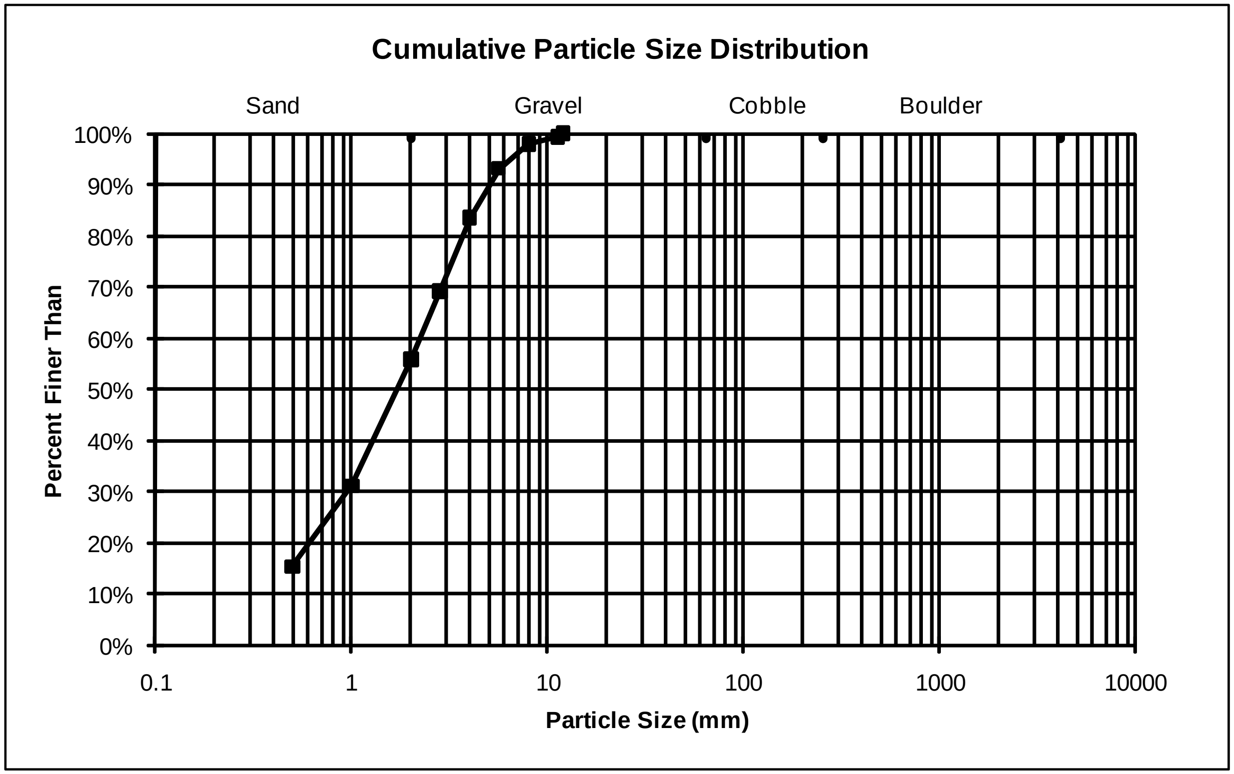
COMMENTS: Grab Sample of 2009 Sediment Accumulation

Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	109.40	15.3%	
0.5	113.20	15.8%	15.3%
1.0	176.20	24.6%	31.1%
2.0	97.00	13.5%	55.7%
2.8	101.50	14.2%	69.2%
4.0	69.50	9.7%	83.4%
5.6	34.20	4.8%	93.1%
8.0	11.00	1.5%	97.9%
11.2	4.20	0.6%	99.4%
12.0	*		100.0%
22.4			-
32.0			
45.0			
64.0			
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	716.20		

*Measured value of the largest particle in the sample and not a sieve weight

SITE NAME: Pike's Peak Highway - Fill Slope
ID NUMBER: 083FS Lower Fence
DATE: 6/9/2009
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	0.458	**1.117**	**1.704**	**4.084**	**6.453**	**12.0**



Sieve Analysis Worksheet

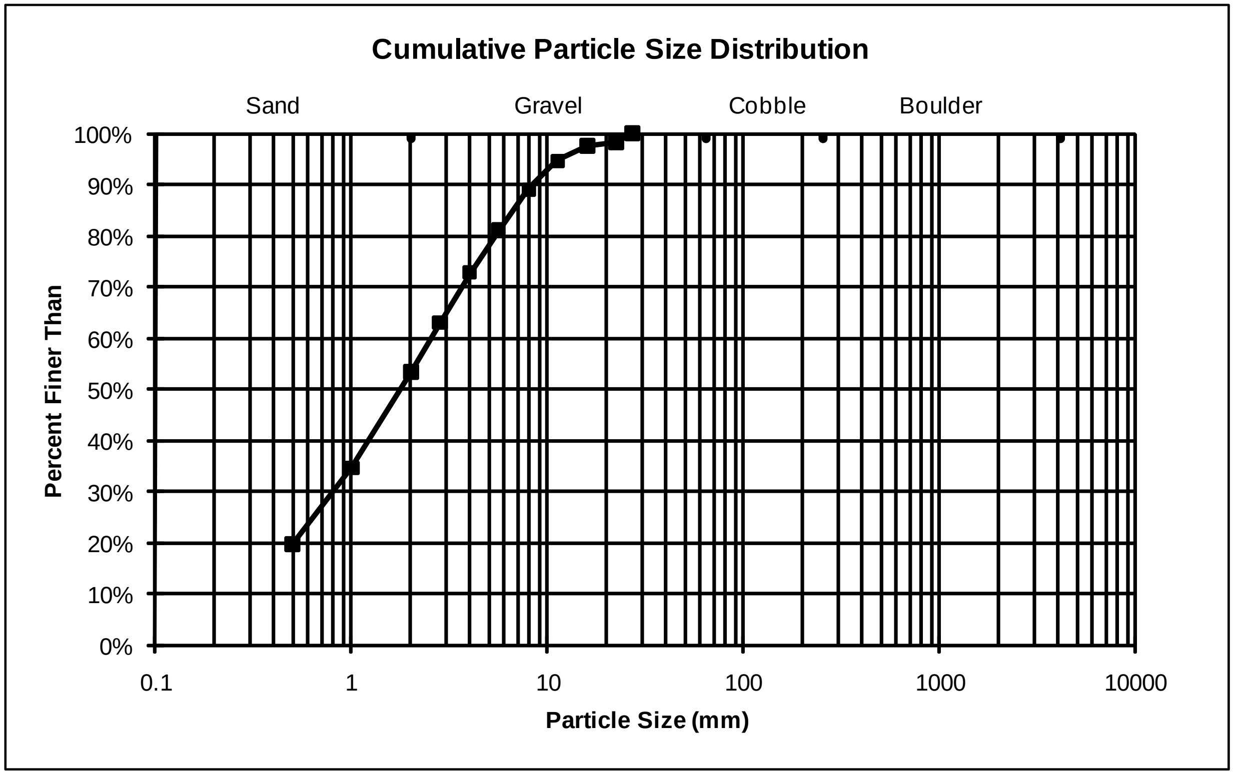
Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	181.30	19.8%	
0.5	135.90	14.8%	19.8%
1.0	172.10	18.8%	34.6%
2.0	88.40	9.6%	53.3%
2.8	90.30	9.8%	63.0%
4.0	75.50	8.2%	72.8%
5.6	72.60	7.9%	81.0%
8.0	52.00	5.7%	88.9%
11.2	27.60	3.0%	94.6%
16.0	6.70	0.7%	97.6%
22.4	15.10	1.6%	98.4%
27.0	*		100.0%
45.0			-
64.0			
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	917.50		

*Measured value of the largest particle in the sample and not a sieve weight

COMMENTS: Grab Sample of 2009 Sediment Accumulation

SITE NAME: Pike's Peak Highway - Fill Slope
ID NUMBER: 083FS Upper Fence
DATE: 6/9/2009
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	0.155	1.016	1.768	6.401	11.722	27.0



Sieve Analysis Worksheet

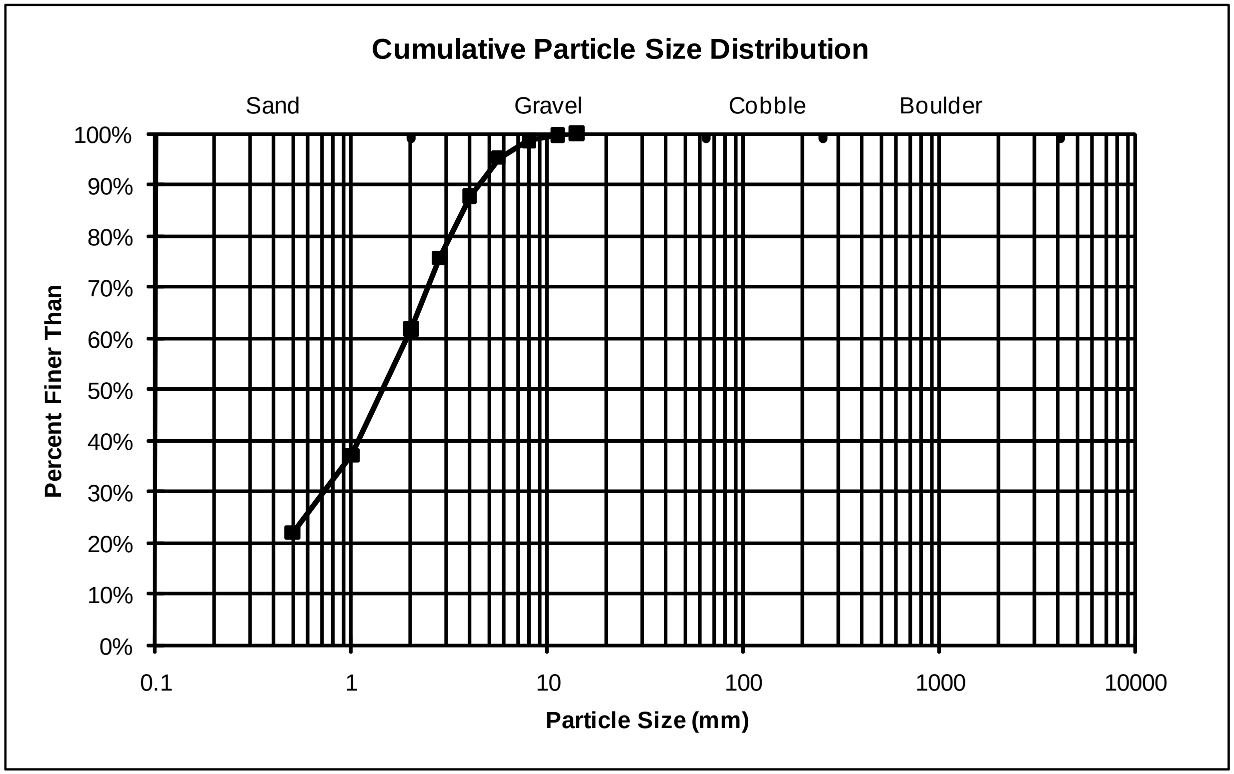
Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	191.40	21.9%	
0.5	132.90	15.2%	21.9%
1.0	216.20	24.7%	37.1%
2.0	121.20	13.9%	61.8%
2.8	106.50	12.2%	75.6%
4.0	65.10	7.4%	87.8%
5.6	28.90	3.3%	95.3%
8.0	8.70	1.0%	98.6%
11.2	3.90	0.4%	99.6%
14.0	*		100.0%
22.4			-
32.0			
45.0			
64.0			
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	874.80		

*Measured value of the largest particle in the sample and not a sieve weight

COMMENTS: Grab Sample of 2009 Sediment Accumulation

SITE NAME: Pike's Peak Highway - Fill Slope
ID NUMBER: 086FS Lower Fence
DATE: 8/18/2009
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	0.109	**0.910**	**1.437**	**3.577**	**5.536**	**14.0**



Sieve Analysis Worksheet

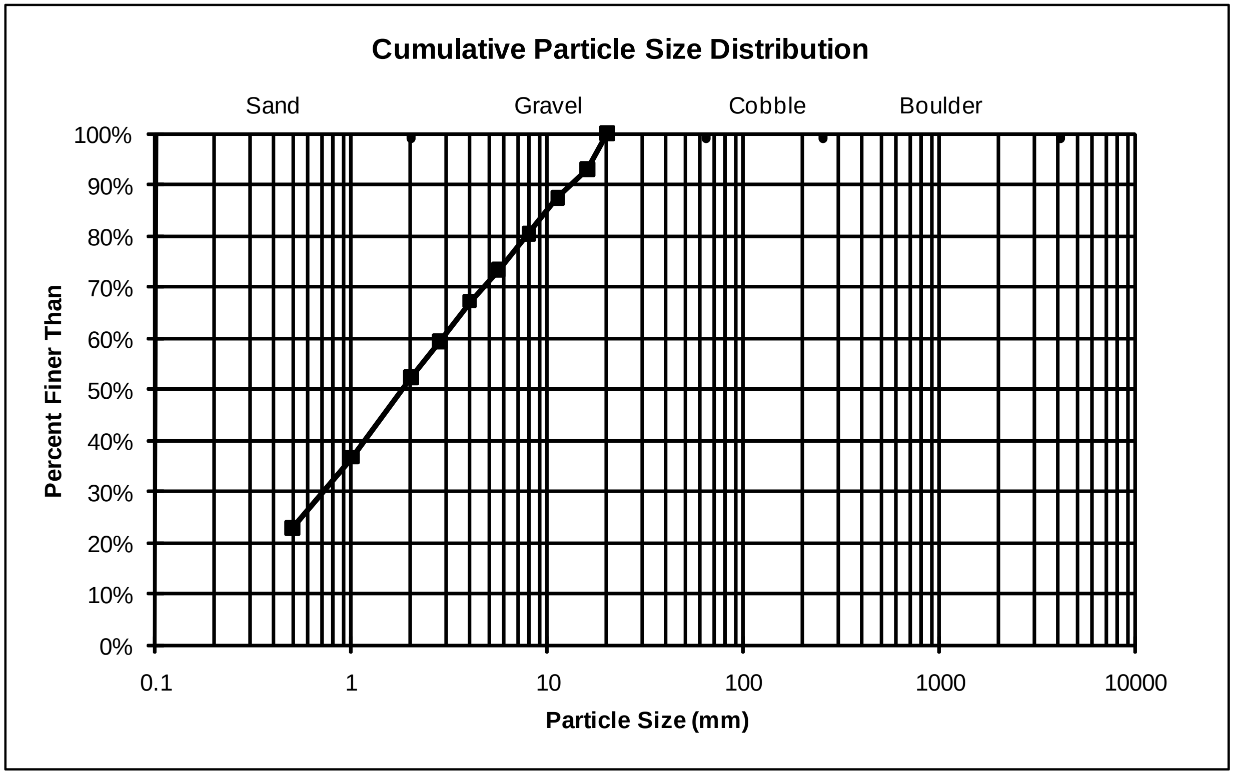
Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	143.80	22.8%	
0.5	87.00	13.8%	22.8%
1.0	98.20	15.6%	36.6%
2.0	45.20	7.2%	52.2%
2.8	49.10	7.8%	59.4%
4.0	39.40	6.3%	67.1%
5.6	43.20	6.9%	73.4%
8.0	45.60	7.2%	80.3%
11.2	34.80	5.5%	87.5%
16.0	44.10	7.0%	93.0%
20.0	*		100.0%
32.0			-
45.0			
64.0			
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	630.40		

*Measured value of the largest particle in the sample and not a sieve weight

COMMENTS: Grab Sample of 2009 Sediment Accumulation

SITE NAME: Pike's Peak Highway - Fill Slope
ID NUMBER: 086FS Upper Fence
DATE: 8/18/2009
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	0.095	0.922	1.814	9.524	17.052	20.0



Sieve Analysis Worksheet

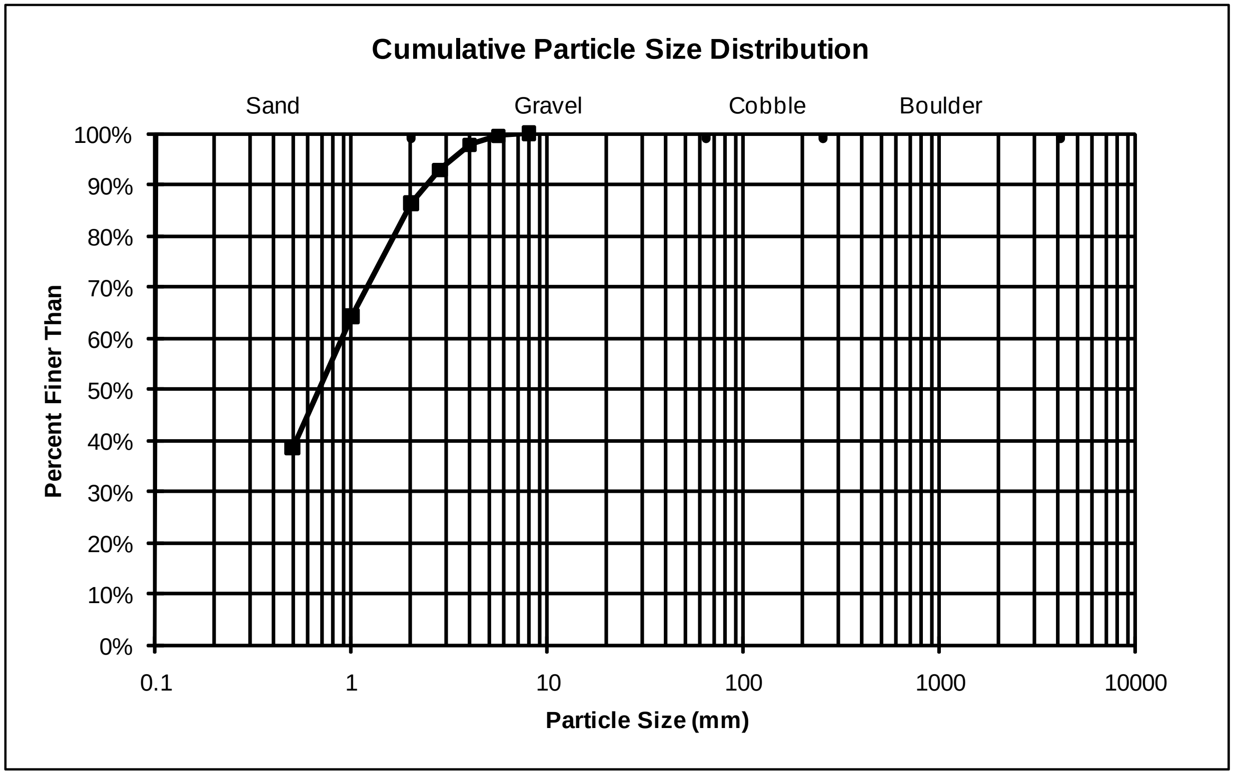
COMMENTS: Grab Sample of 2009 Sediment Accumulation

Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	293.00	38.4%	
0.5	197.10	25.8%	38.4%
1.0	168.70	22.1%	64.2%
2.0	49.50	6.5%	86.3%
2.8	37.80	5.0%	92.8%
4.0	13.30	1.7%	97.8%
5.6	3.70	0.5%	99.5%
8.0	*		100.0%
11.2			-
16.0			
22.4			
32.0			
45.0			
64.0			
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	763.10		

*Measured value of the largest particle in the sample and not a sieve weight

SITE NAME: Pike's Peak Highway - Fill Slope
ID NUMBER: 088FS Lower Fence
DATE: 6/9/2009
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	0.026	0.325	0.683	1.859	3.276	8.0



Sieve Analysis Worksheet

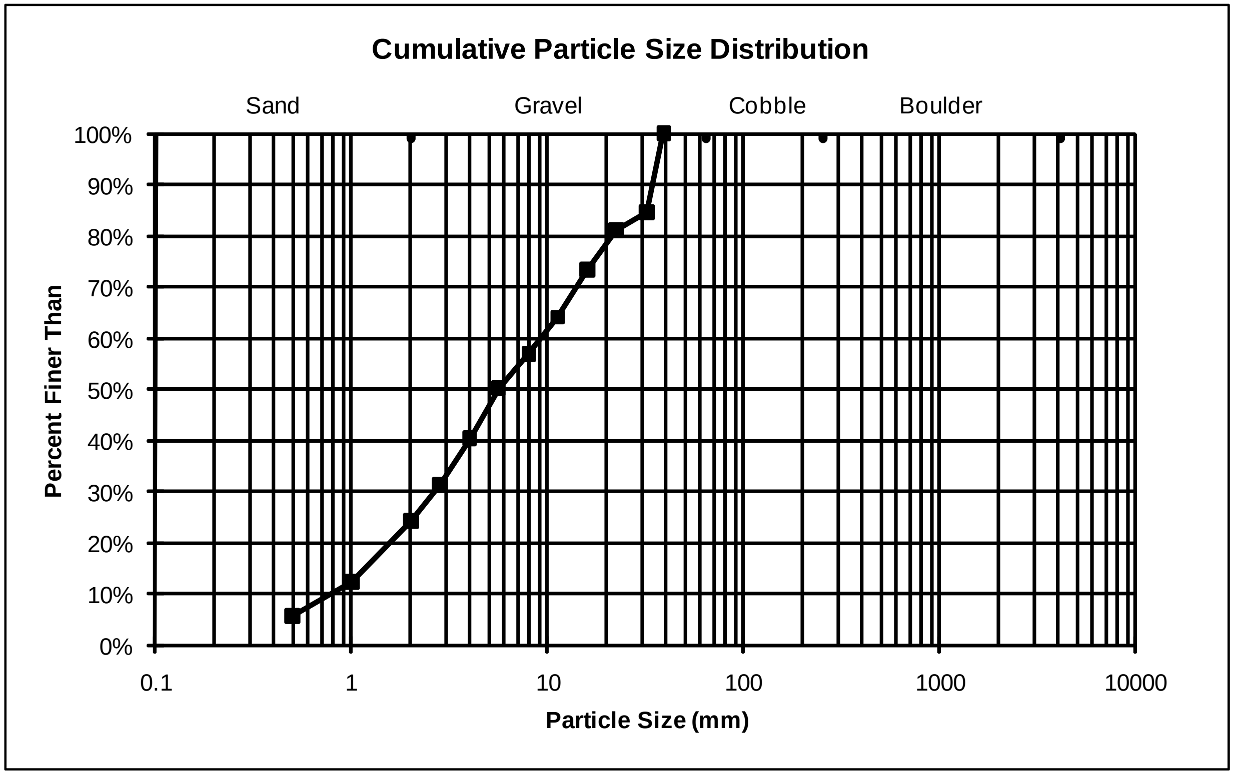
Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	31.50	5.6%	
0.5	38.10	6.7%	5.6%
1.0	68.00	12.0%	12.3%
2.0	39.20	6.9%	24.3%
2.8	52.20	9.2%	31.2%
4.0	54.40	9.6%	40.5%
5.6	38.70	6.8%	50.1%
8.0	40.20	7.1%	56.9%
11.2	52.90	9.3%	64.0%
16.0	43.20	7.6%	73.3%
22.4	19.70	3.5%	81.0%
32.0	88.00	15.5%	84.5%
39.0	*		100.0%
64.0			-
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	566.10		

*Measured value of the largest particle in the sample and not a sieve weight

COMMENTS: Grab Sample of 2009 Sediment Accumulation

SITE NAME: Pike's Peak Highway - Fill Slope
ID NUMBER: 088FS Upper Fence
DATE: 6/9/2009
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	1.169	3.239	5.588	30.542	36.596	39.0



Sieve Analysis Worksheet

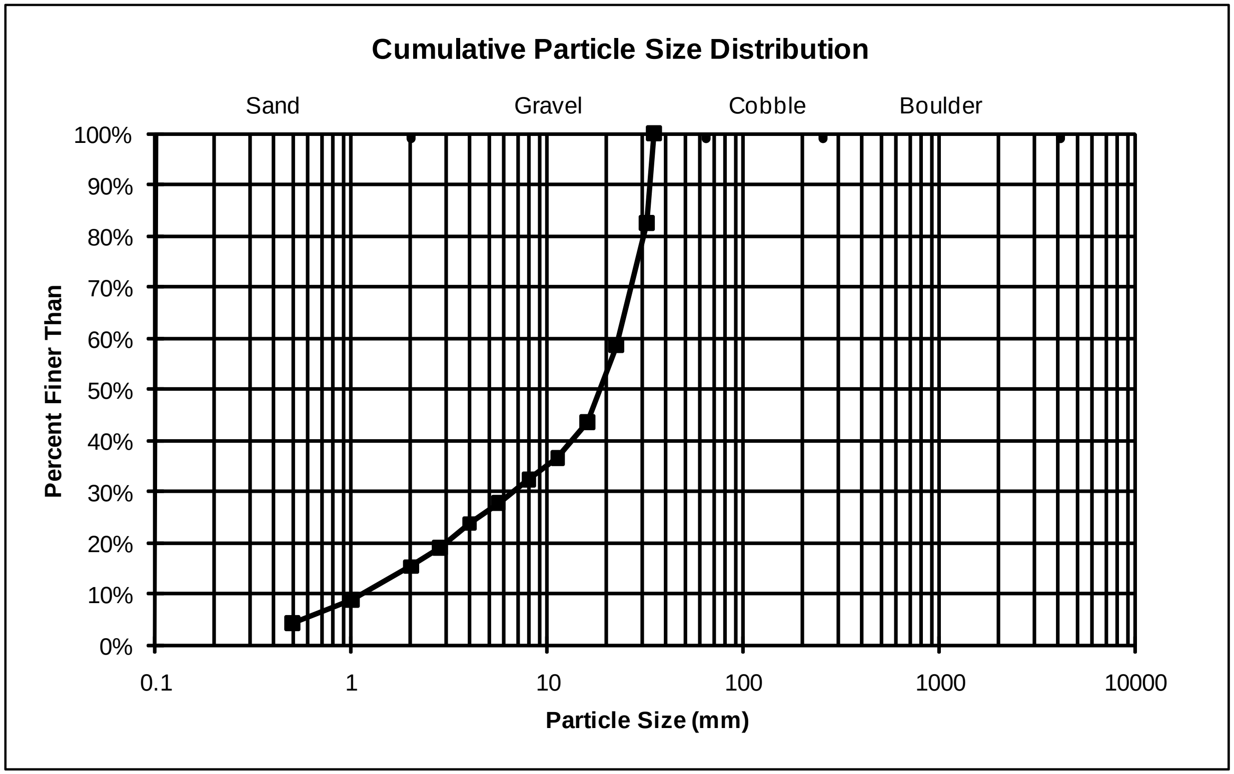
Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	44.70	4.2%	
0.5	46.80	4.4%	4.2%
1.0	69.90	6.6%	8.7%
2.0	39.60	3.8%	15.3%
2.8	49.30	4.7%	19.0%
4.0	41.40	3.9%	23.7%
5.6	49.70	4.7%	27.6%
8.0	43.20	4.1%	32.3%
11.2	75.10	7.1%	36.4%
16.0	156.70	14.8%	43.5%
22.4	255.00	24.2%	58.4%
32.0	184.20	17.4%	82.6%
35.0	*		100.0%
64.0			-
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	1055.60		

*Measured value of the largest particle in the sample and not a sieve weight

COMMENTS: Grab Sample of 2009 Sediment Accumulation

SITE NAME: Pike's Peak Highway - Fill Slope
ID NUMBER: 093FS Upper Fence
DATE: 7/21/2009
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	1.940	9.954	18.519	32.239	34.113	35.0



Sieve Analysis Worksheet

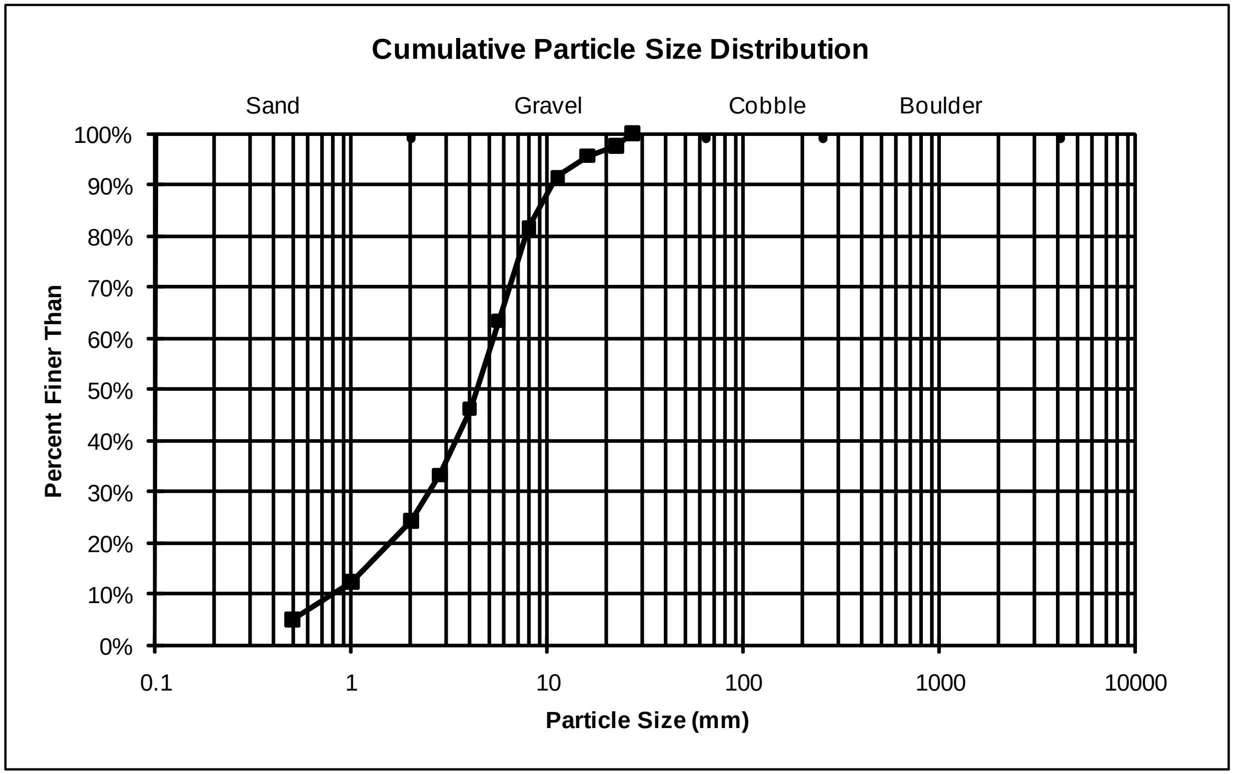
COMMENTS: Grab Sample of 2009 Sediment Accumulation

Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	30.20	4.8%	
0.5	47.20	7.5%	4.8%
1.0	75.30	12.0%	12.3%
2.0	55.70	8.9%	24.3%
2.8	81.50	13.0%	33.2%
4.0	108.20	17.2%	46.1%
5.6	113.20	18.0%	63.4%
8.0	63.30	10.1%	81.4%
11.2	26.00	4.1%	91.5%
16.0	12.00	1.9%	95.6%
22.4	15.70	2.5%	97.5%
27.0	*		100.0%
45.0			-
64.0			
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	628.30		

*Measured value of the largest particle in the sample and not a sieve weight

SITE NAME: Pike's Peak Highway - Fill Slope
ID NUMBER: 101FS Lower Fence
DATE: 8/13/2009
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	1.168	2.945	4.313	8.732	15.205	27.0



Sieve Analysis Worksheet

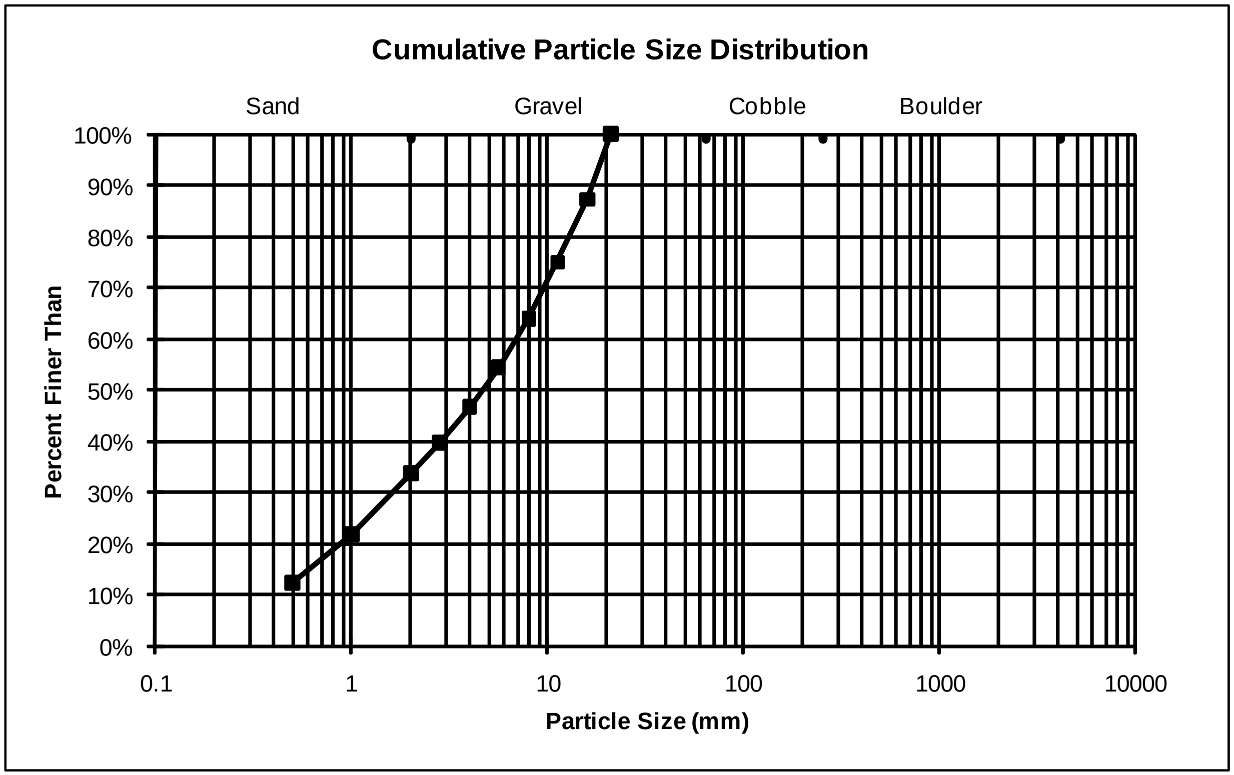
COMMENTS: Grab Sample of 2009 Sediment Accumulation

Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	71.90	12.3%	
0.5	55.30	9.5%	12.3%
1.0	69.40	11.9%	21.8%
2.0	34.80	6.0%	33.7%
2.8	41.10	7.1%	39.7%
4.0	43.80	7.5%	46.8%
5.6	56.10	9.6%	54.3%
8.0	64.20	11.0%	63.9%
11.2	71.70	12.3%	74.9%
16.0	74.40	12.8%	87.2%
21.0	*		100.0%
32.0			-
45.0			
64.0			
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	582.70		

*Measured value of the largest particle in the sample and not a sieve weight

SITE NAME: Pike's Peak Highway - Fill Slope
ID NUMBER: 101FS Upper Fence
DATE: 8/13/2009
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	0.607	2.147	4.623	14.569	18.879	21.0



Sieve Analysis Worksheet

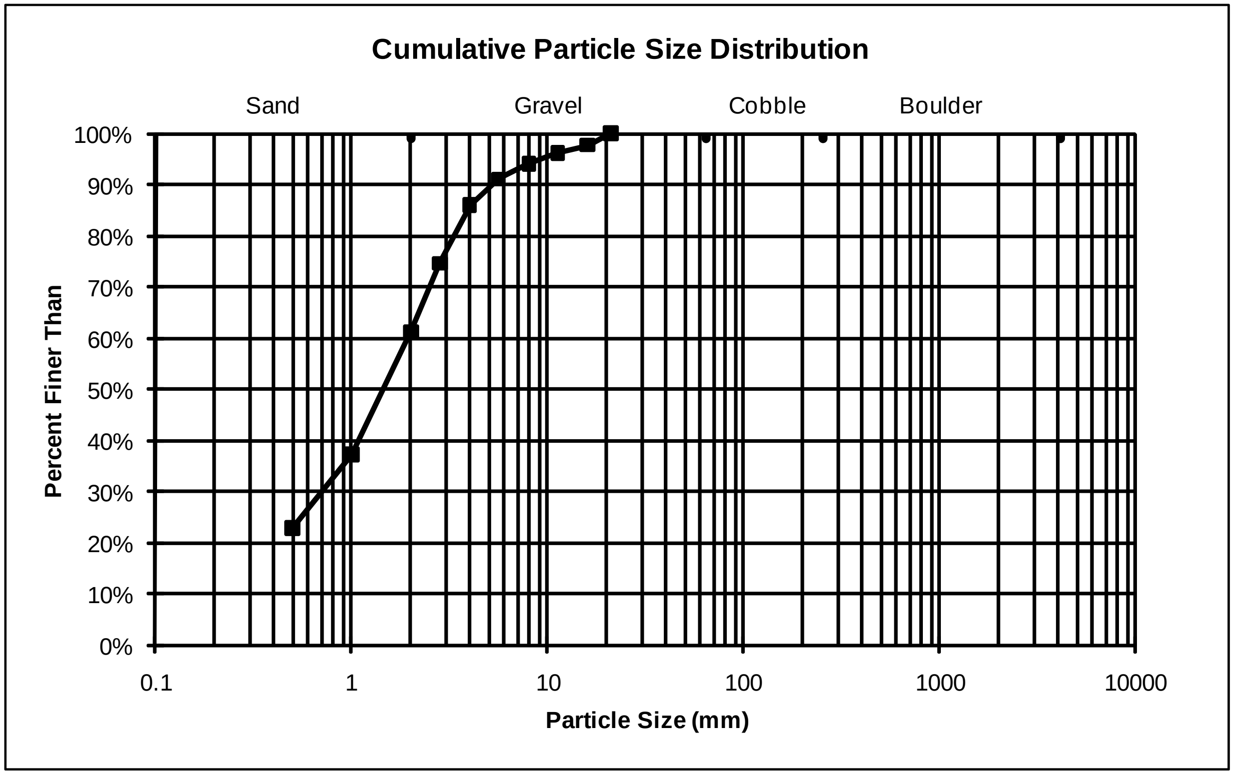
COMMENTS: Grab Sample of 2009 Sediment Accumulation

Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	169.90	22.8%	
0.5	106.60	14.3%	22.8%
1.0	179.00	24.1%	37.2%
2.0	99.20	13.3%	61.3%
2.8	84.10	11.3%	74.6%
4.0	38.70	5.2%	85.9%
5.6	22.50	3.0%	91.1%
8.0	15.70	2.1%	94.1%
11.2	10.90	1.5%	96.2%
16.0	17.00	2.3%	97.7%
21.0	*		100.0%
32.0			-
45.0			
64.0			
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	743.60		

*Measured value of the largest particle in the sample and not a sieve weight

SITE NAME: Pike's Peak Highway - Fill Slope
ID NUMBER: 103FS Lower Fence
DATE: 6/23/2009
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	0.094	0.900	1.446	3.767	9.180	21.0



Sieve Analysis Worksheet

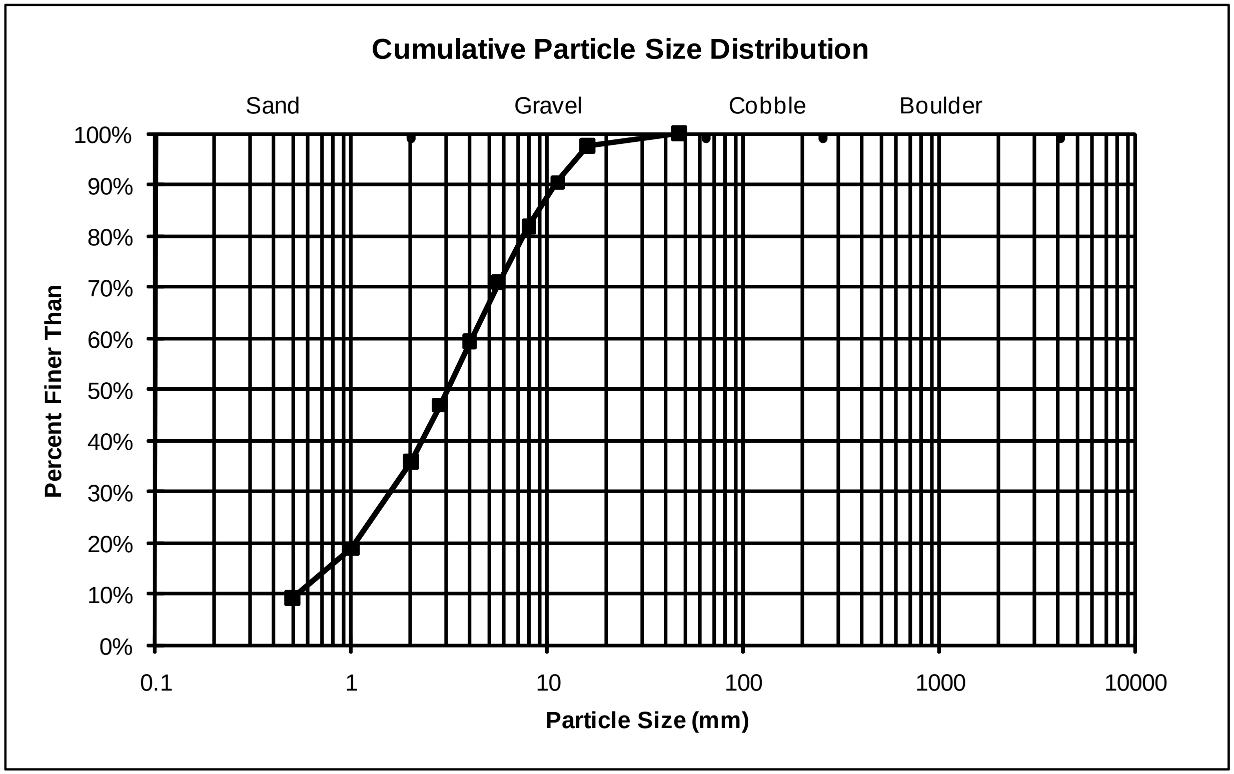
Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	88.30	9.1%	
0.5	94.50	9.7%	9.1%
1.0	164.40	16.9%	18.8%
2.0	107.50	11.1%	35.8%
2.8	121.20	12.5%	46.8%
4.0	112.40	11.6%	59.3%
5.6	106.30	10.9%	70.9%
8.0	82.90	8.5%	81.8%
11.2	68.80	7.1%	90.4%
16.0	24.70	2.5%	97.5%
47.0	*		100.0%
32.0			-
45.0			
64.0			
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	971.00		

*Measured value of the largest particle in the sample and not a sieve weight

COMMENTS: Grab Sample of 2009 Sediment Accumulation

SITE NAME: Pike's Peak Highway - Fill Slope
ID NUMBER: 103FS Upper Fence
DATE: 6/23/2009
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	0.761	1.939	3.066	8.713	14.139	47.0



Sieve Analysis Worksheet

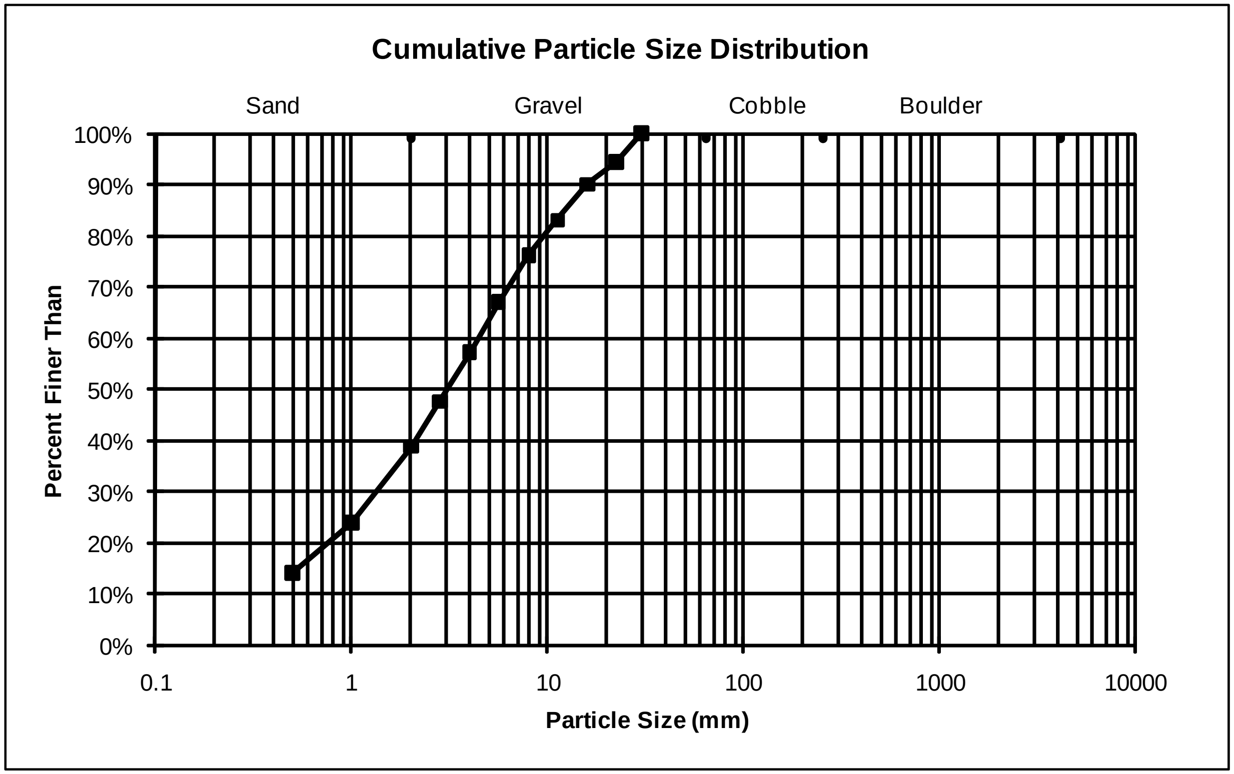
COMMENTS: Grab Sample of 2009 Sediment Accumulation

Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	107.50	14.1%	
0.5	75.60	9.9%	14.1%
1.0	113.00	14.8%	24.0%
2.0	67.20	8.8%	38.8%
2.8	73.70	9.6%	47.6%
4.0	75.70	9.9%	57.2%
5.6	68.10	8.9%	67.1%
8.0	53.20	7.0%	76.0%
11.2	53.80	7.0%	83.0%
16.0	32.70	4.3%	90.0%
22.4	43.40	5.7%	94.3%
30.0	*		100.0%
45.0			-
64.0			
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	763.90		

*Measured value of the largest particle in the sample and not a sieve weight

SITE NAME: Pike's Peak Highway - Fill Slope
ID NUMBER: 124FS Upper Fence
DATE: 8/13/2009
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	0.534	1.677	3.064	11.785	23.199	30.0



Sieve Analysis Worksheet

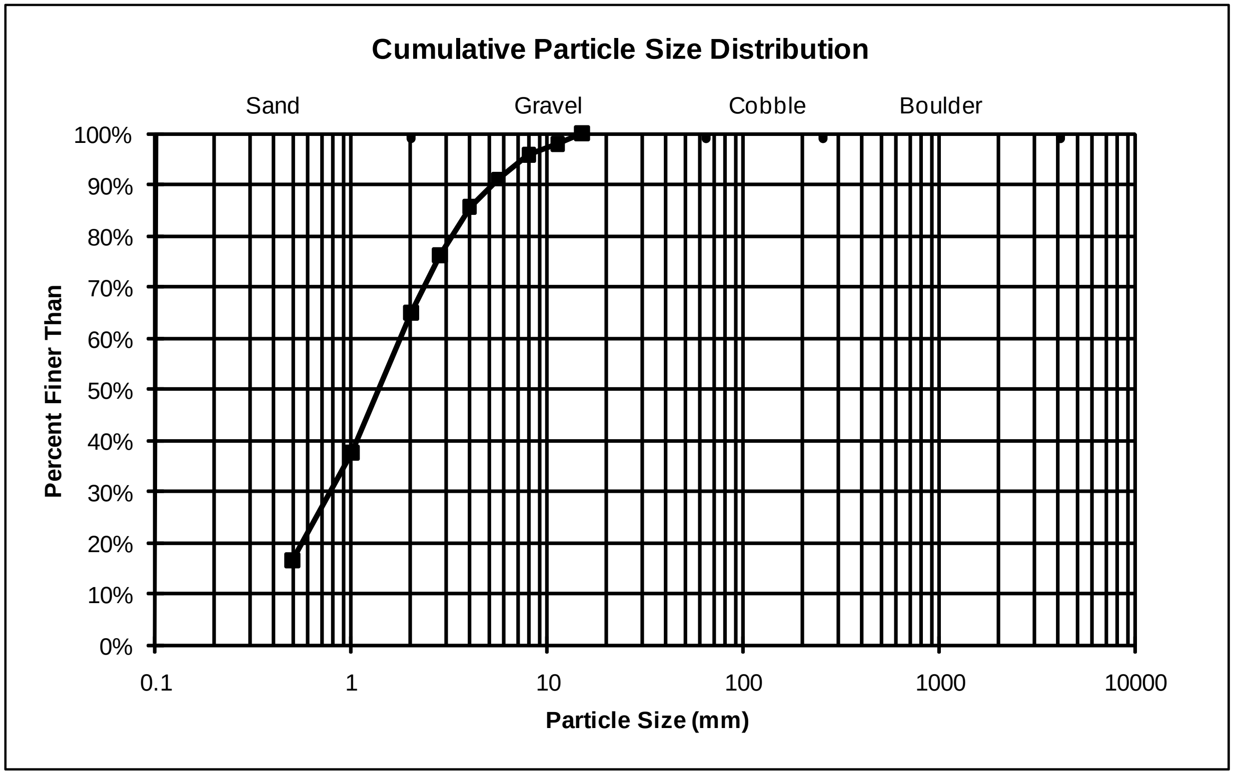
Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	109.90	16.5%	
0.5	139.70	21.0%	16.5%
1.0	182.00	27.4%	37.5%
2.0	73.90	11.1%	64.9%
2.8	63.80	9.6%	76.0%
4.0	36.20	5.4%	85.6%
5.6	31.80	4.8%	91.1%
8.0	12.80	1.9%	95.9%
11.2	14.70	2.2%	97.8%
15.0	*		100.0%
22.4			-
32.0			
45.0			
64.0			
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	664.80		

*Measured value of the largest particle in the sample and not a sieve weight

COMMENTS: Grab Sample of 2009 Sediment Accumulation

SITE NAME: Pike's Peak Highway - Fill Slope
ID NUMBER: 128FS Upper Fence
DATE: 7/7/2009
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	0.319	0.919	1.371	3.764	7.501	15.0



Sieve Analysis Worksheet

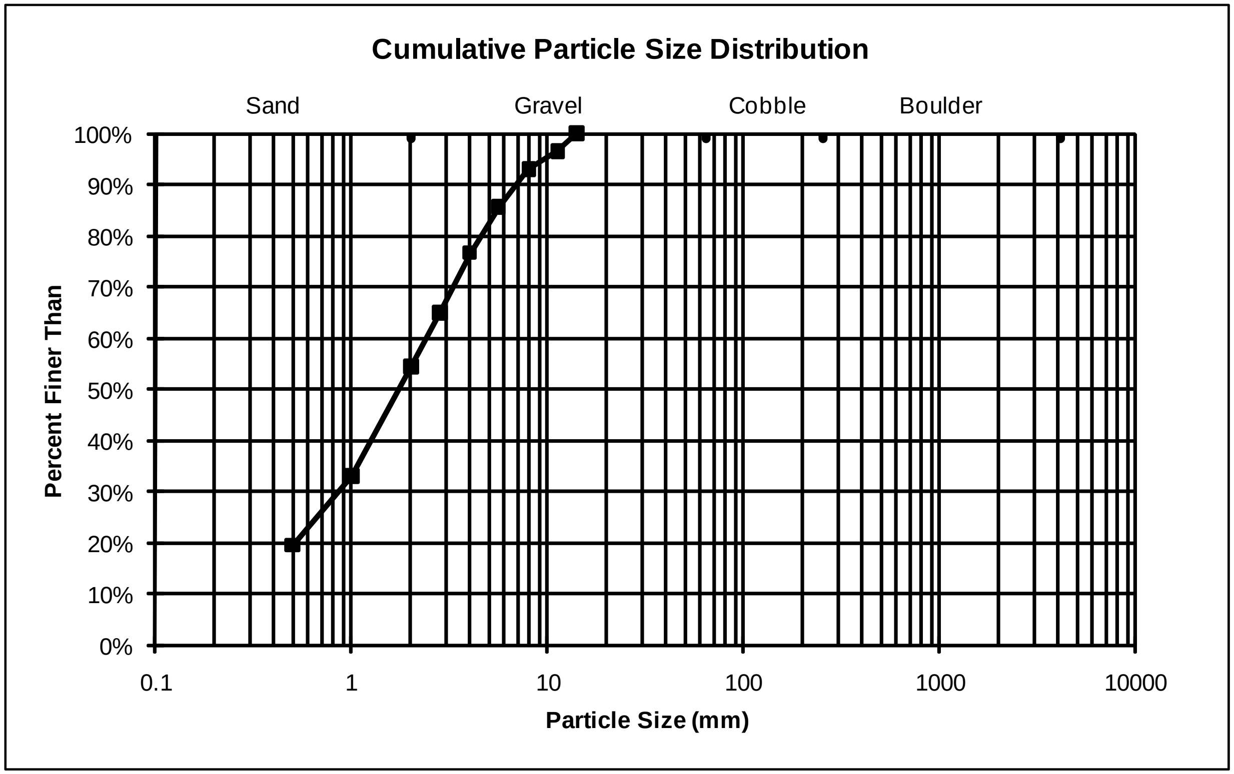
COMMENTS: Grab Sample of 2009 Sediment Accumulation

Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	108.50	19.5%	
0.5	74.80	13.4%	19.5%
1.0	119.60	21.5%	32.9%
2.0	58.30	10.5%	54.4%
2.8	66.00	11.8%	64.8%
4.0	49.30	8.8%	76.7%
5.6	41.70	7.5%	85.5%
8.0	19.60	3.5%	93.0%
11.2	19.50	3.5%	96.5%
14.0	*		100.0%
22.4			-
32.0			
45.0			
64.0			
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	557.30		

*Measured value of the largest particle in the sample and not a sieve weight

SITE NAME: Pike's Peak Highway - Fill Slope
ID NUMBER: 186FS Upper Fence
DATE: 7/29/2009
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	0.164	1.071	1.738	5.289	9.702	14.0



Sieve Analysis Worksheet

COMMENTS: Grab Sample of 2009 Sediment Accumulation

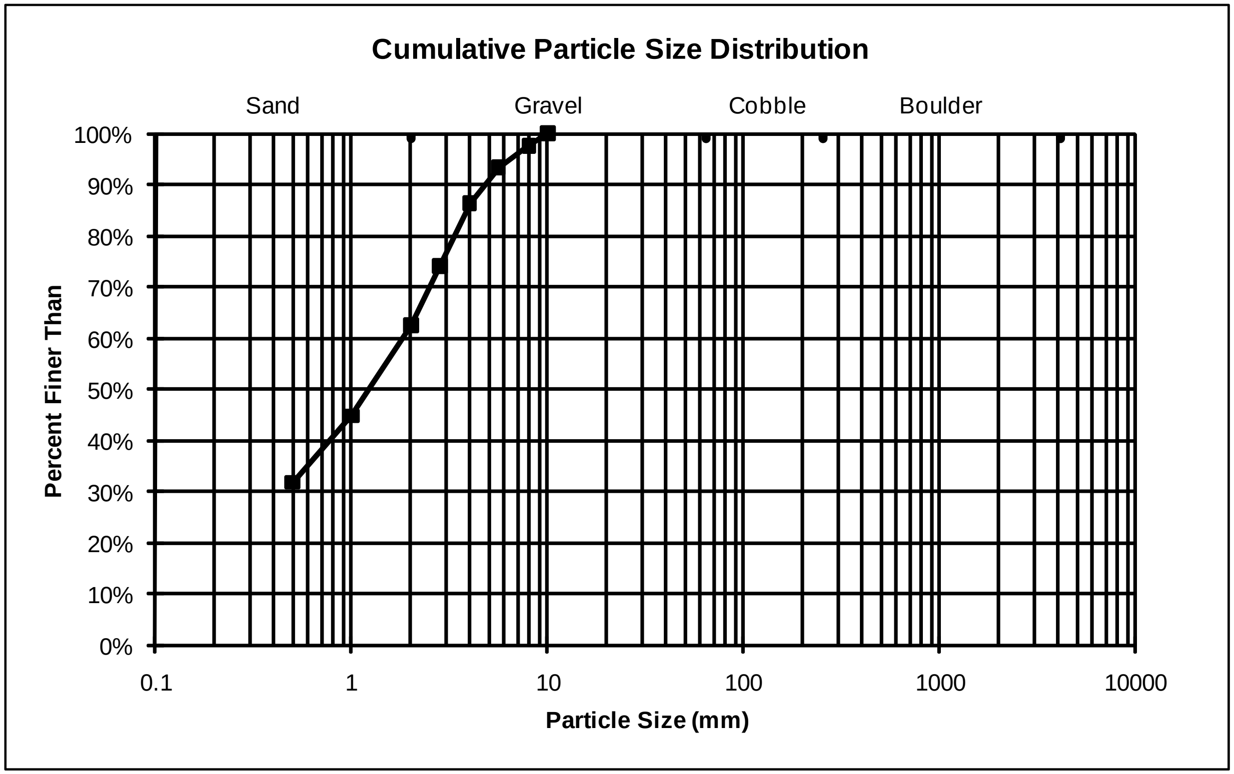
Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	228.40	31.7%	
0.5	93.50	13.0%	31.7%
1.0	128.10	17.8%	44.7%
2.0	82.60	11.5%	62.5%
2.8	87.70	12.2%	74.0%
4.0	51.70	7.2%	86.2%
5.6	30.50	4.2%	93.4%
8.0	17.00	2.4%	97.6%
10.0	*		100.0%
16.0			-
22.4			
32.0			
45.0			
64.0			
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	719.50		

*Measured value of the largest particle in the sample and not a sieve weight

SITE NAME: Pike's Peak Highway - Fill Slope
ID NUMBER: 194FS Upper Fence
DATE: 9/16/2009
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)

D15	D35	D50	D84	D95	Lpart
0.039	0.595	1.227	3.749	6.408	10.0



Sieve Analysis Worksheet

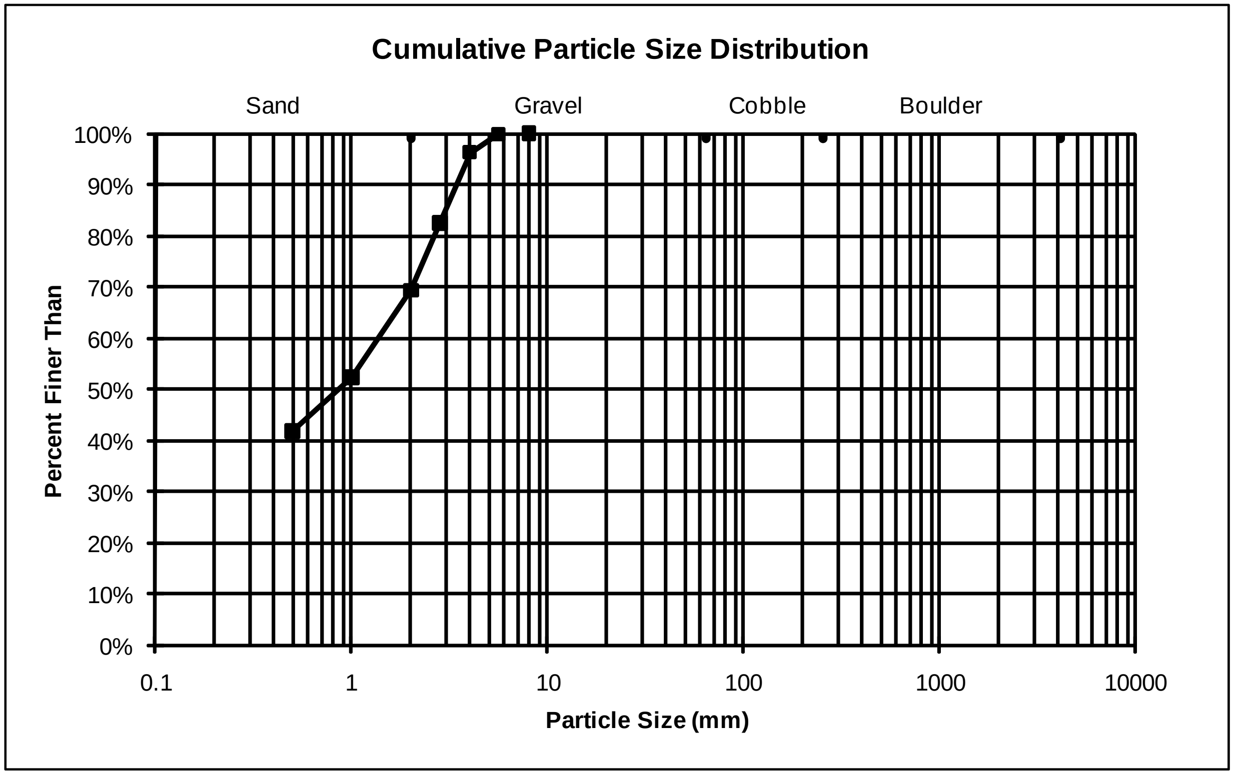
COMMENTS: Grab Sample of 2009 Sediment Accumulation

Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	336.40	41.8%	
0.5	84.80	10.5%	41.8%
1.0	136.20	16.9%	52.4%
2.0	104.80	13.0%	69.3%
2.8	111.90	13.9%	82.4%
4.0	28.50	3.5%	96.3%
5.6	1.40	0.2%	99.8%
8.0	*		100.0%
11.2			-
16.0			
22.4			
32.0			
45.0			
64.0			
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	804.00		

*Measured value of the largest particle in the sample and not a sieve weight

SITE NAME: Pike's Peak Highway - Fill Slope
ID NUMBER: 203FS Lower Fence
DATE: 5/6/2009
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	0.022	0.226	0.855	2.920	3.871	8.0



Sieve Analysis Worksheet

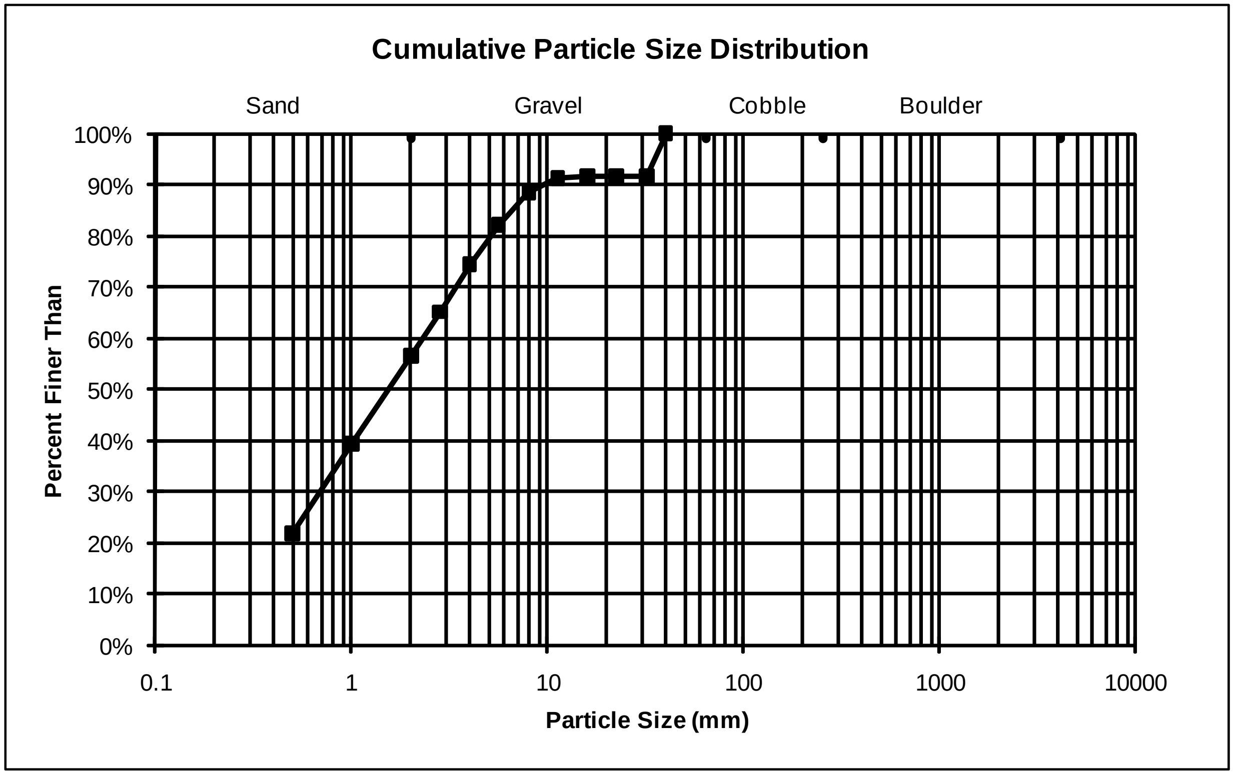
Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	184.00	21.9%	
0.5	146.00	17.3%	21.9%
1.0	145.50	17.3%	39.2%
2.0	72.20	8.6%	56.5%
2.8	77.90	9.3%	65.1%
4.0	65.70	7.8%	74.3%
5.6	53.80	6.4%	82.1%
8.0	21.80	2.6%	88.5%
11.2	4.00	0.5%	91.1%
16.0	0.00	0.0%	91.6%
22.4	0.00	0.0%	91.6%
32.0	70.80	8.4%	91.6%
40.0	*		100.0%
64.0			-
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	841.70		

*Measured value of the largest particle in the sample and not a sieve weight

COMMENTS: Grab Sample of 2009 Sediment Accumulation

SITE NAME: Pike's Peak Highway - Fill Slope
ID NUMBER: 203FS Upper Fence
DATE: 5/6/2009
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	0.109	0.845	1.542	6.215	35.031	40.0

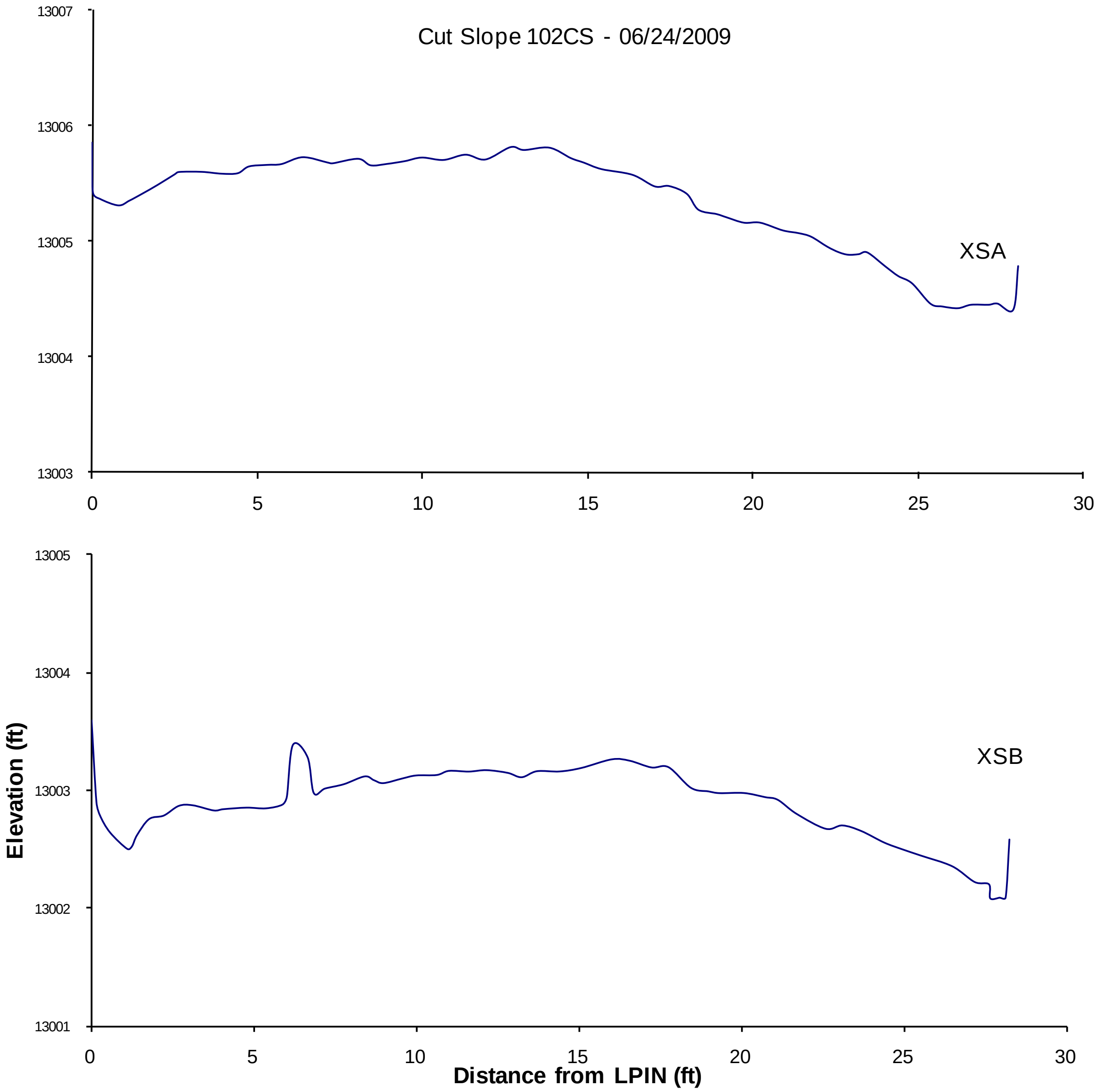


Appendix G

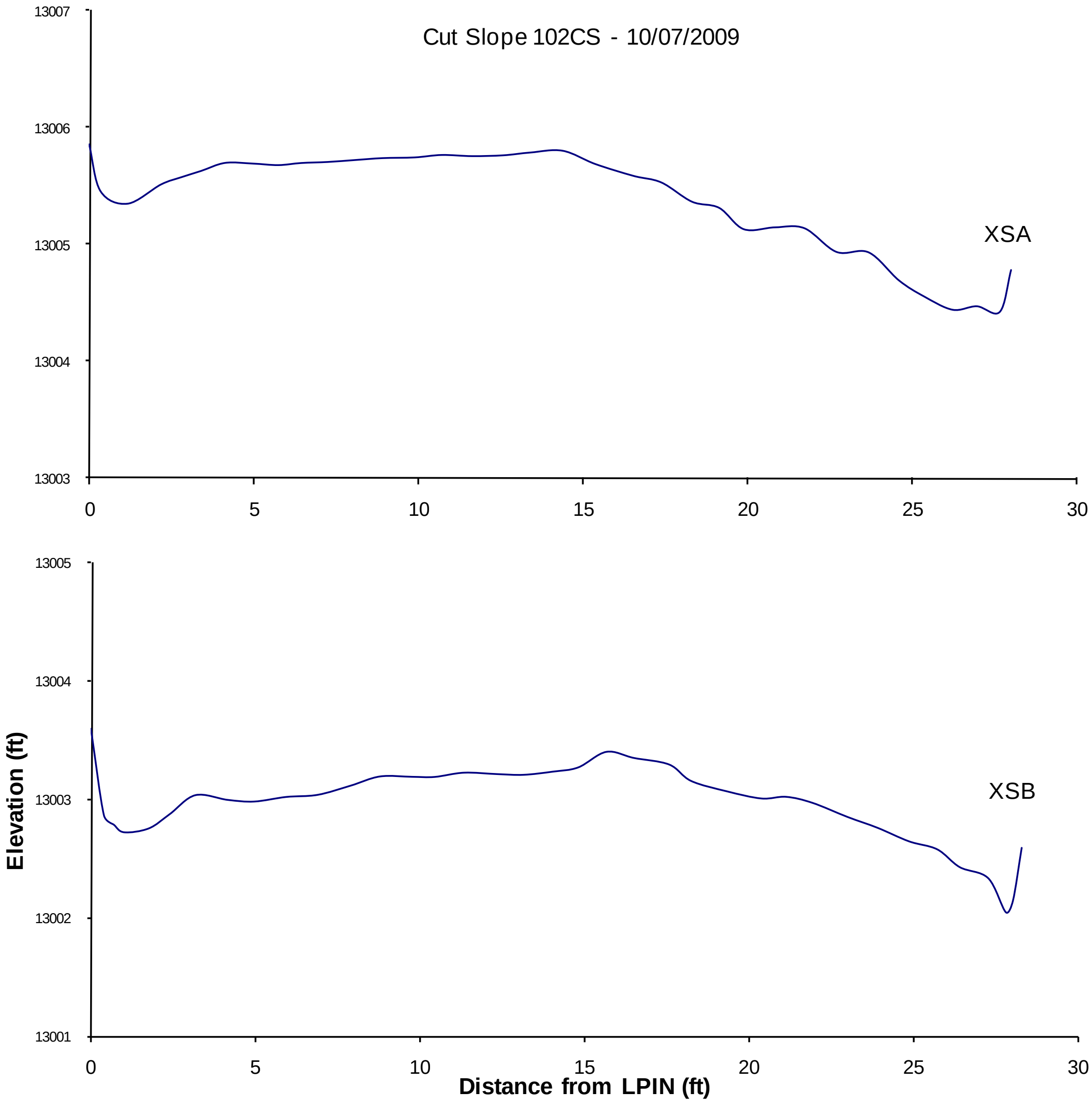
Cut Slope

Cross Section Graphs

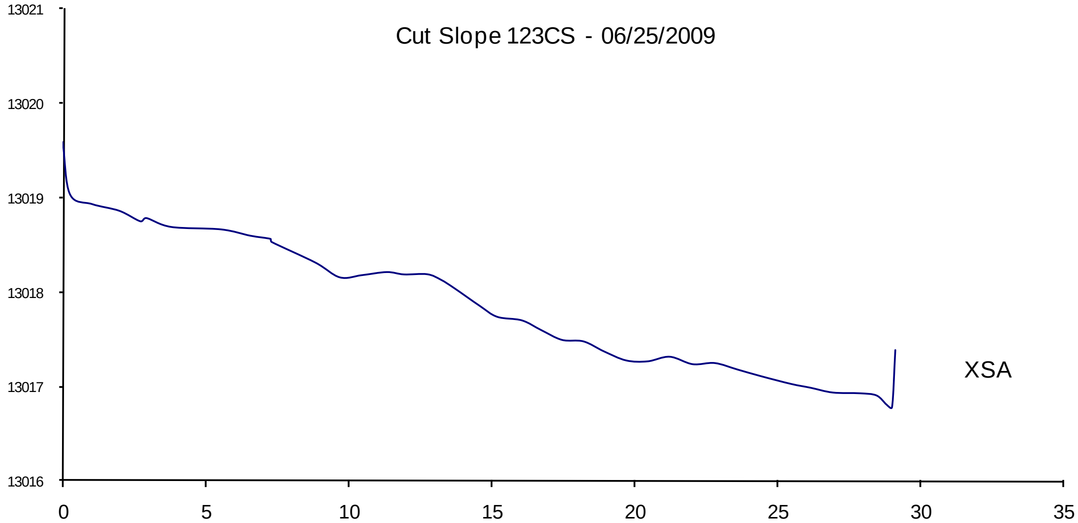
2009

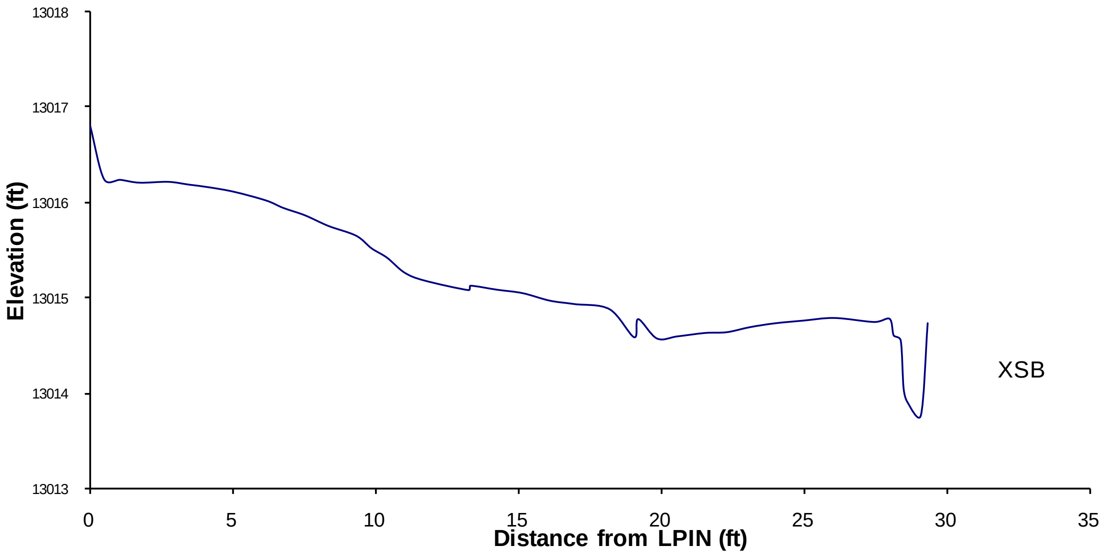


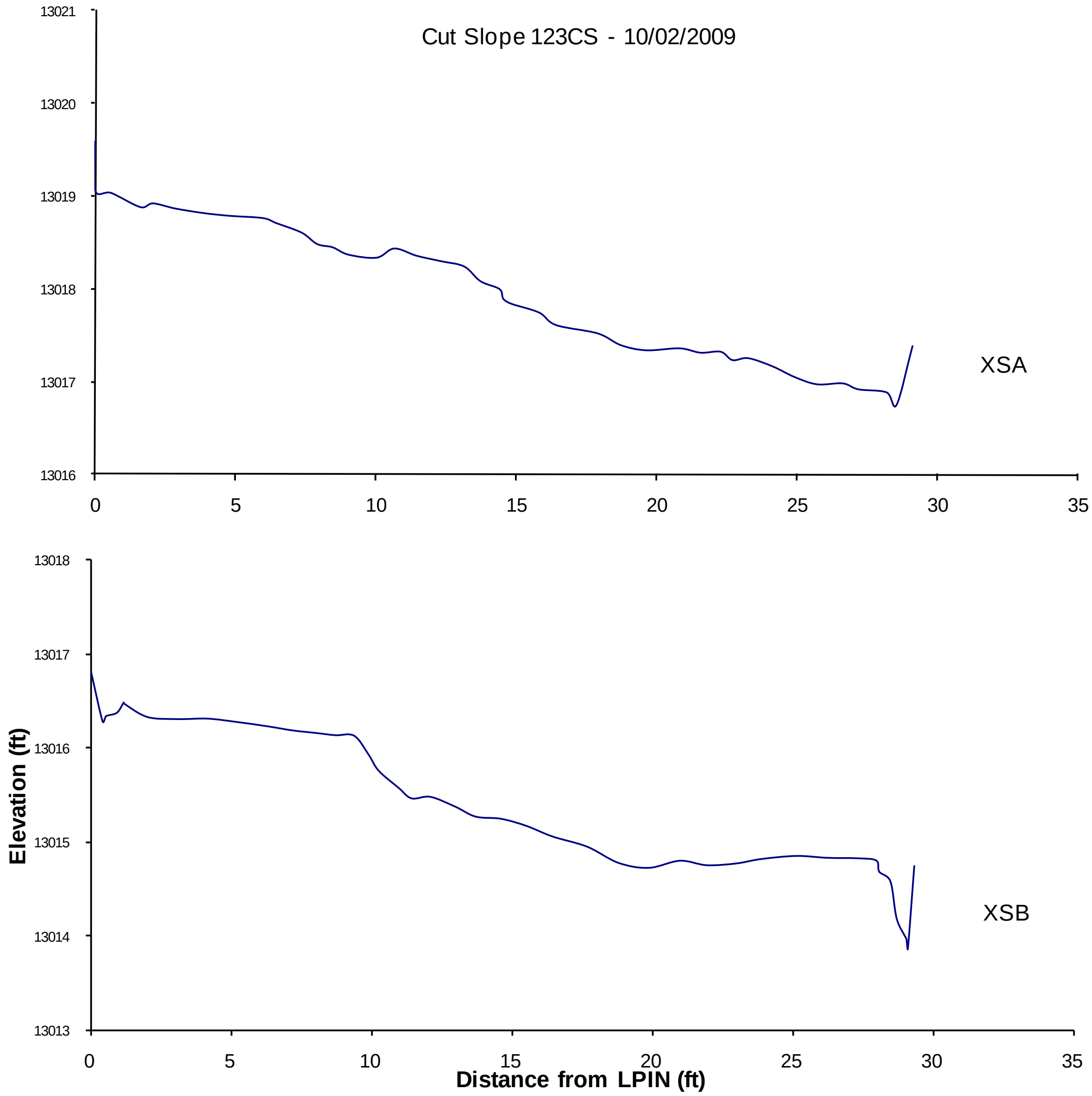
Cut Slope 102CS - 06/24/2009
13007
13006
13005
13004
13003
0
5
10
15
20
25
30
XSA
13005
13004
13003
13002
13001
Elevation (ft)
XSB
Distance from LPIN (ft)



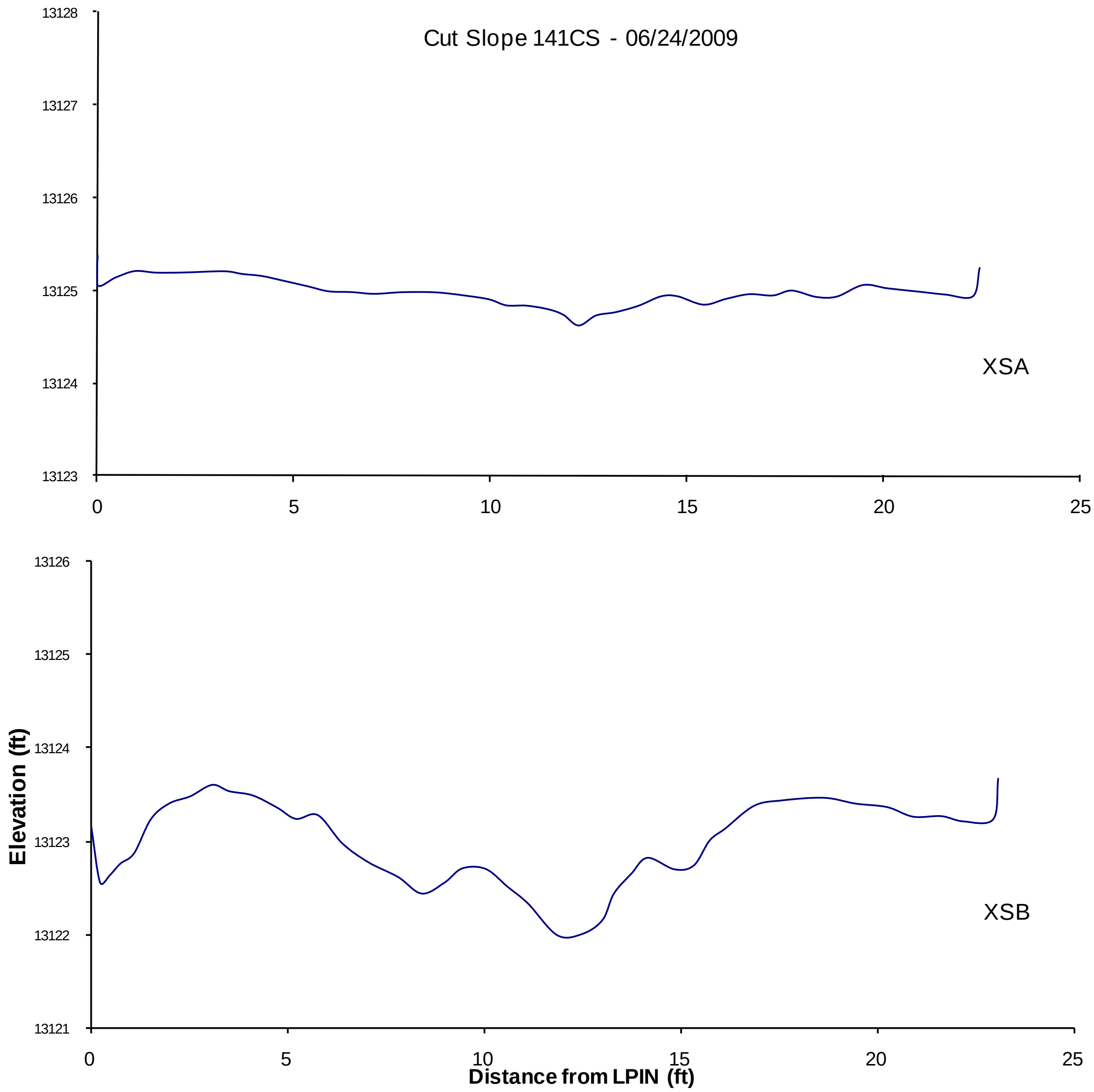
Cut Slope 102CS - 10/07/2009
13007
13006
13005
13004
13003
XSA
0
5
10
15
20
25
30
13005
13004
13003
13002
13001
Elevation (ft)
XSB
Distance from LPIN (ft)


Cut Slope 123CS - 06/25/2009
13021
13020
13019
13018
13017
13016
0
5
10
15
20
25
30
35
XSA

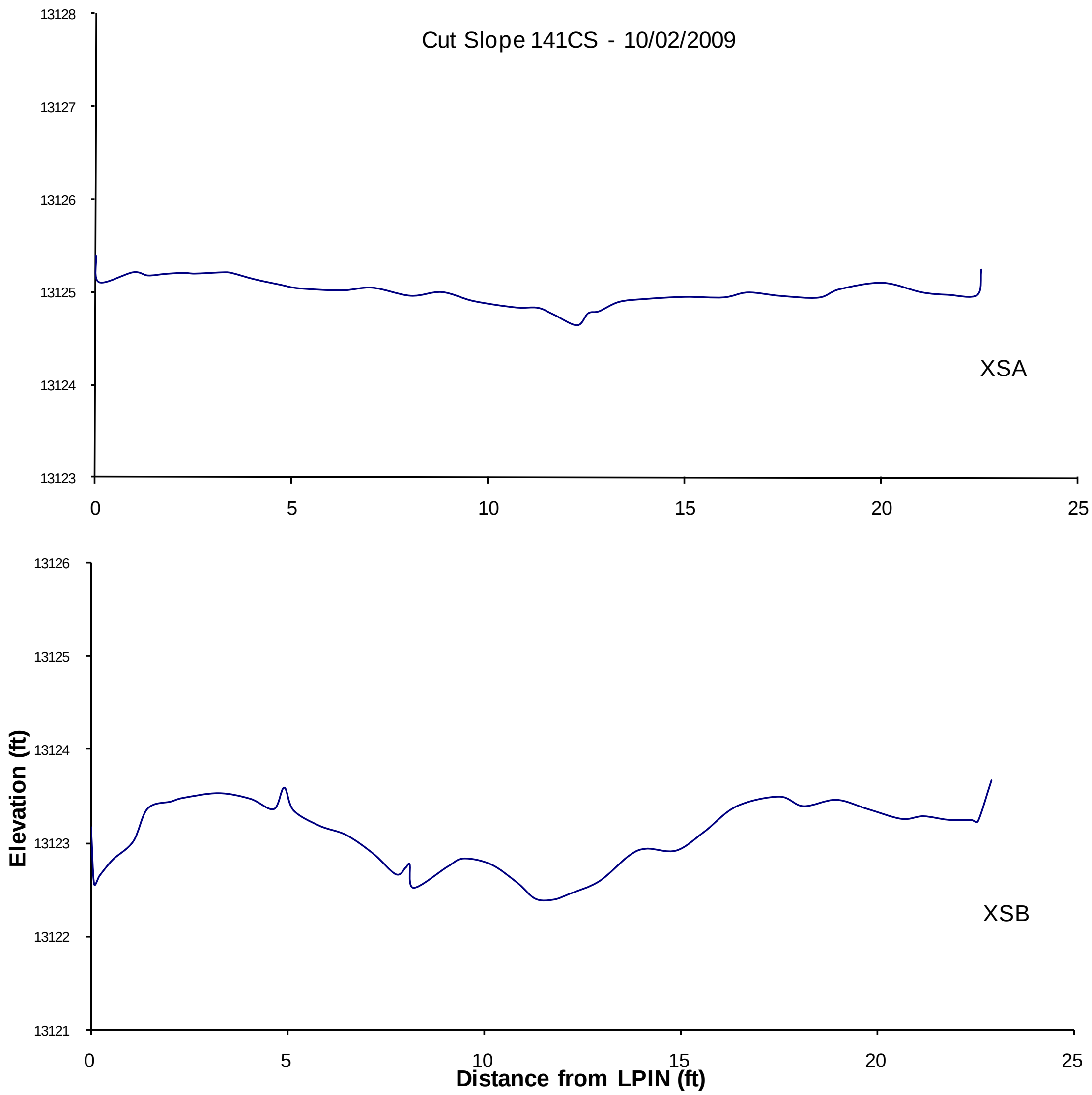

Elevation (ft)
13018
13017
13016
13015
13014
13013
0
5
10
15
20
25
30
35
Distance from LPIN (ft)
XSB



Cut Slope 123CS - 10/02/2009
13021
13020
13019
13018
13017
13016
0
5
10
15
20
25
30
35
XSA
13018
13017
13016
13015
13014
13013
Elevation (ft)
0
5
10
15
20
25
30
35
XSB
Distance from LPIN (ft)



Cut Slope 141CS - 06/24/2009
13128
13127
13126
13125
13124
13123
0
5
10
15
20
25
XSA
13126
13125
13124
13123
13122
13121
Elevation (ft)
XSB
Distance from LPIN (ft)

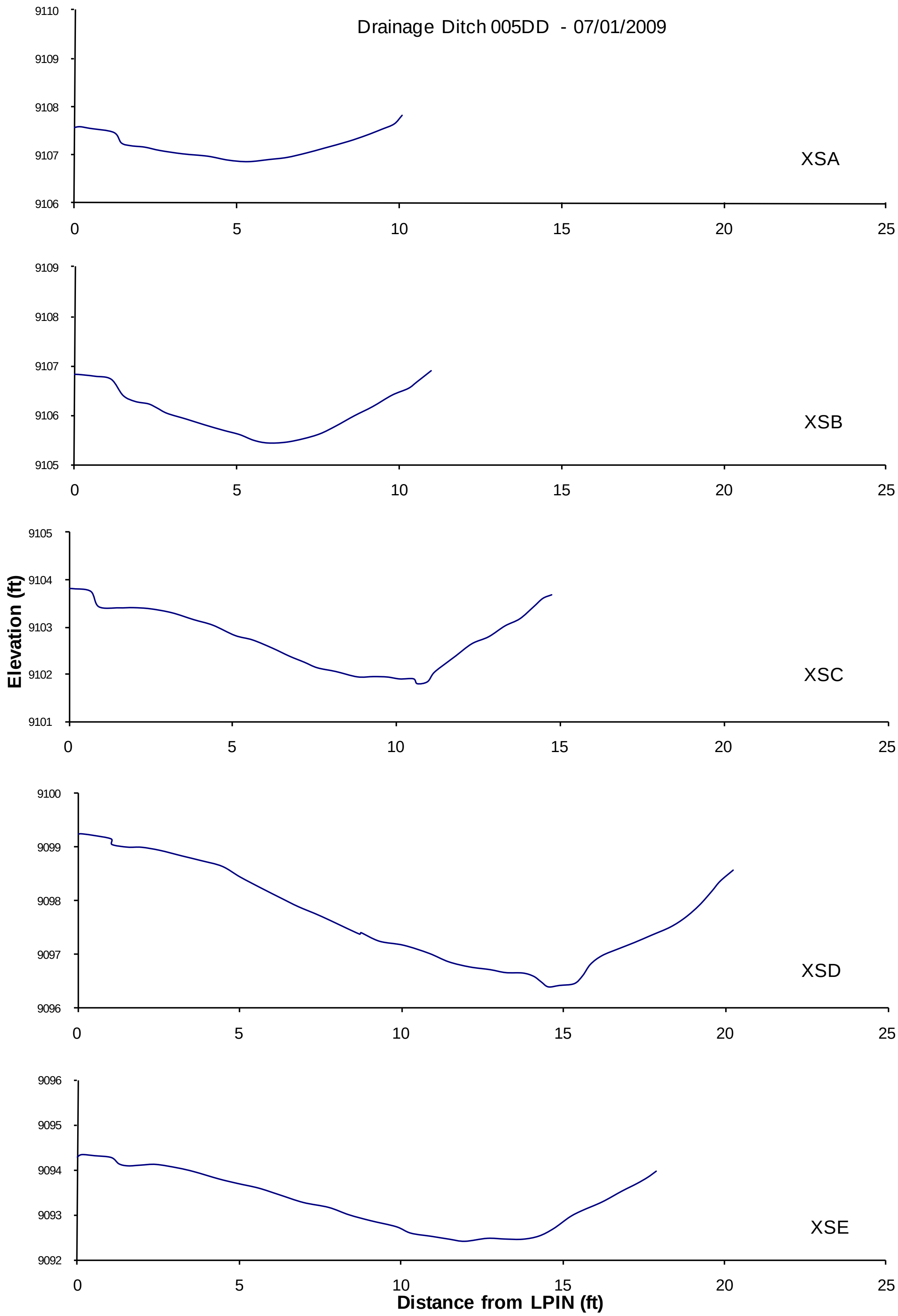

Cut Slope 141CS - 10/02/2009
13128
13127
13126
13125
13124
13123
0
5
10
15
20
25
XSA
13126
13125
13124
13123
13122
13121
Elevation (ft)
XSB
Distance from LPIN (ft)

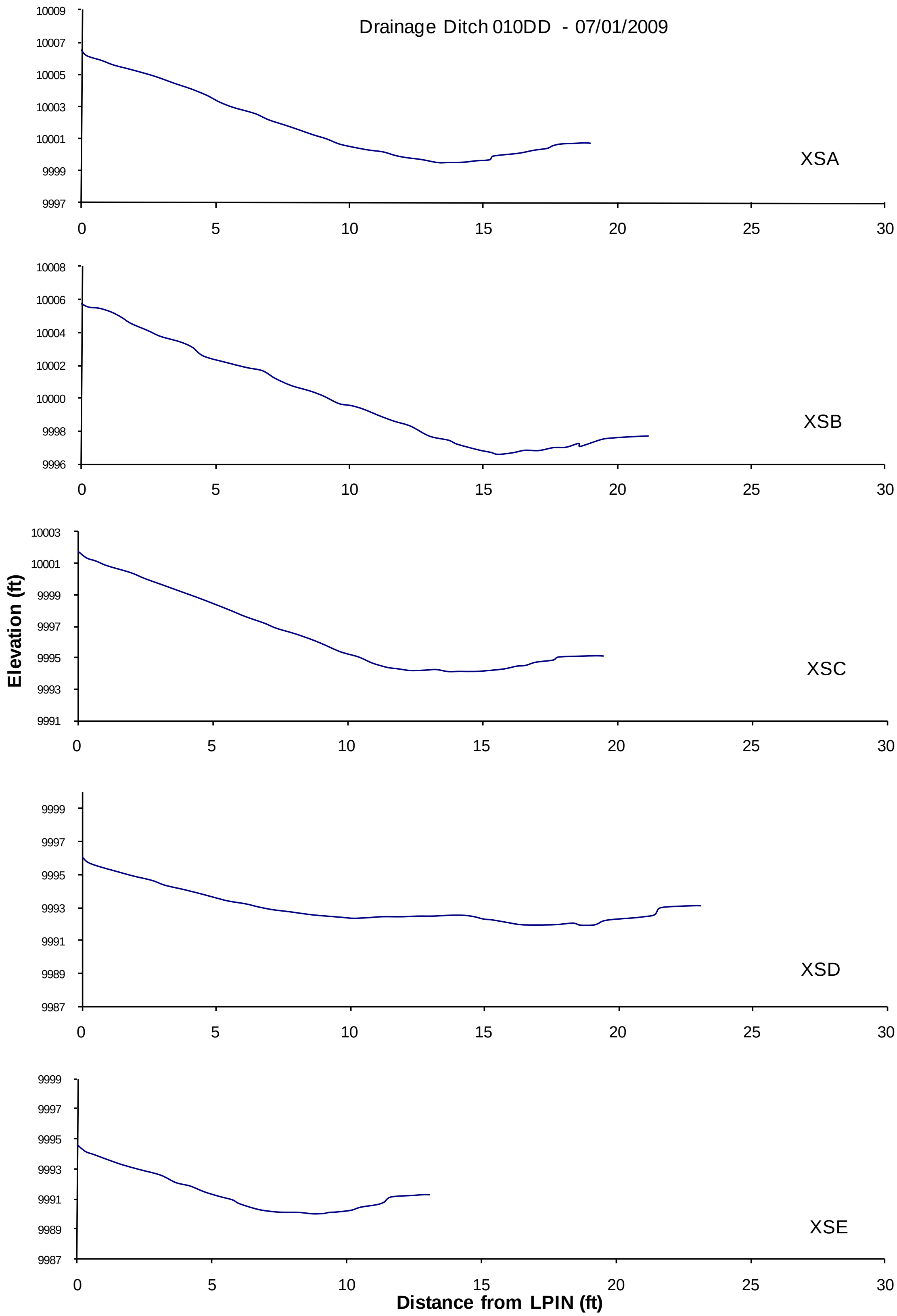
Appendix H

Drainage Ditch

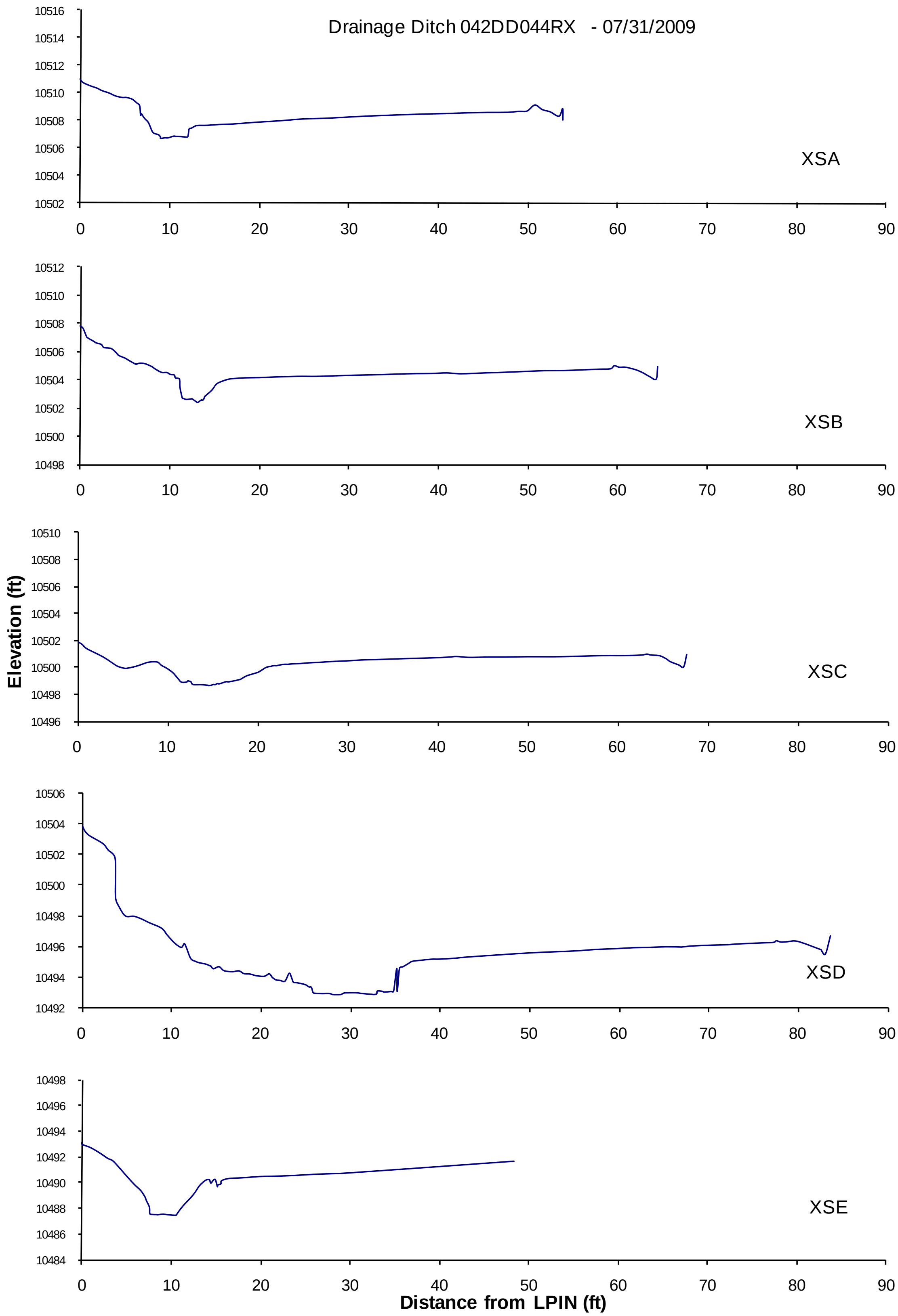
Cross Section Graphs

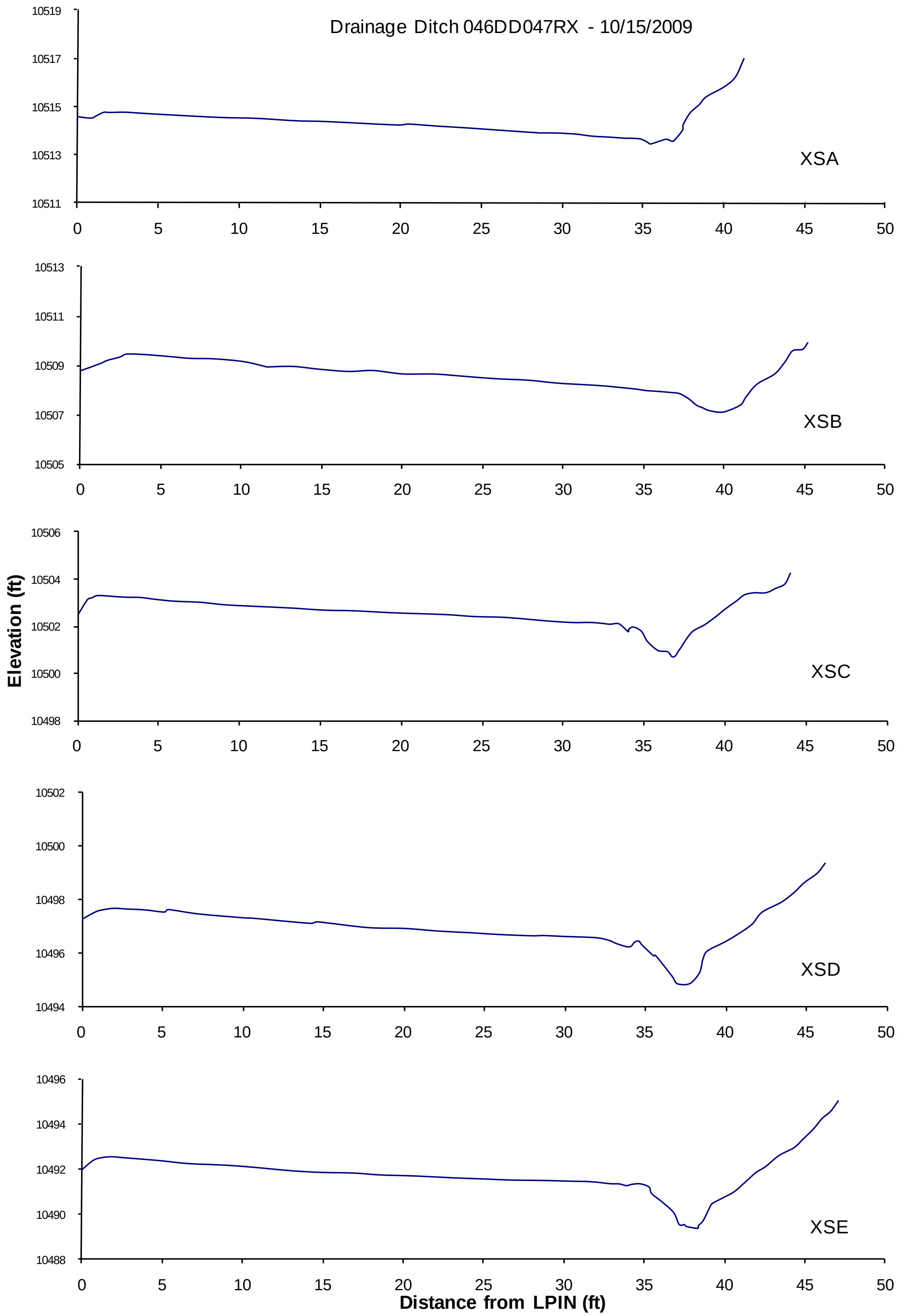
2009

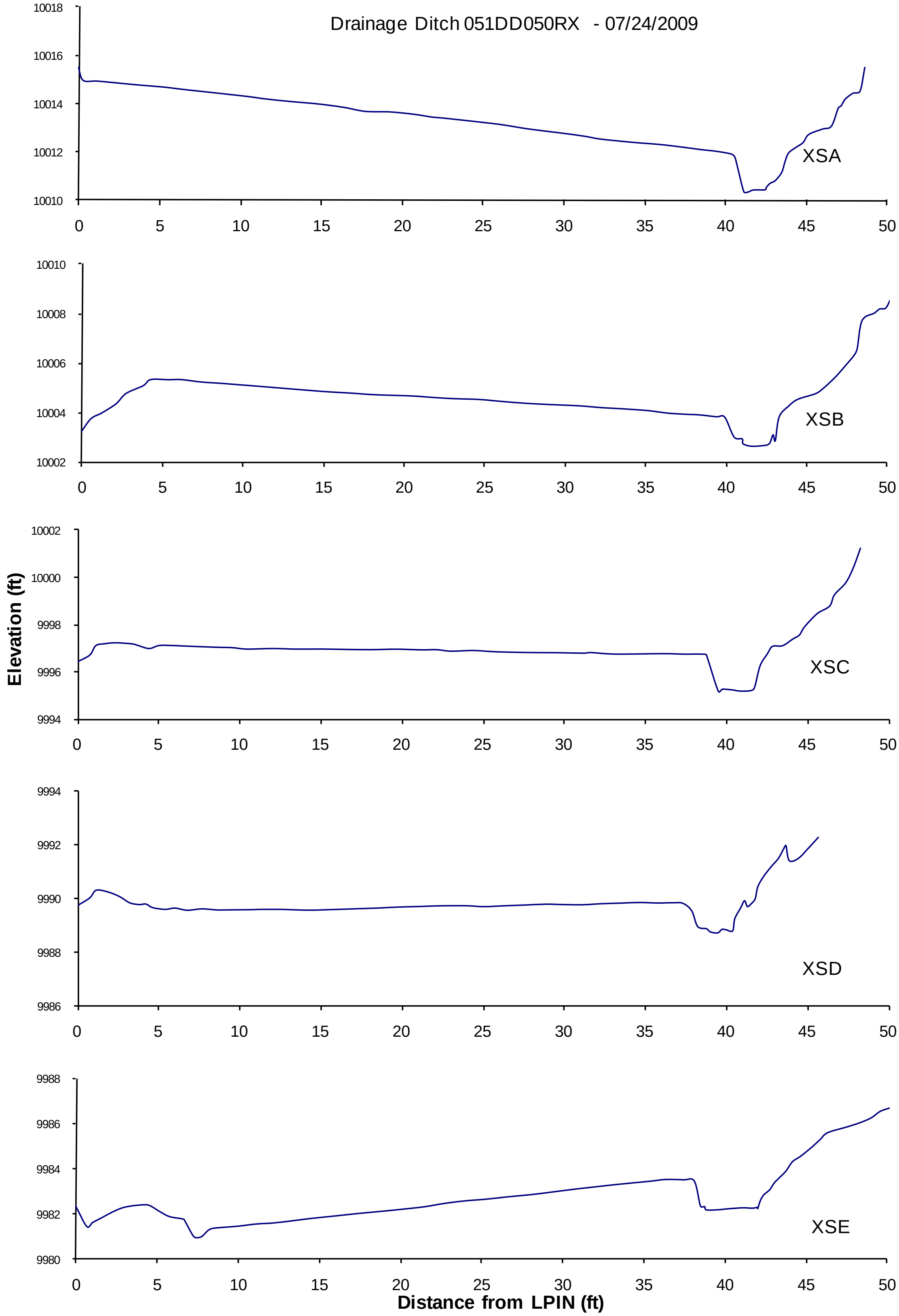

Drainage Ditch 005DD - 07/01/2009
XSA
XSB
XSC
XSD
XSE
Elevation (ft)
Distance from LPIN (ft)
9110
9109
9108
9107
9106
9105
9104
9103
9102
9101
9100
9099
9098
9097
9096
9095
9094
9093
9092
0
5
10
15
20
25

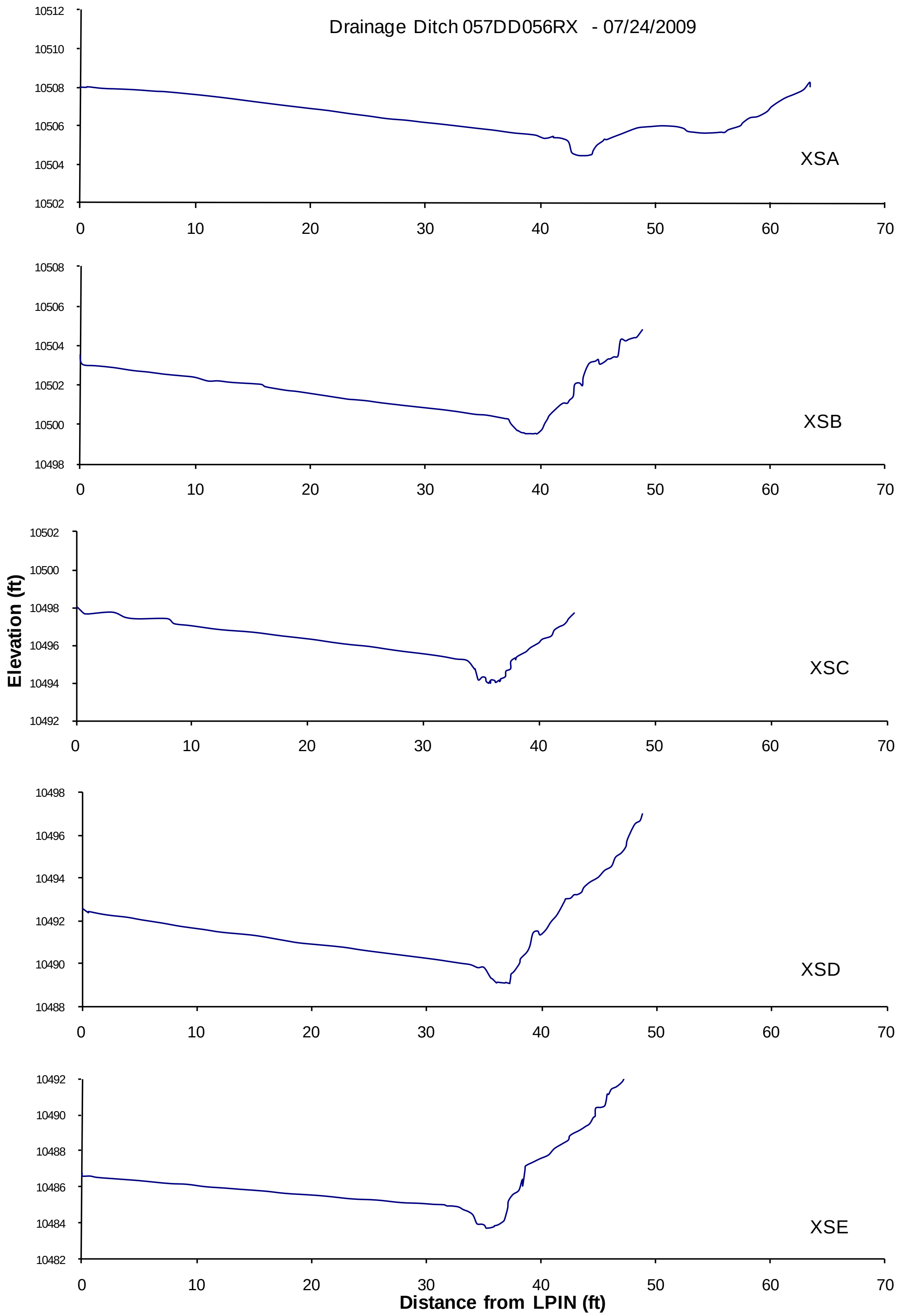


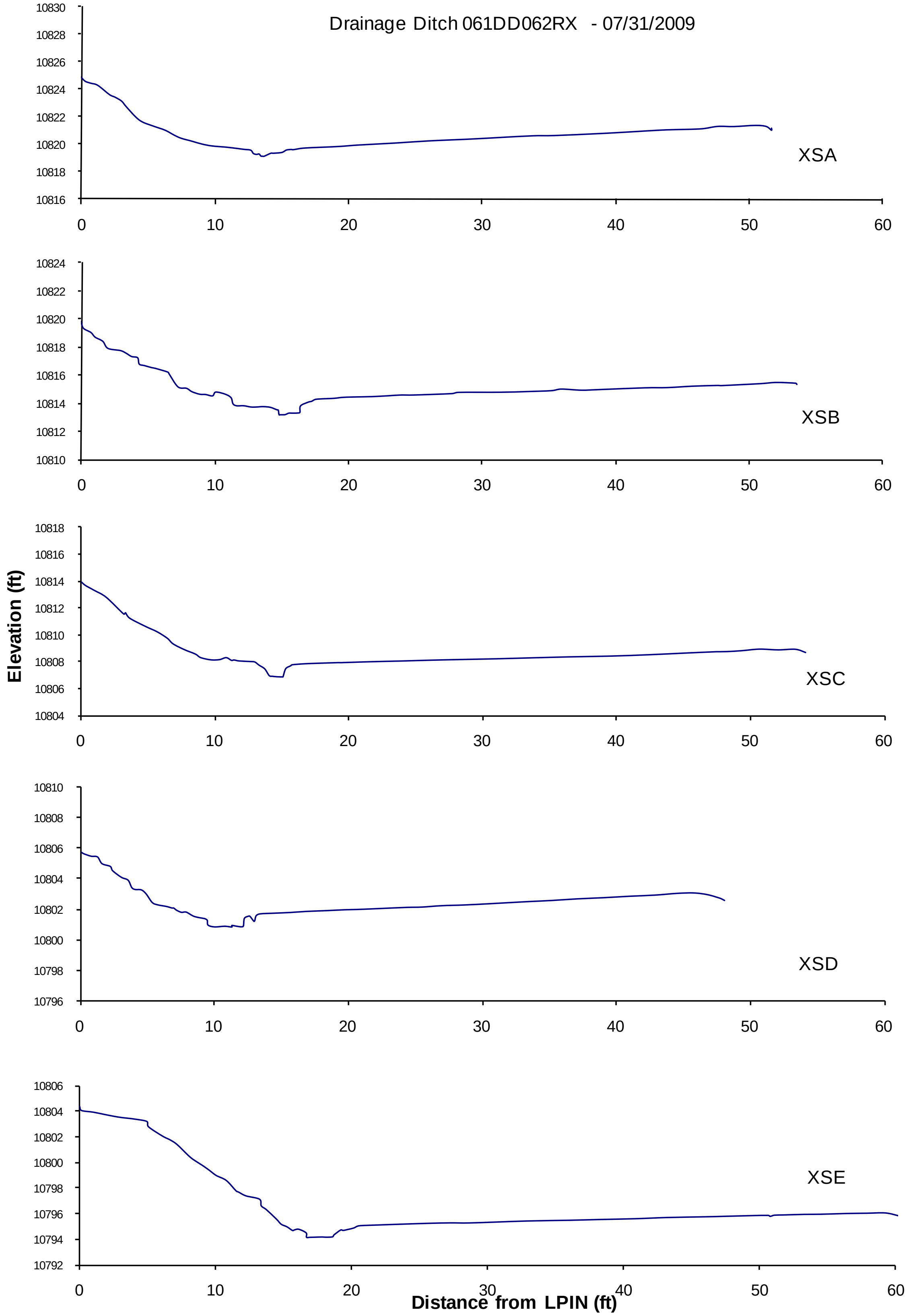
Drainage Ditch 010DD - 07/01/2009
XSA
XSB
XSC
XSD
XSE
Elevation (ft)
Distance from LPIN (ft)


Drainage Ditch 042DD044RX - 07/31/2009
XSA
XSB
XSC
XSD
XSE
Elevation (ft)
Distance from LPIN (ft)

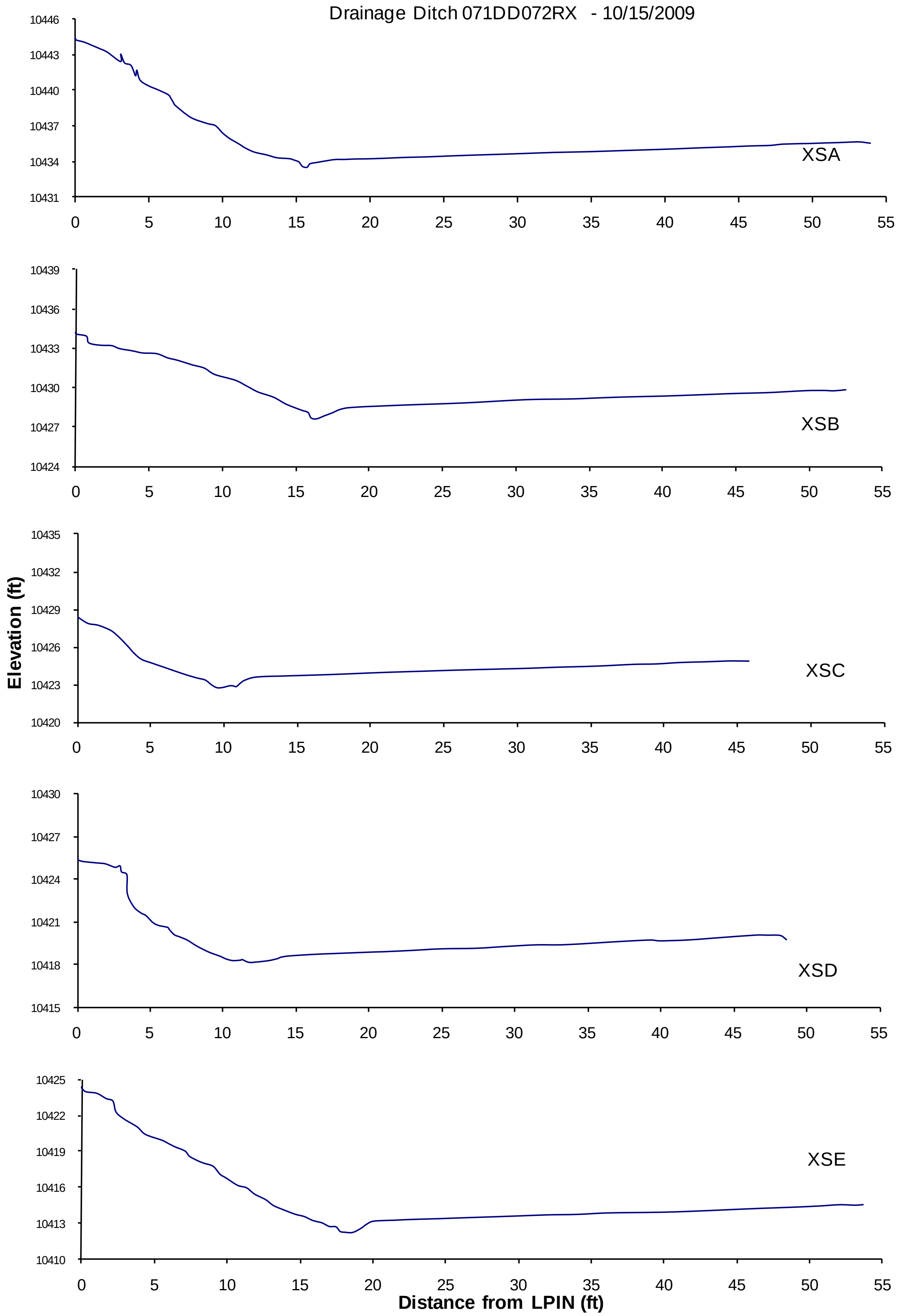

Drainage Ditch 046DD047RX - 10/15/2009
XSA
XSB
XSC
XSD
XSE
Elevation (ft)
Distance from LPIN (ft)


Drainage Ditch 051DD050RX - 07/24/2009
10018
10016
10014
10012
10010
0
5
10
15
20
25
30
35
40
45
50
XSA
10010
10008
10006
10004
10002
XSB
10002
10000
9998
9996
9994
XSC
9994
9992
9990
9988
9986
XSD
9988
9986
9984
9982
9980
XSE
Elevation (ft)
Distance from LPIN (ft)

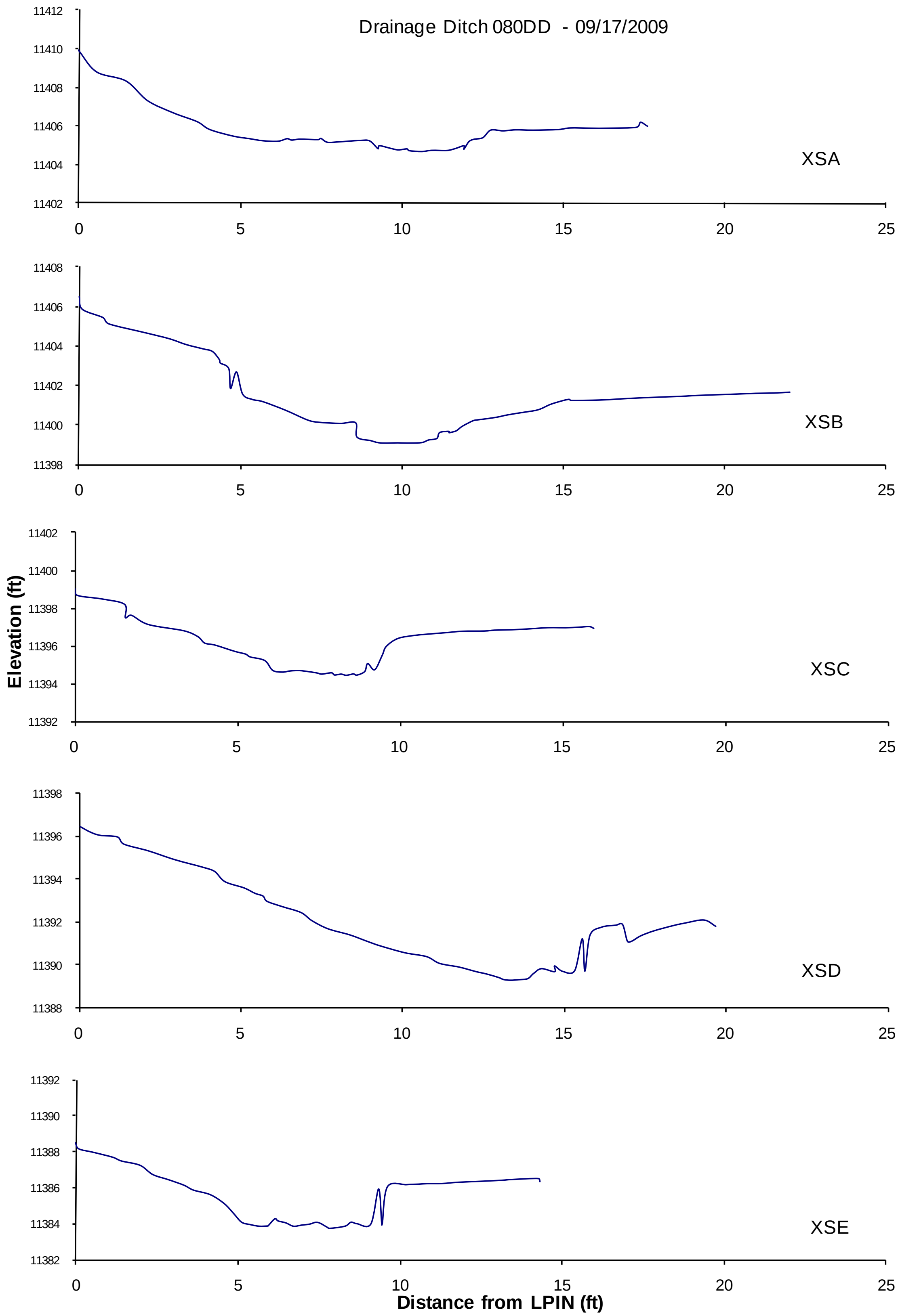

Drainage Ditch 057DD056RX - 07/24/2009
Elevation (ft)
Distance from LPIN (ft)
XSA
XSB
XSC
XSD
XSE
10512
10510
10508
10506
10504
10502
10500
10498
10496
10494
10492
10490
10488
10486
10484
10482
0
10
20
30
40
50
60
70



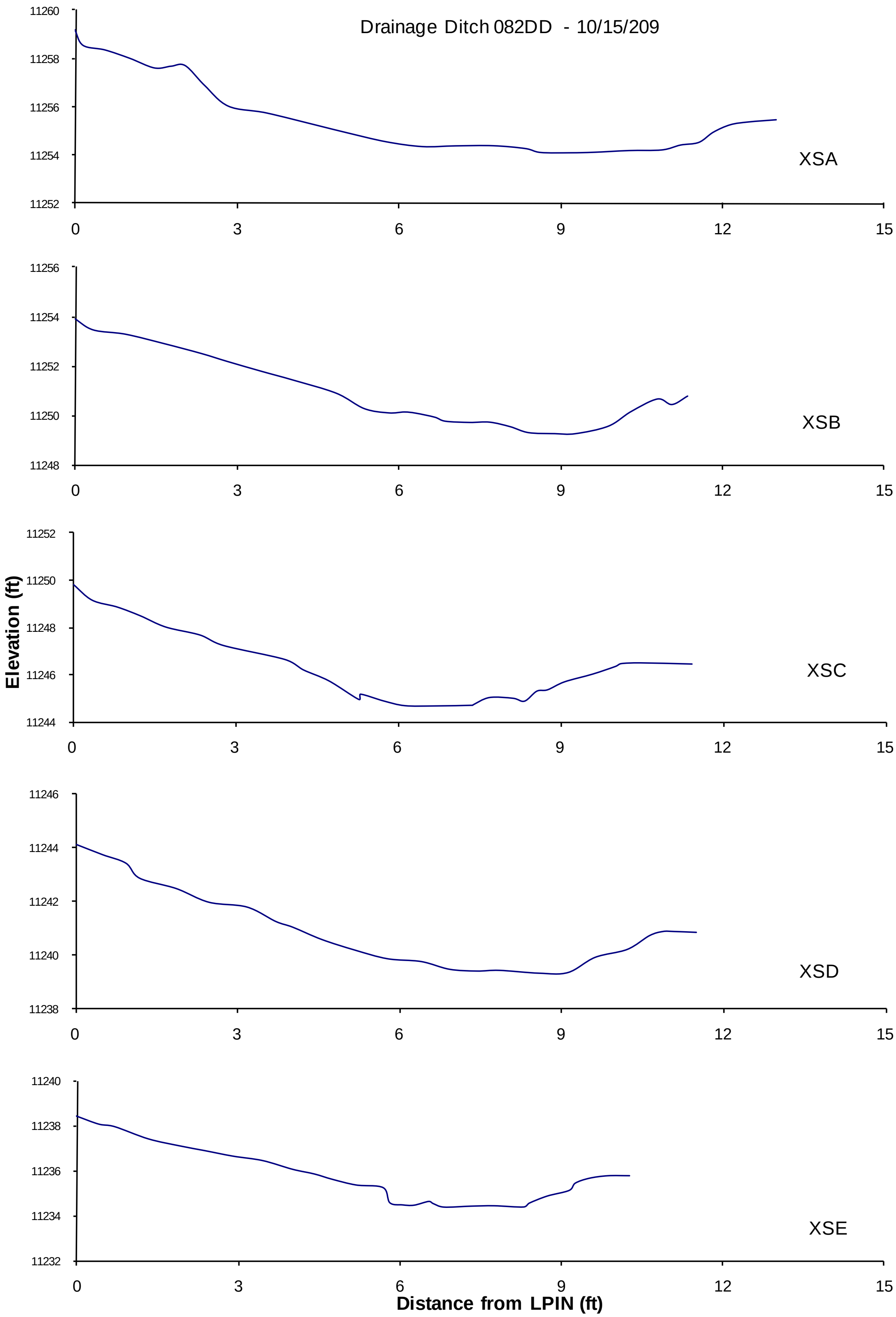
Drainage Ditch 061DD062RX - 07/31/2009
XSA
XSB
XSC
XSD
XSE
Elevation (ft)
Distance from LPIN (ft)
10830
10828
10826
10824
10822
10820
10818
10816
10812
10814
10810
10808
10806
10804
10802
10800
10798
10796
10794
10792
0
10
20
30
40
50
60



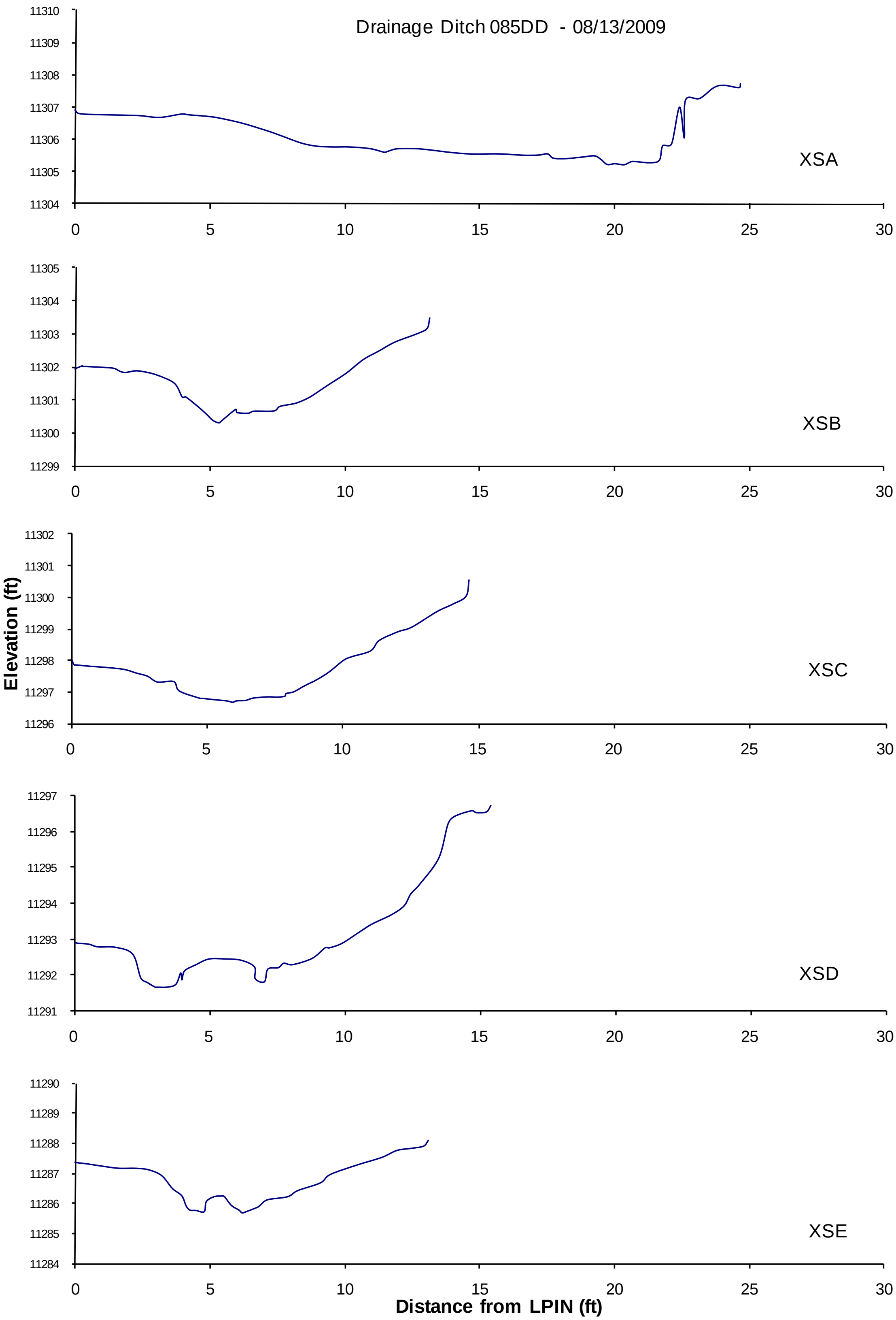
Drainage Ditch 071DD072RX - 10/15/2009
XSA
XSB
XSC
XSD
XSE
Elevation (ft)
Distance from LPIN (ft)



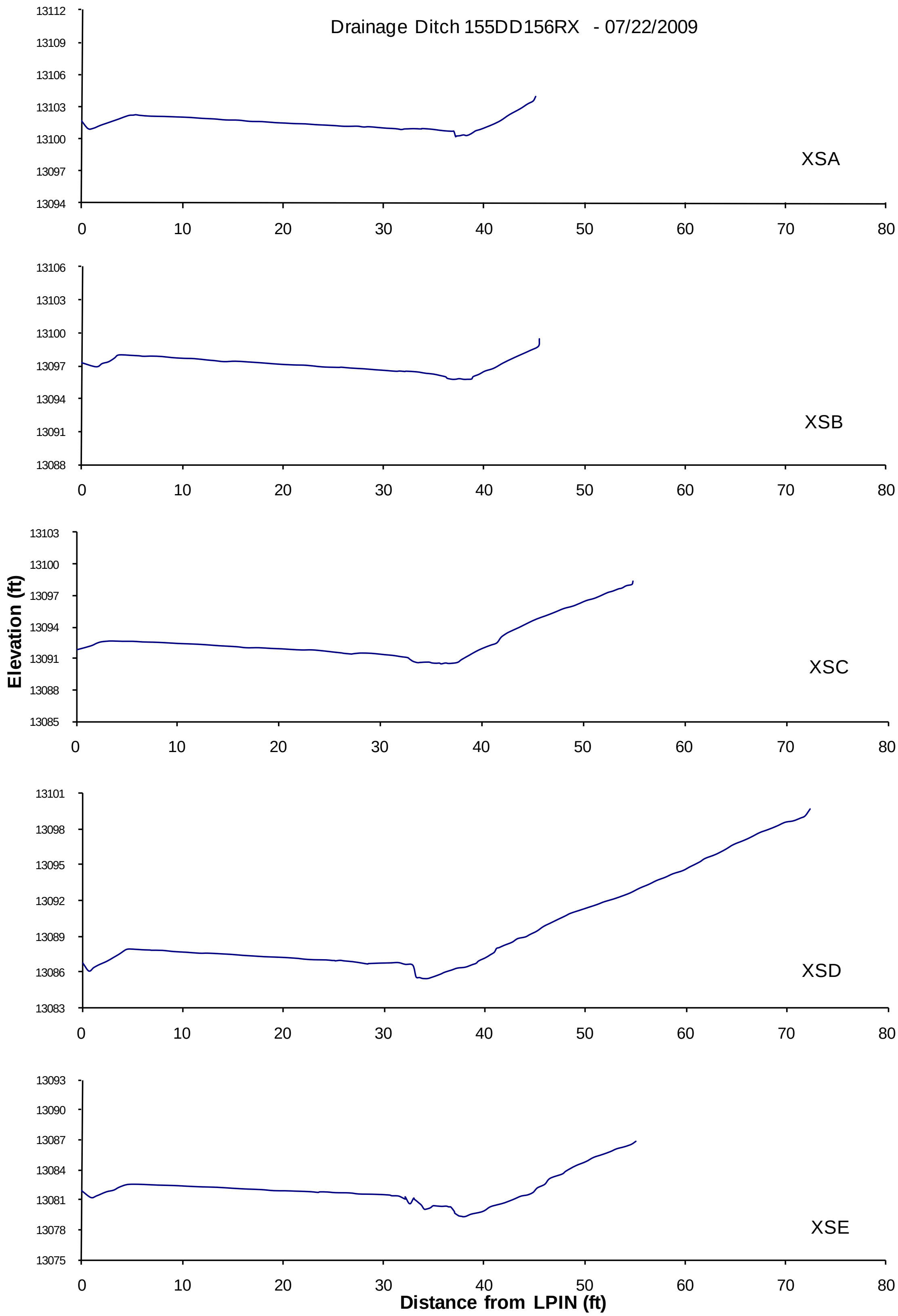
Drainage Ditch 080DD - 09/17/2009
Elevation (ft)
XSA
11412
11410
11408
11406
11404
11402
XSB
11408
11406
11404
11402
11400
11398
XSC
11402
11400
11398
11396
11394
11392
XSD
11398
11396
11394
11392
11390
11388
XSE
11392
11390
11388
11386
11384
11382
0
5
10
15
20
25
Distance from LPIN (ft)

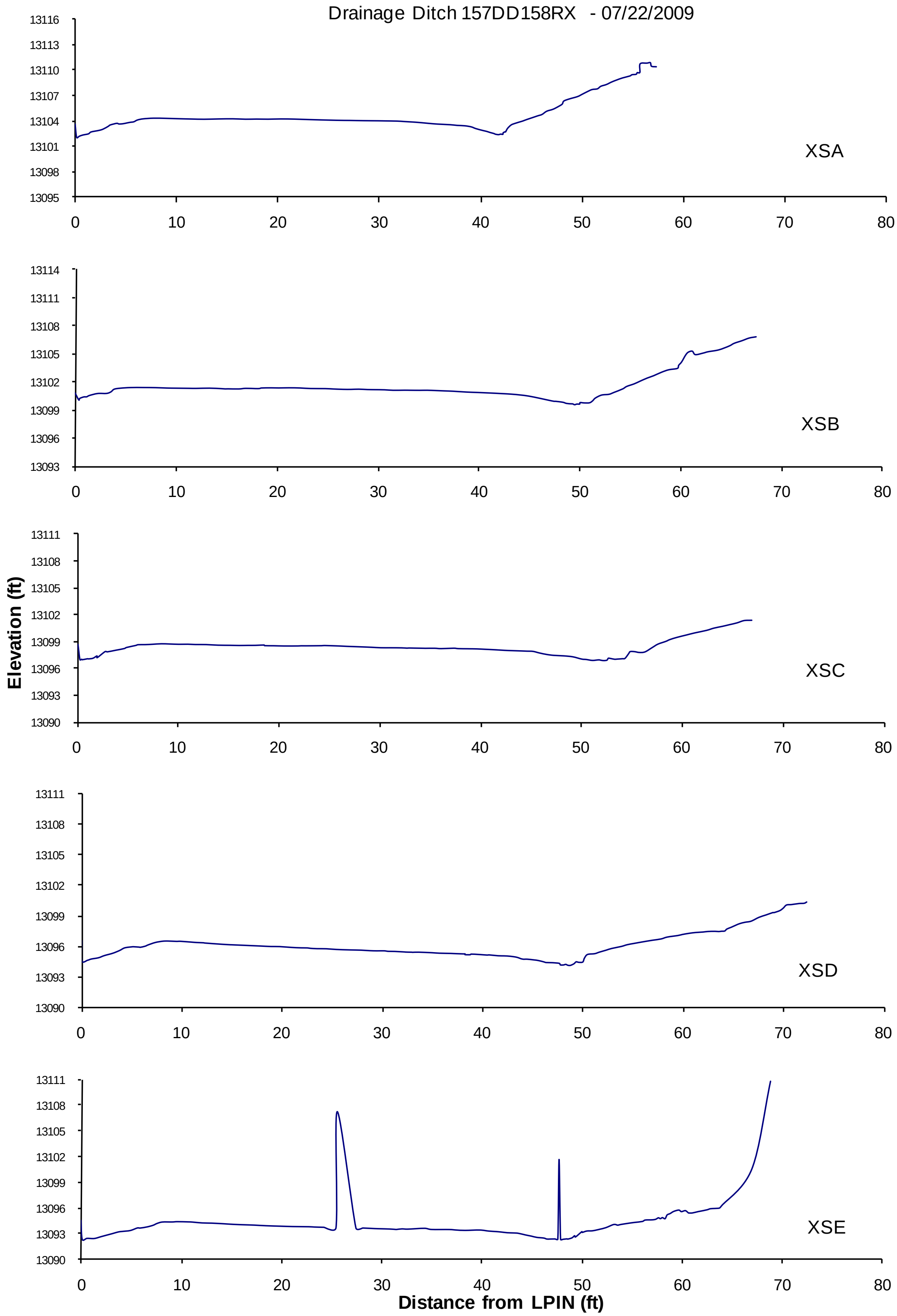


Drainage Ditch 082DD - 10/15/209
XSA
XSB
XSC
XSD
XSE
Elevation (ft)
Distance from LPIN (ft)
11260
11258
11256
11254
11252
11250
11248
11246
11244
11242
11240
11238
11236
11234
11232
0
3
6
9
12
15

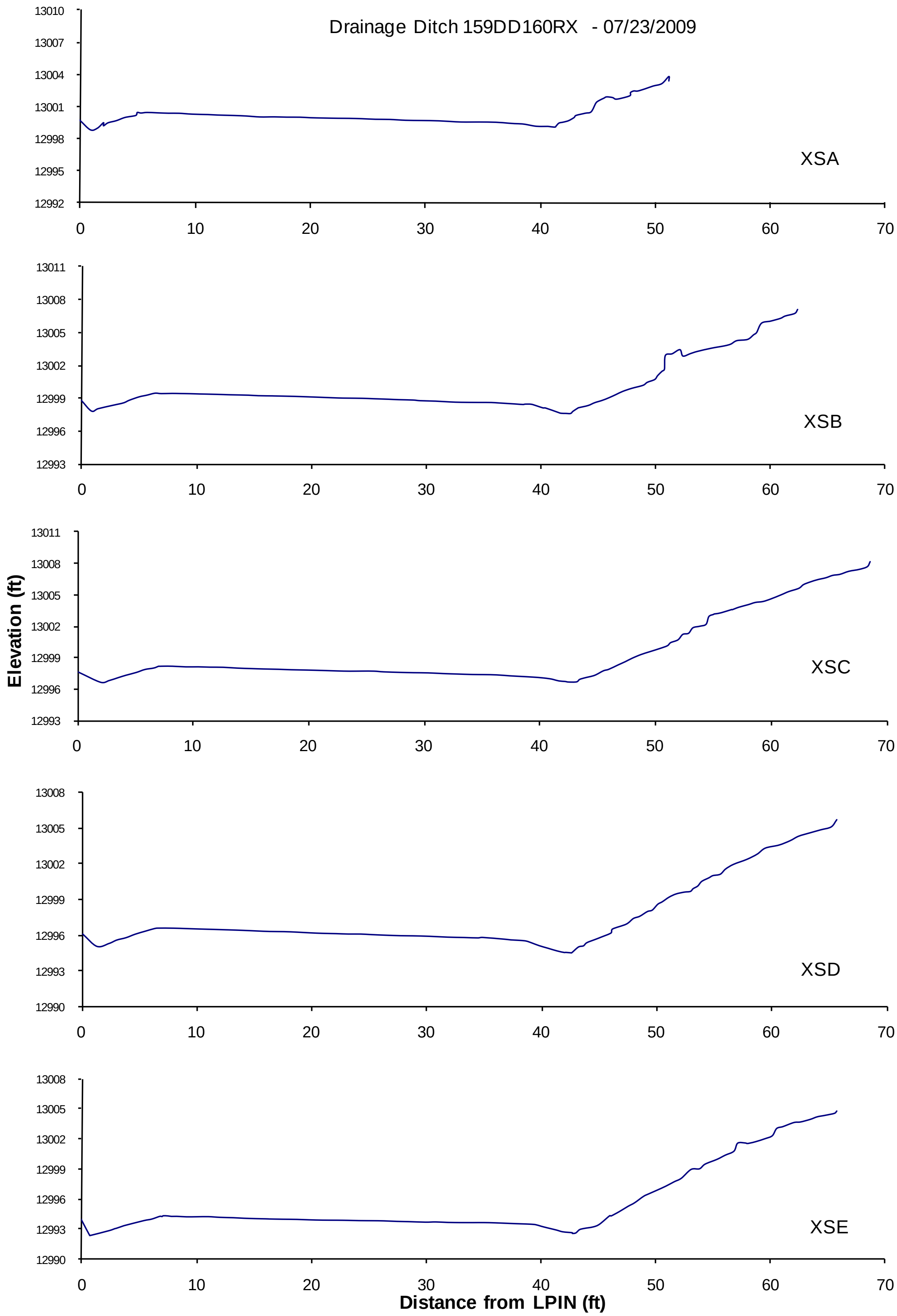


Drainage Ditch 085DD - 08/13/2009
Elevation (ft)
Distance from LPIN (ft)
XSA
XSB
XSC
XSD
XSE

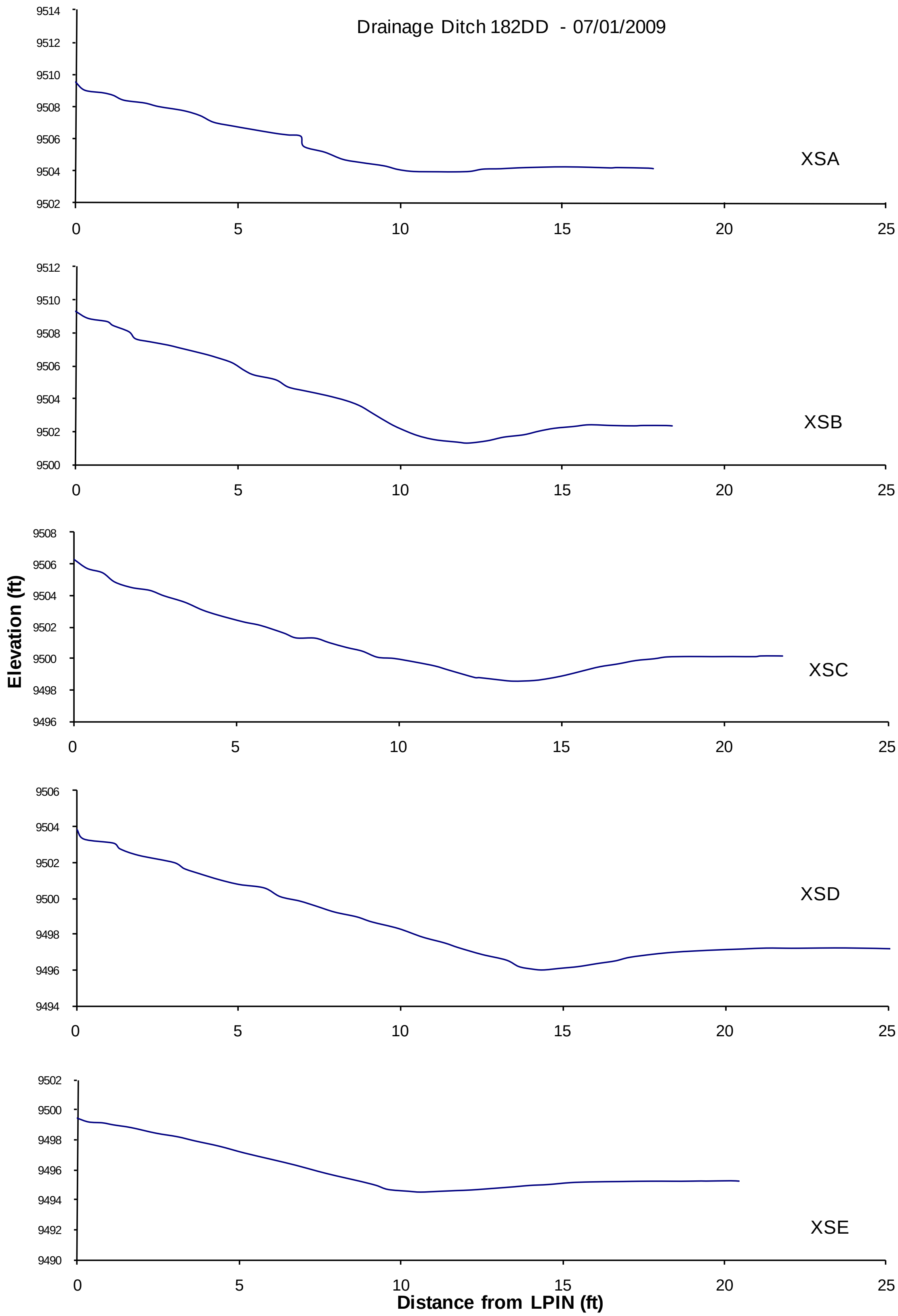

Drainage Ditch 155DD156RX - 07/22/2009
XSA
XSB
XSC
XSD
XSE
Elevation (ft)
Distance from LPIN (ft)

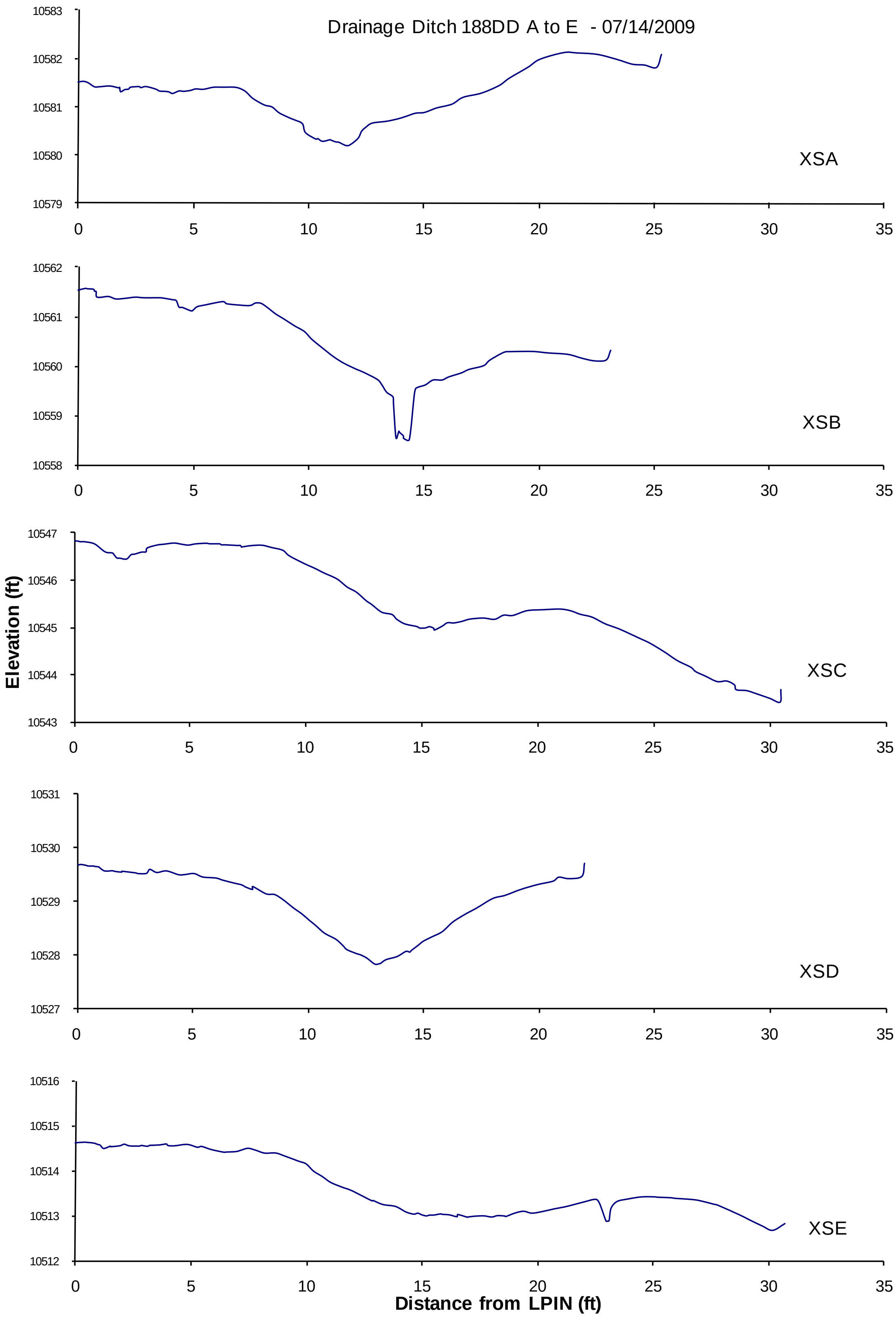


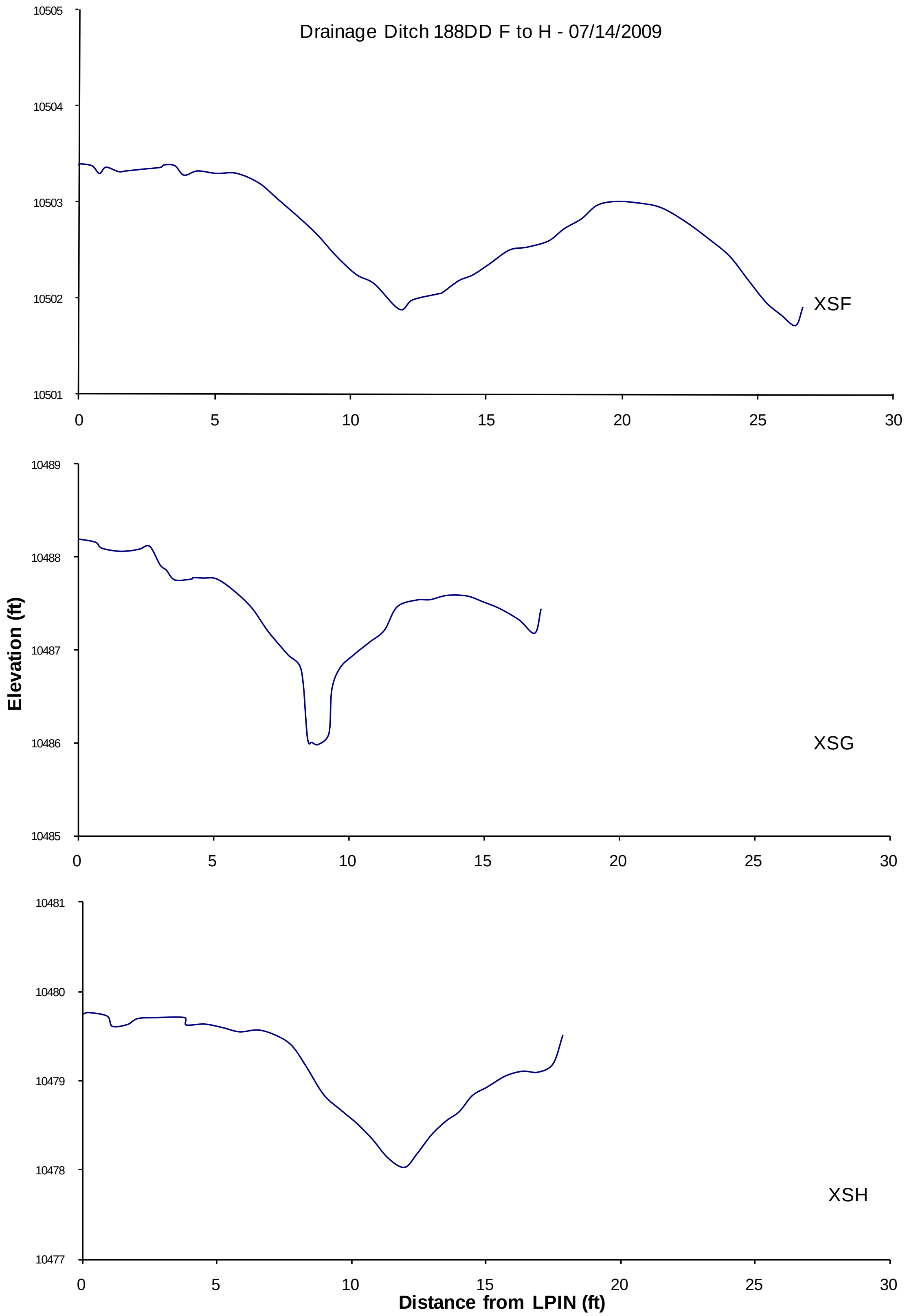
Drainage Ditch 157DD158RX - 07/22/2009
XSA
XSB
XSC
XSD
XSE
Elevation (ft)
Distance from LPIN (ft)



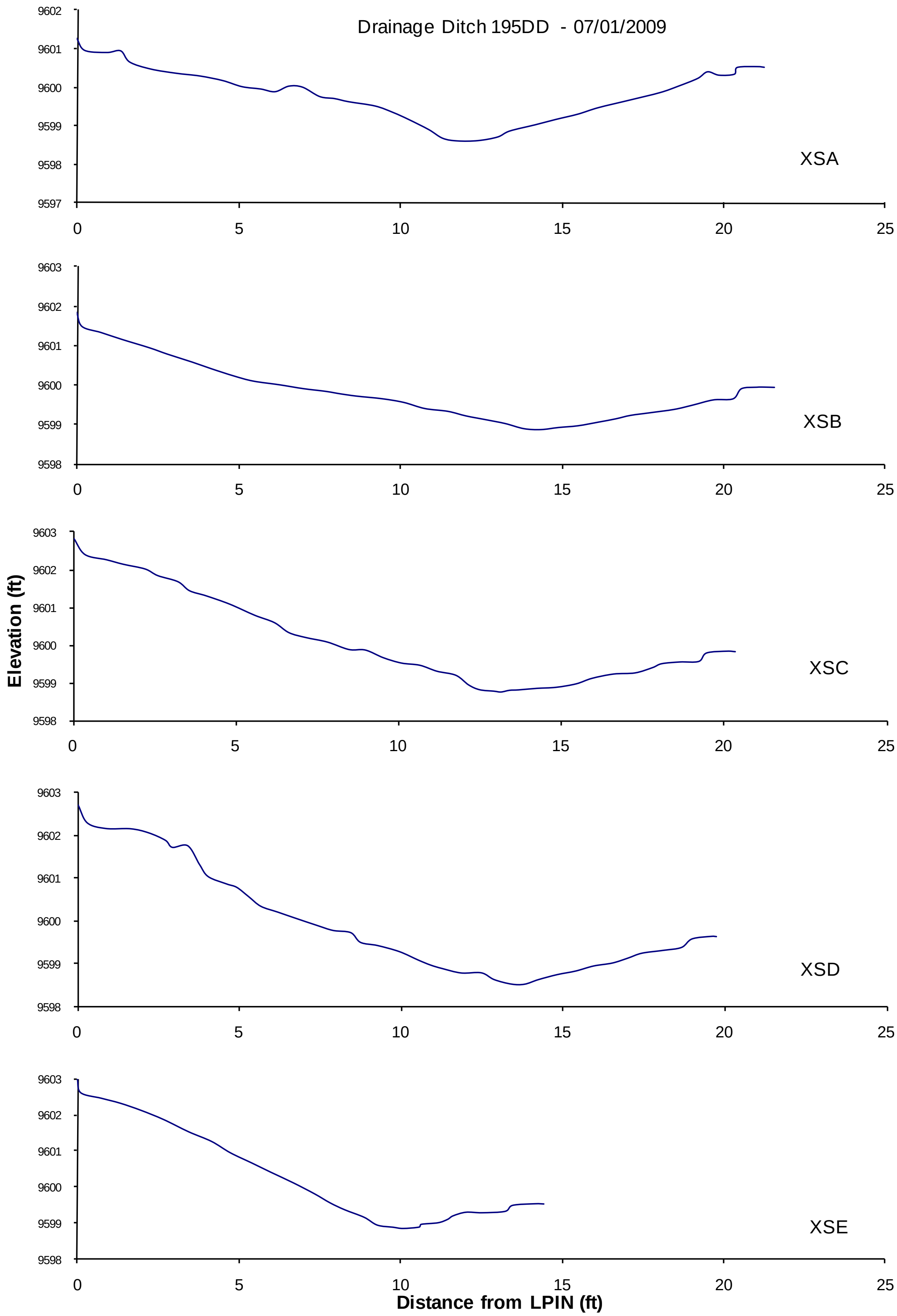
Drainage Ditch 159DD160RX - 07/23/2009
XSA
XSB
XSC
XSD
XSE
Elevation (ft)
Distance from LPIN (ft)
13010
13007
13004
13001
12998
12995
12992
13011
13008
13005
13002
12999
12996
12993
12990
0
10
20
30
40
50
60
70

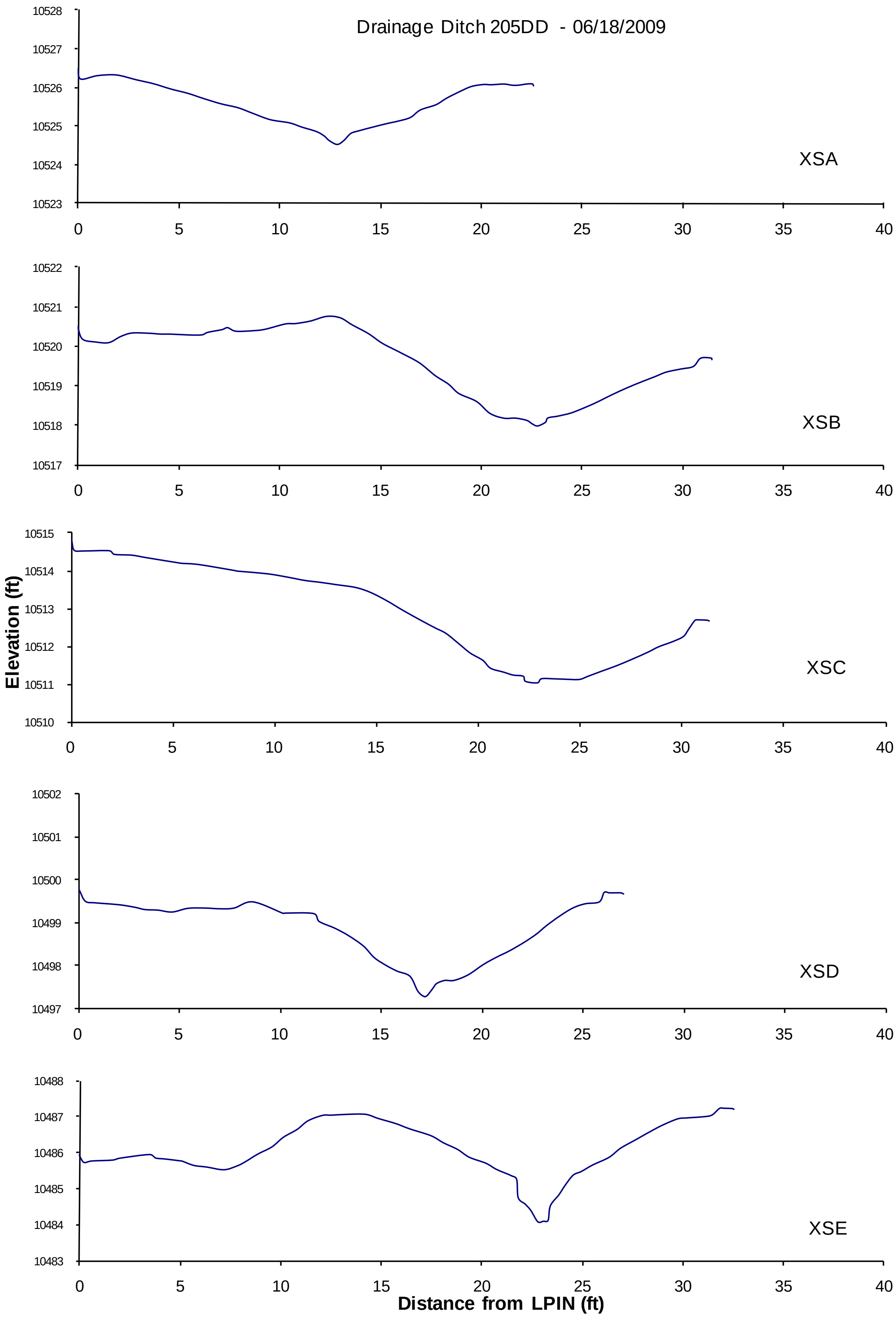

Drainage Ditch 182DD - 07/01/2009
XSA
XSB
XSC
XSD
XSE
Elevation (ft)
Distance from LPIN (ft)
9514
9512
9510
9508
9506
9504
9502
9500
9498
9496
9494
9492
9490
0
5
10
15
20
25


Drainage Ditch 188DD A to E - 07/14/2009
XSA
XSB
XSC
XSD
XSE
Elevation (ft)
Distance from LPIN (ft)
10583
10582
10581
10580
10579
10562
10561
10560
10559
10558
10547
10546
10545
10544
10543
10531
10530
10529
10528
10527
10516
10515
10514
10513
10512
0
5
10
15
20
25
30
35



Drainage Ditch 188DD F to H - 07/14/2009
10505
10504
10503
10502
10501
XSF
0
5
10
15
20
25
30
10489
10488
10487
10486
10485
XSG
Elevation (ft)
10481
10480
10479
10478
10477
XSH
Distance from LPIN (ft)


Drainage Ditch 195DD - 07/01/2009
XSA
XSB
XSC
XSD
XSE
Elevation (ft)
Distance from LPIN (ft)
9597
9598
9599
9600
9601
9602
9603
0
5
10
15
20
25

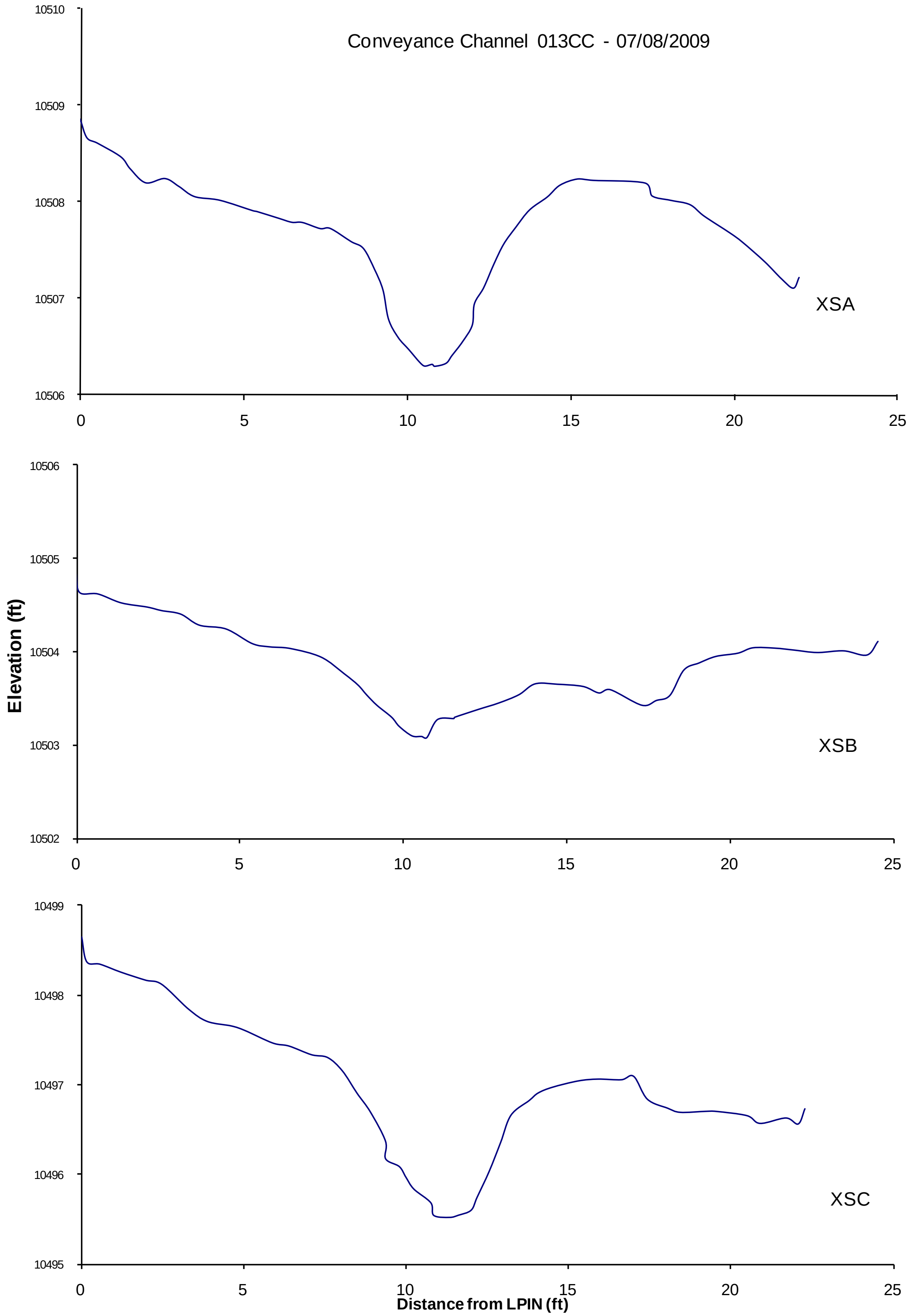

Drainage Ditch 205DD - 06/18/2009
XSA
XSB
XSC
XSD
XSE
Elevation (ft)
Distance from LPIN (ft)
10528
10527
10526
10525
10524
10523
10522
10521
10520
10519
10518
10517
10515
10514
10513
10512
10511
10510
10502
10501
10500
10499
10498
10497
10488
10487
10486
10485
10484
10483
0
5
10
15
20
25
30
35
40

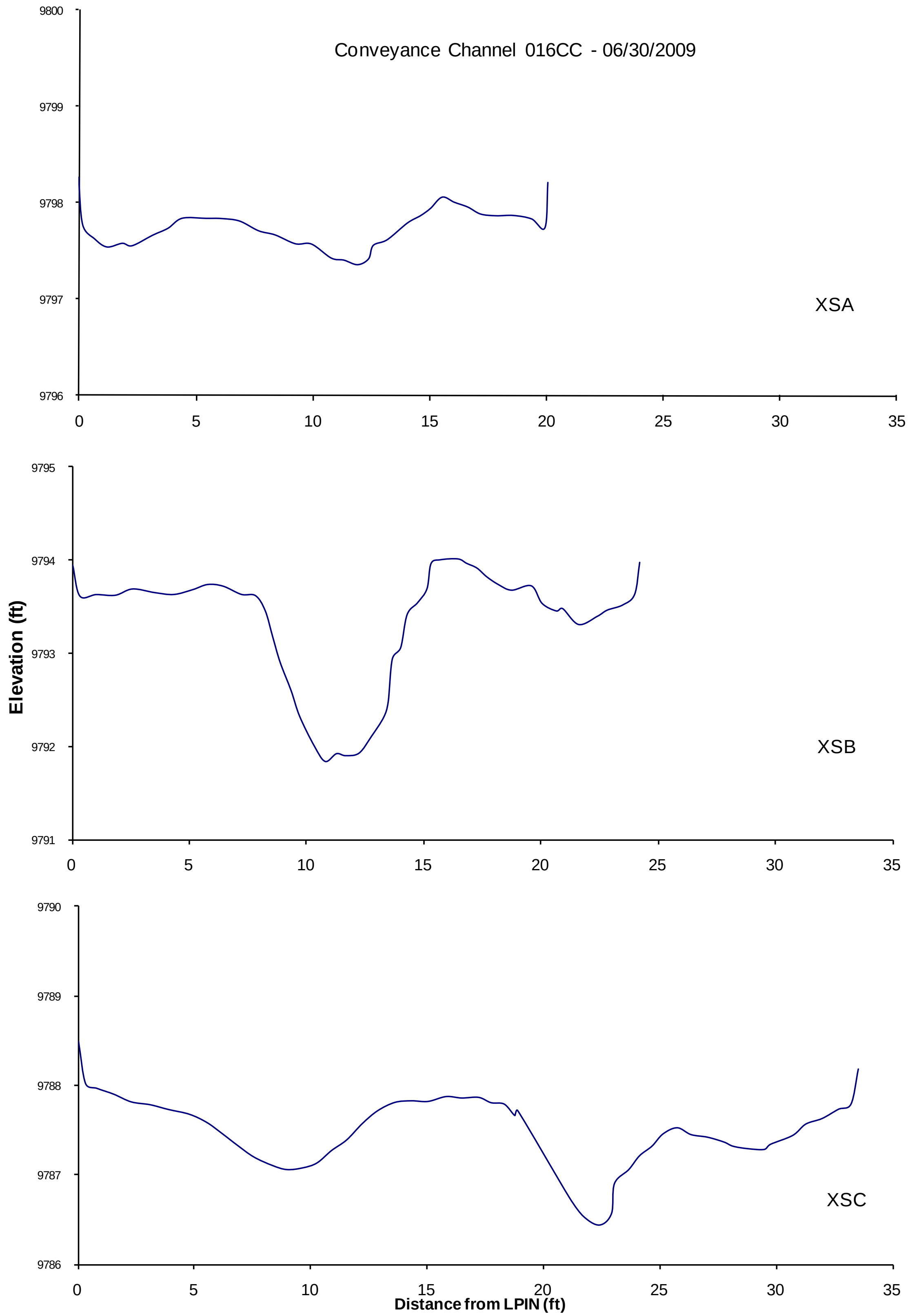
Appendix I

Conveyance Channel

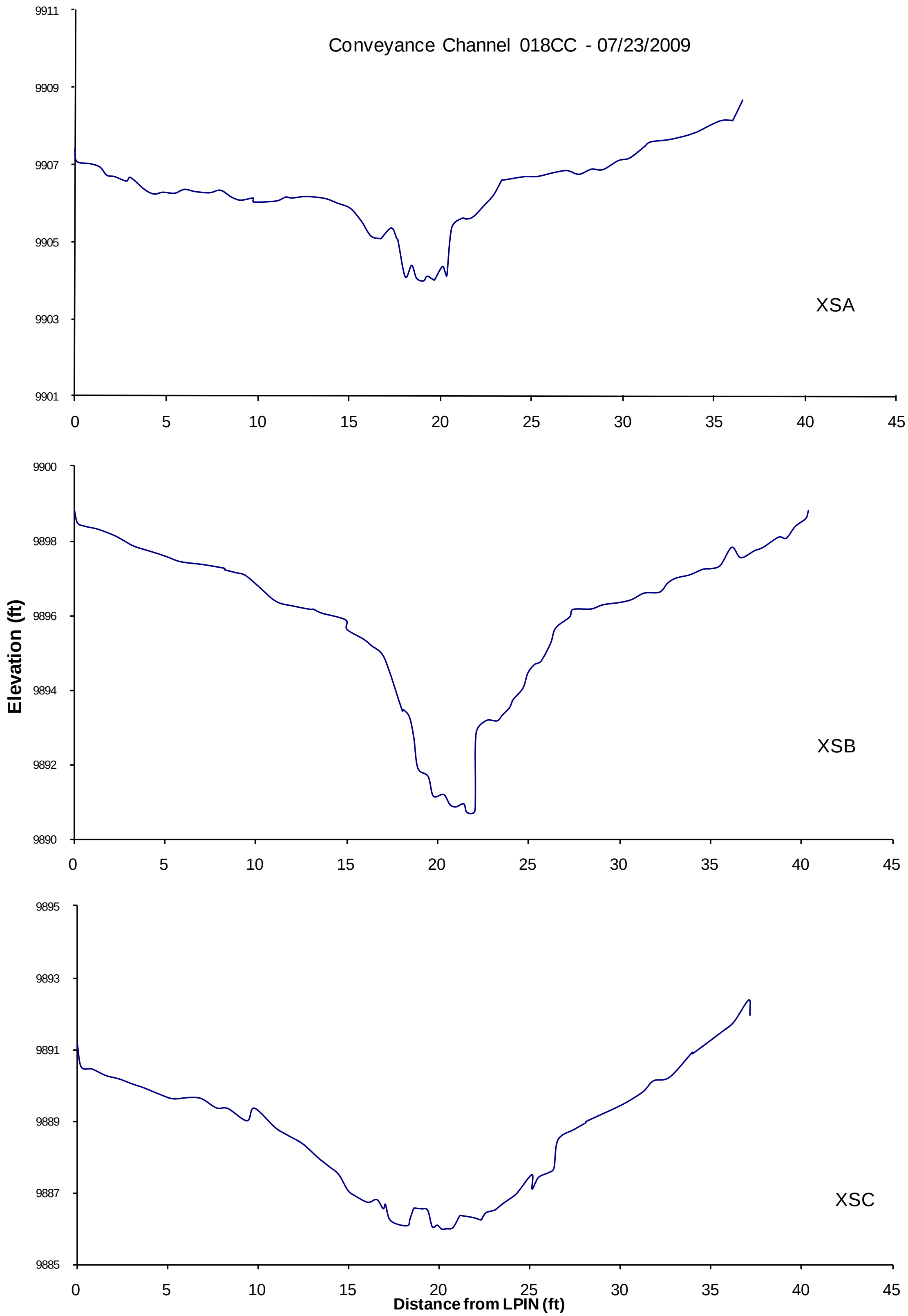
Cross Section Graphs

2009

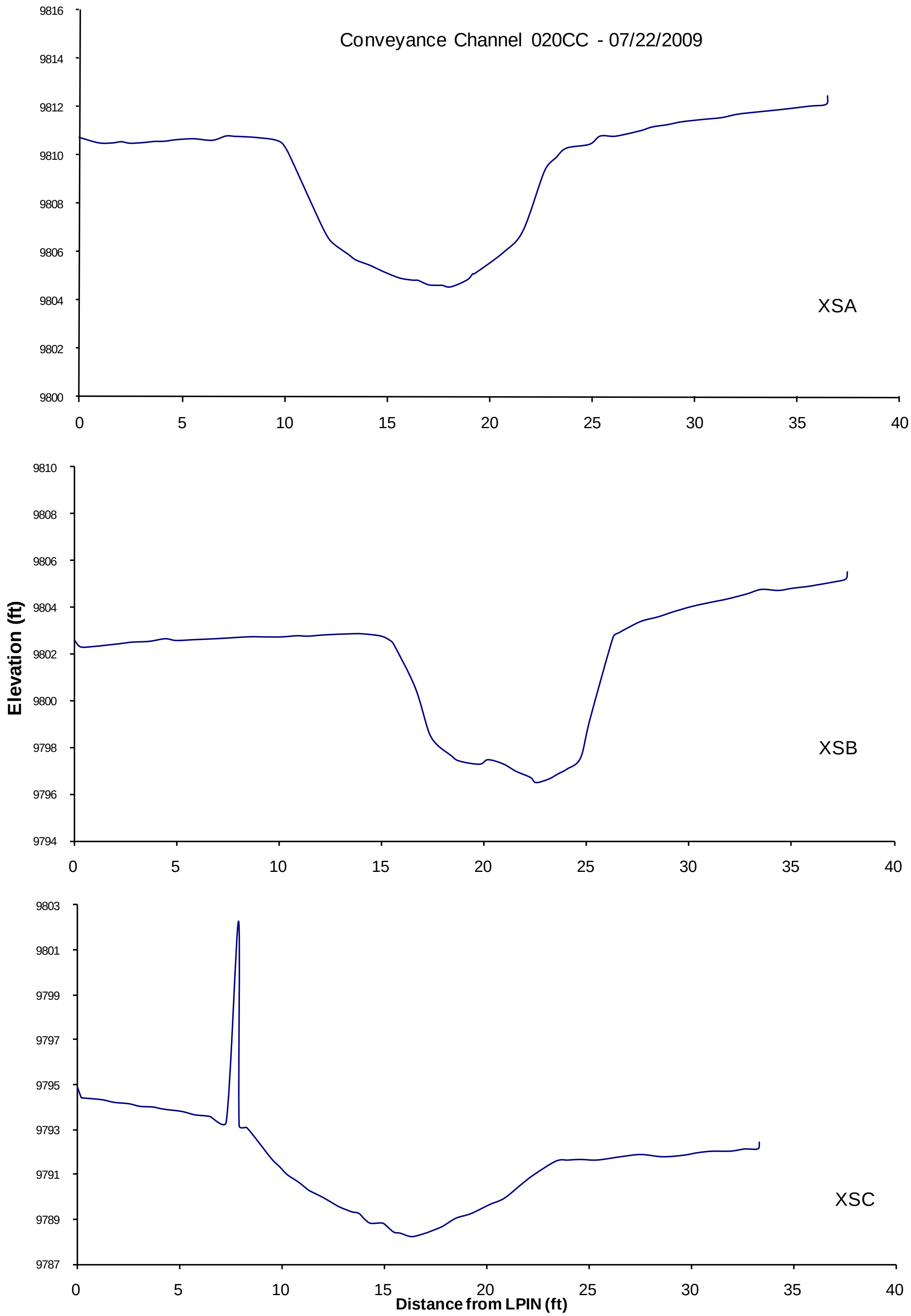

Conveyance Channel 013CC - 07/08/2009
XSA
XSB
XSC
Elevation (ft)
Distance from LPIN (ft)
10510
10509
10508
10507
10506
10505
10504
10503
10502
10499
10498
10497
10496
10495
0
5
10
15
20
25

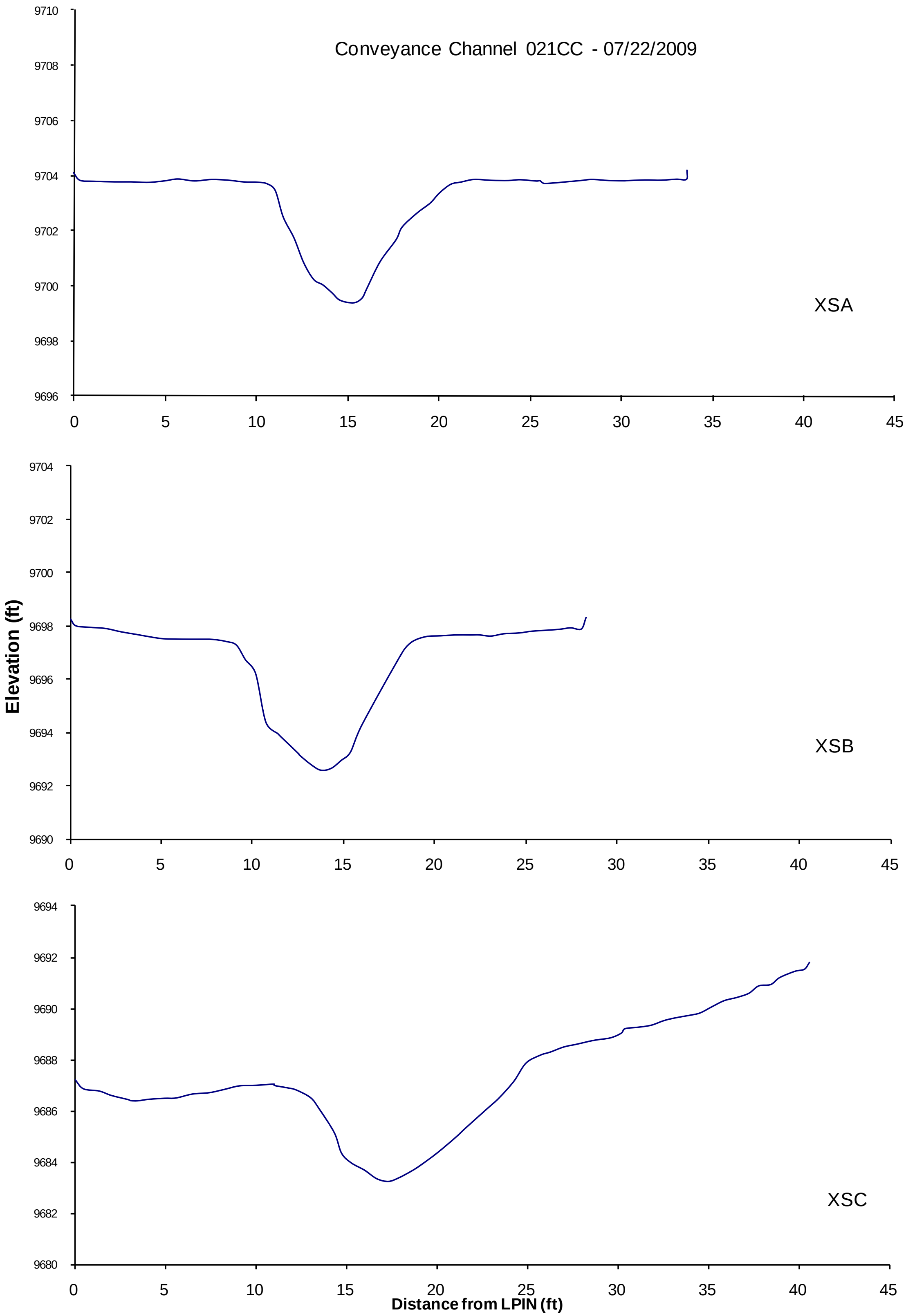


Conveyance Channel 016CC - 06/30/2009
Elevation (ft)
XSA
XSB
XSC
Distance from LPIN (ft)
9800
9799
9798
9797
9796
9795
9794
9793
9792
9791
9790
9789
9788
9787
9786
0
5
10
15
20
25
30
35

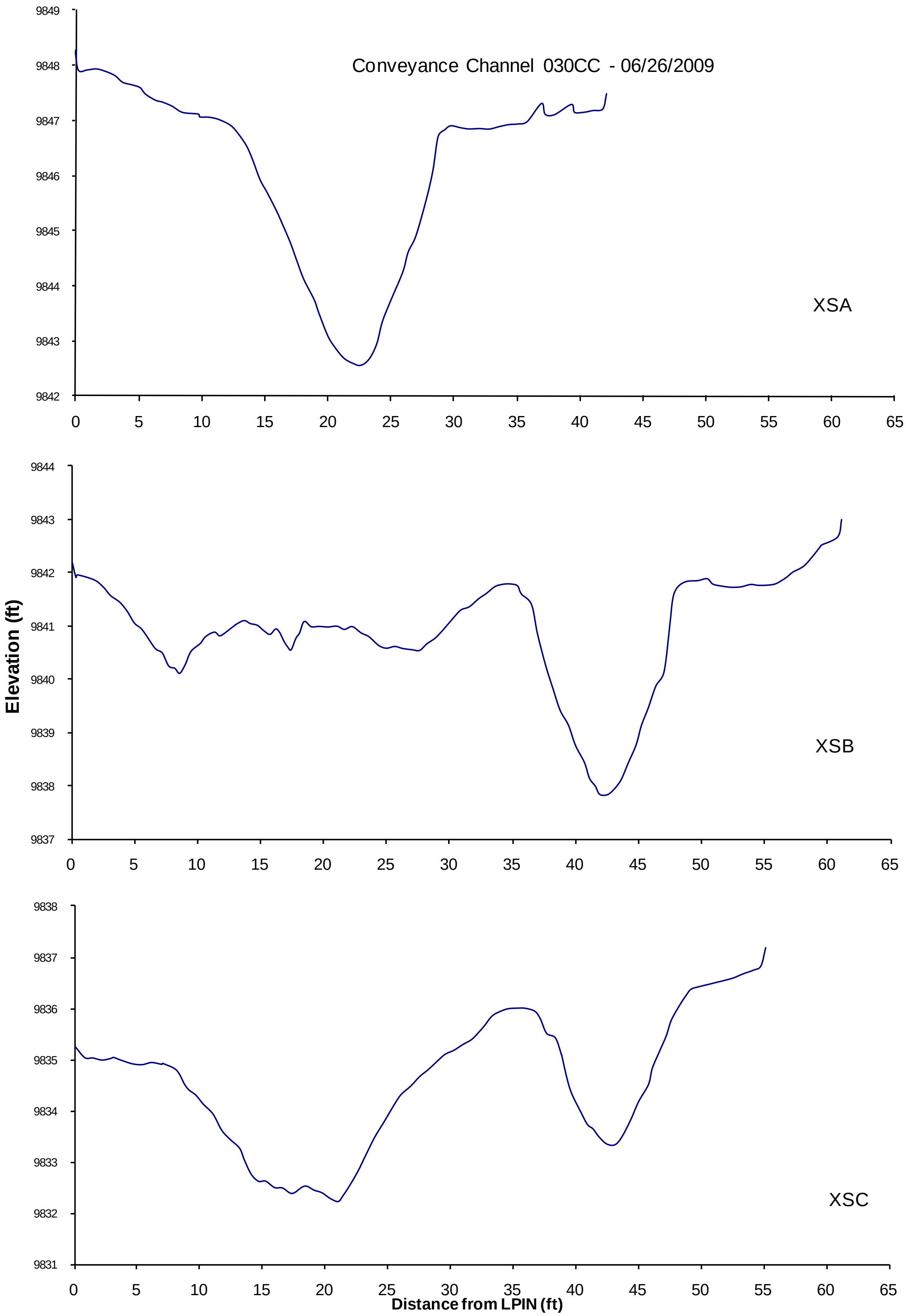


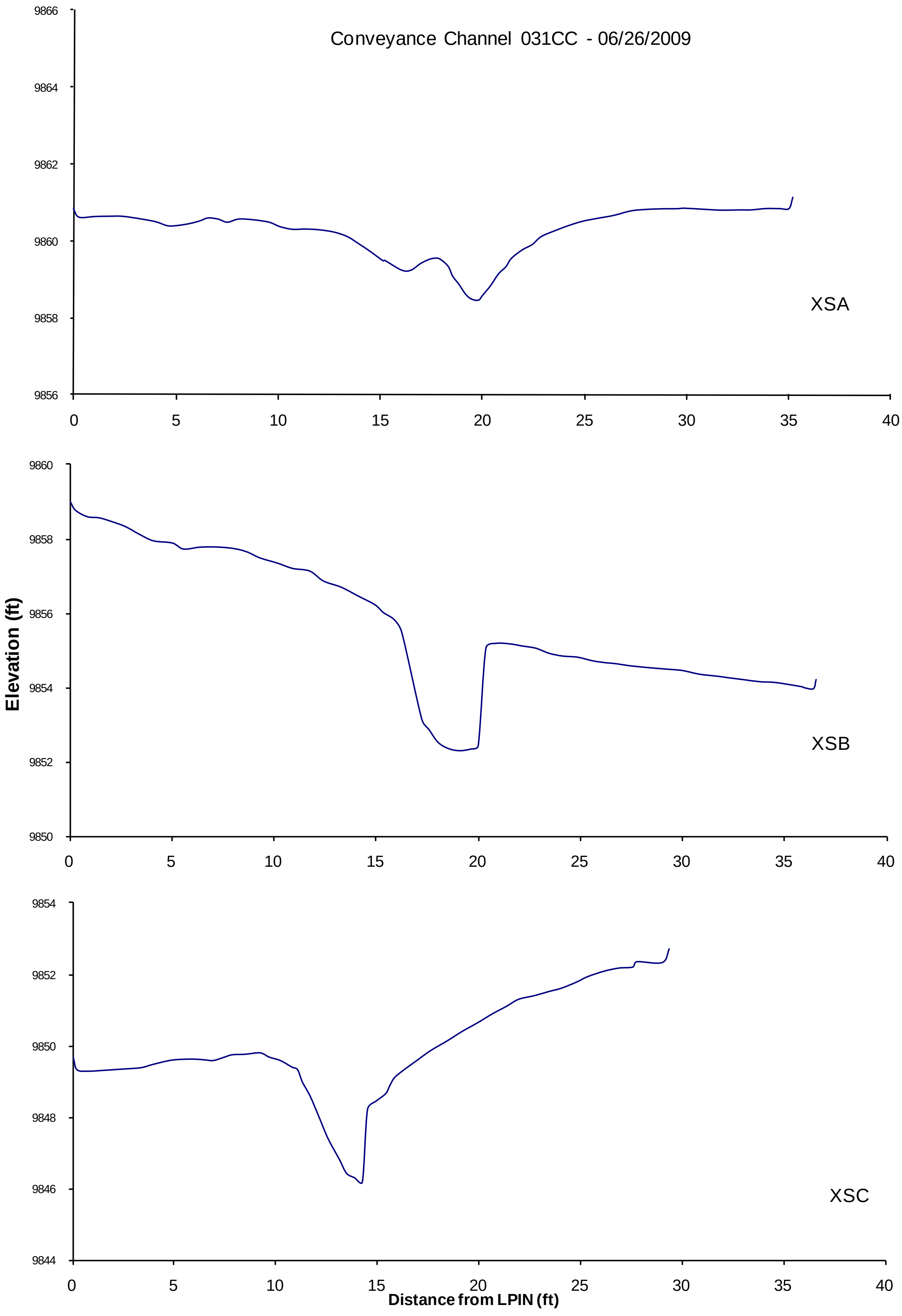
Conveyance Channel 018CC - 07/23/2009
Elevation (ft)
9911
9909
9907
9905
9903
9901
XSA
0
5
10
15
20
25
30
35
40
45
9900
9898
9896
9894
9892
9890
XSB
9895
9893
9891
9889
9887
9885
XSC
Distance from LPIN (ft)

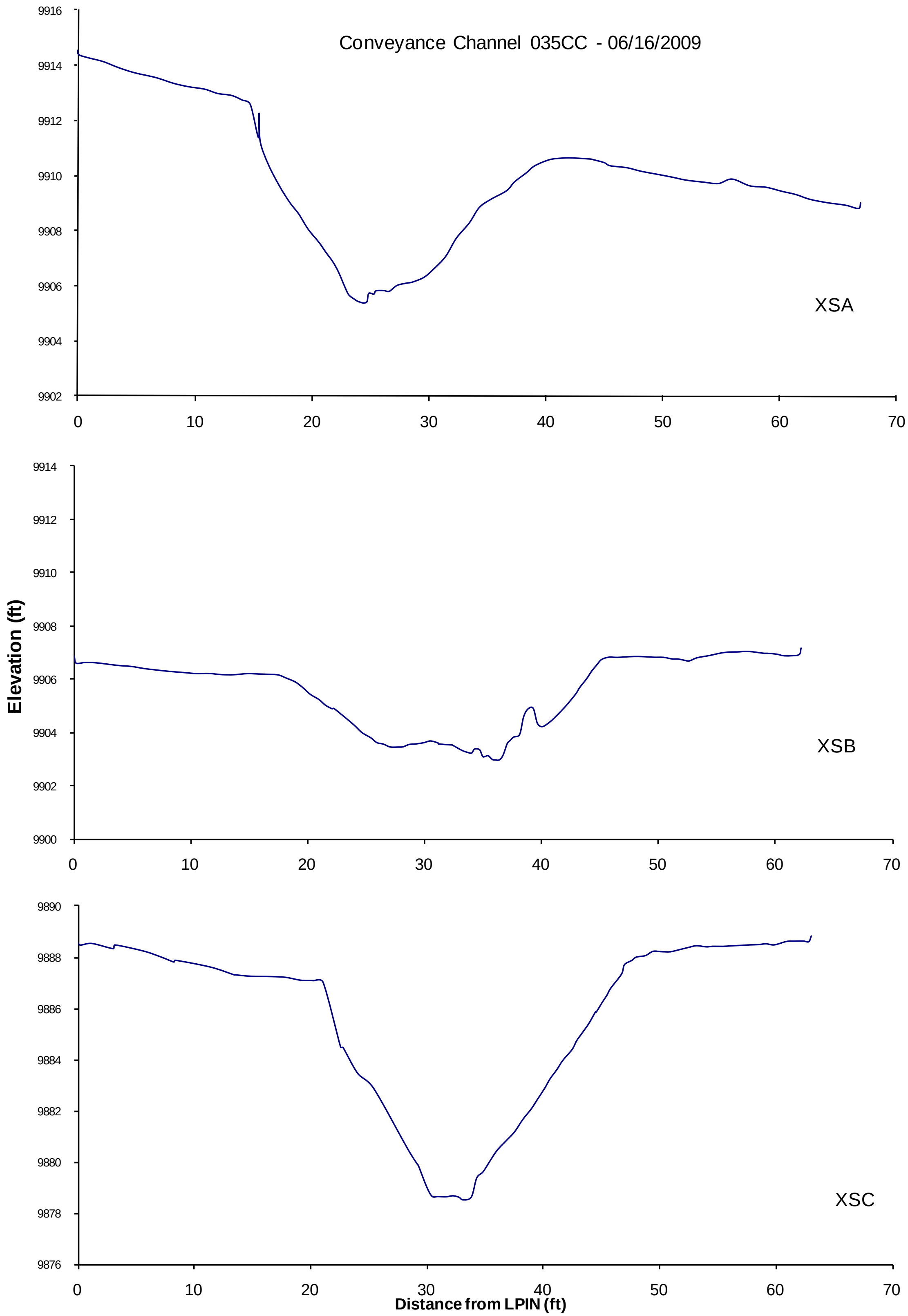

Conveyance Channel 020CC - 07/22/2009
Elevation (ft)
XSA
XSB
XSC
Distance from LPIN (ft)
9816
9814
9812
9810
9808
9806
9804
9802
9800
9810
9808
9806
9804
9802
9800
9798
9796
9794
9803
9801
9799
9797
9795
9793
9791
9789
9787
0
5
10
15
20
25
30
35
40

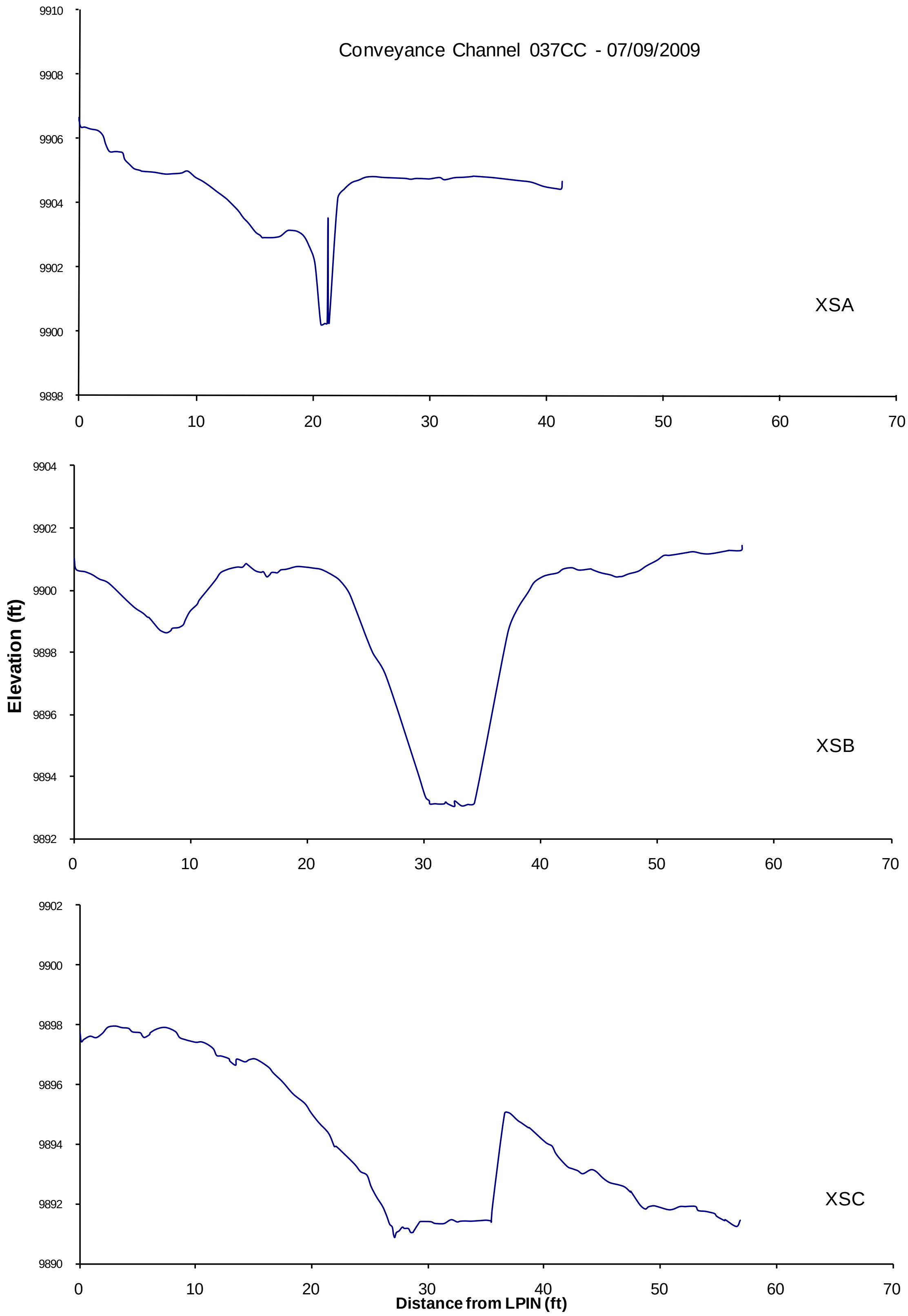


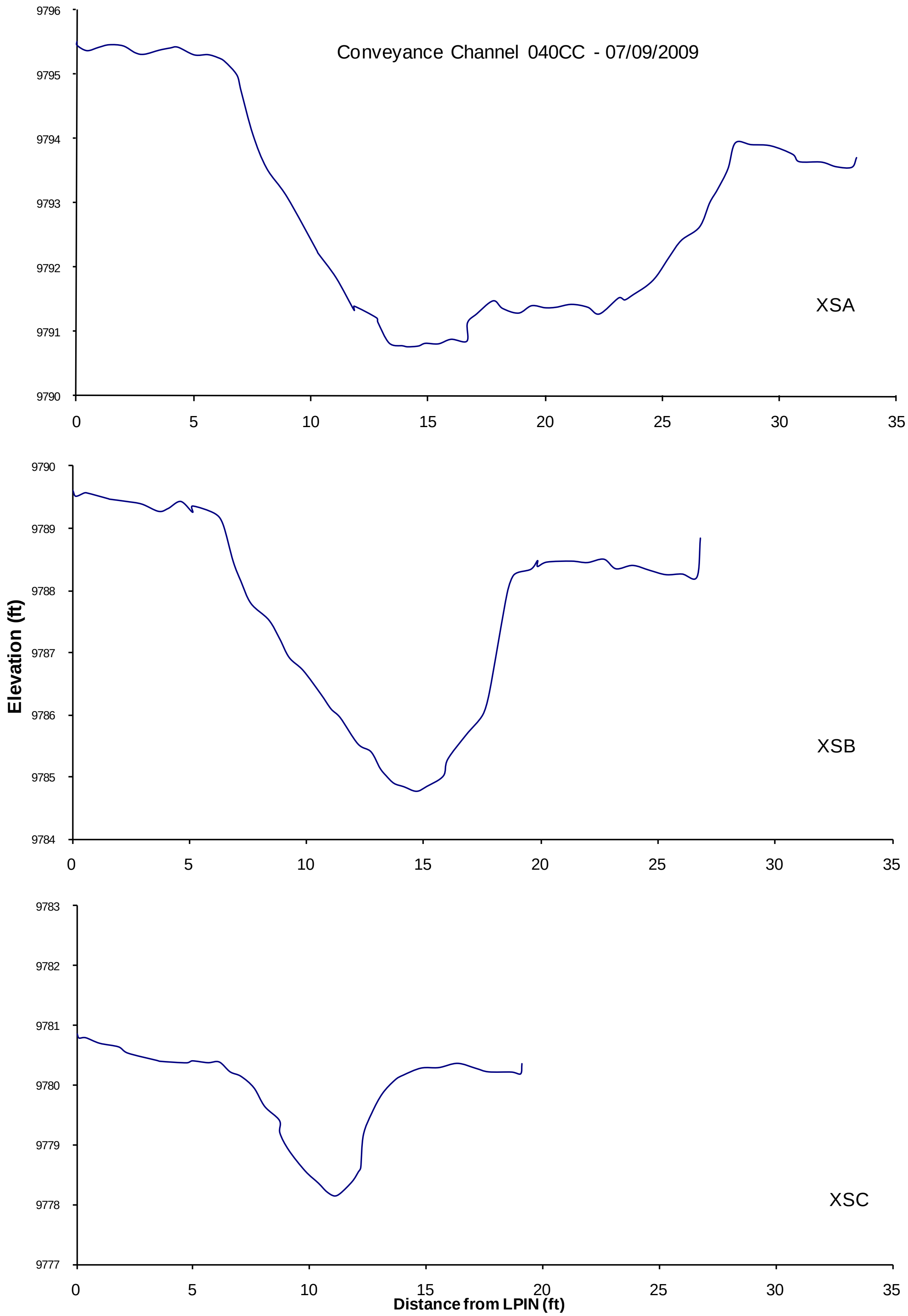
Conveyance Channel 021CC - 07/22/2009
XSA
XSB
XSC
Elevation (ft)
Distance from LPIN (ft)
9710
9708
9706
9704
9702
9700
9698
9696
9694
9692
9690
9688
9686
9684
9682
9680
0
5
10
15
20
25
30
35
40
45


Conveyance Channel 030CC - 06/26/2009
XSA
XSB
XSC
Elevation (ft)
Distance from LPIN (ft)
9849
9848
9847
9846
9845
9844
9843
9842
9841
9840
9839
9838
9837
9836
9835
9834
9833
9832
9831
0
5
10
15
20
25
30
35
40
45
50
55
60
65

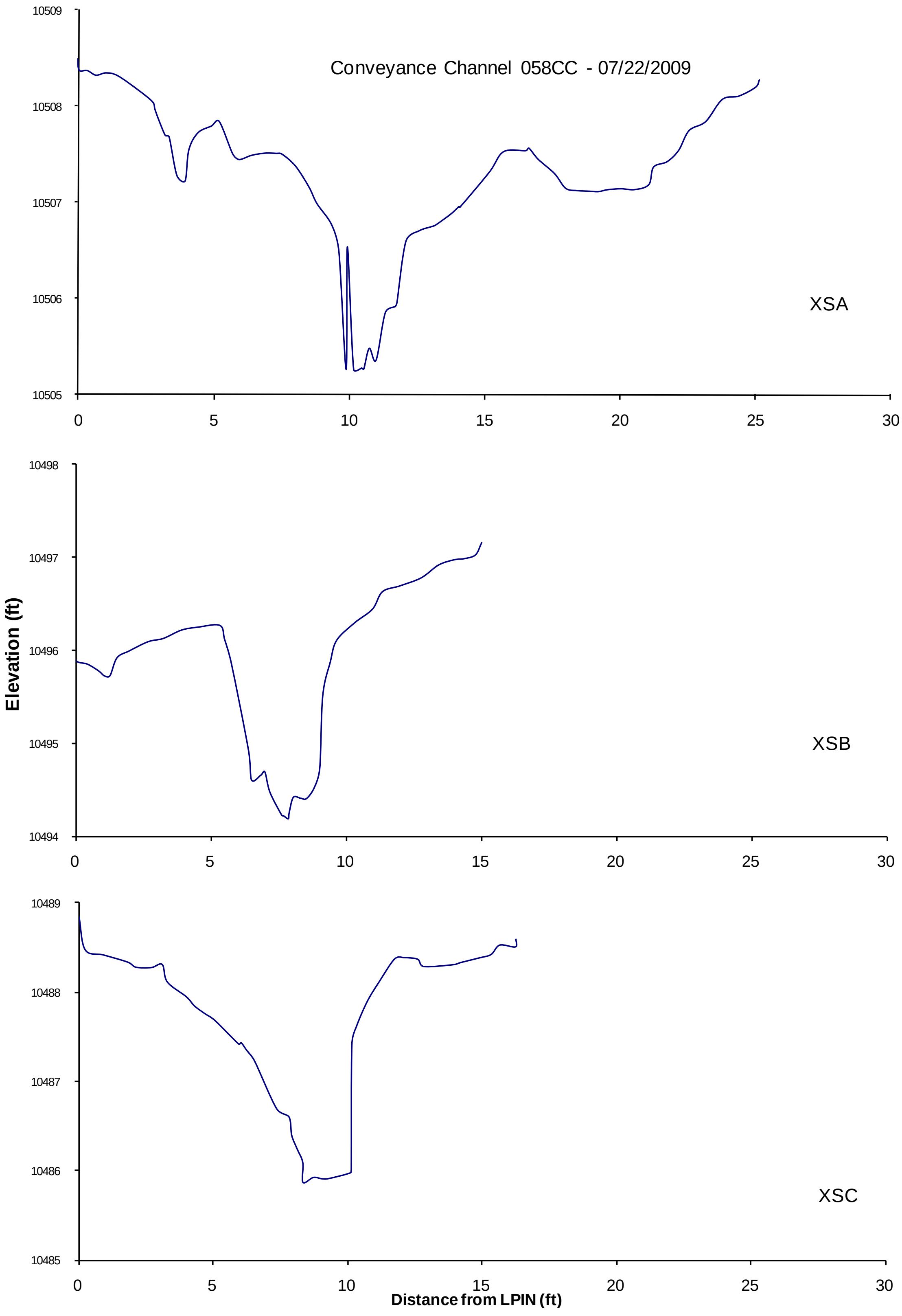

Conveyance Channel 031CC - 06/26/2009
XSA
XSB
XSC
Elevation (ft)
Distance from LPIN (ft)
9866
9864
9862
9860
9858
9856
9854
9852
9850
9848
9846
9844
0
5
10
15
20
25
30
35
40


Conveyance Channel 035CC - 06/16/2009
Elevation (ft)
XSA
XSB
XSC
Distance from LPIN (ft)
9916
9914
9912
9910
9908
9906
9904
9902
9900
9890
9888
9886
9884
9882
9880
9878
9876
0
10
20
30
40
50
60
70

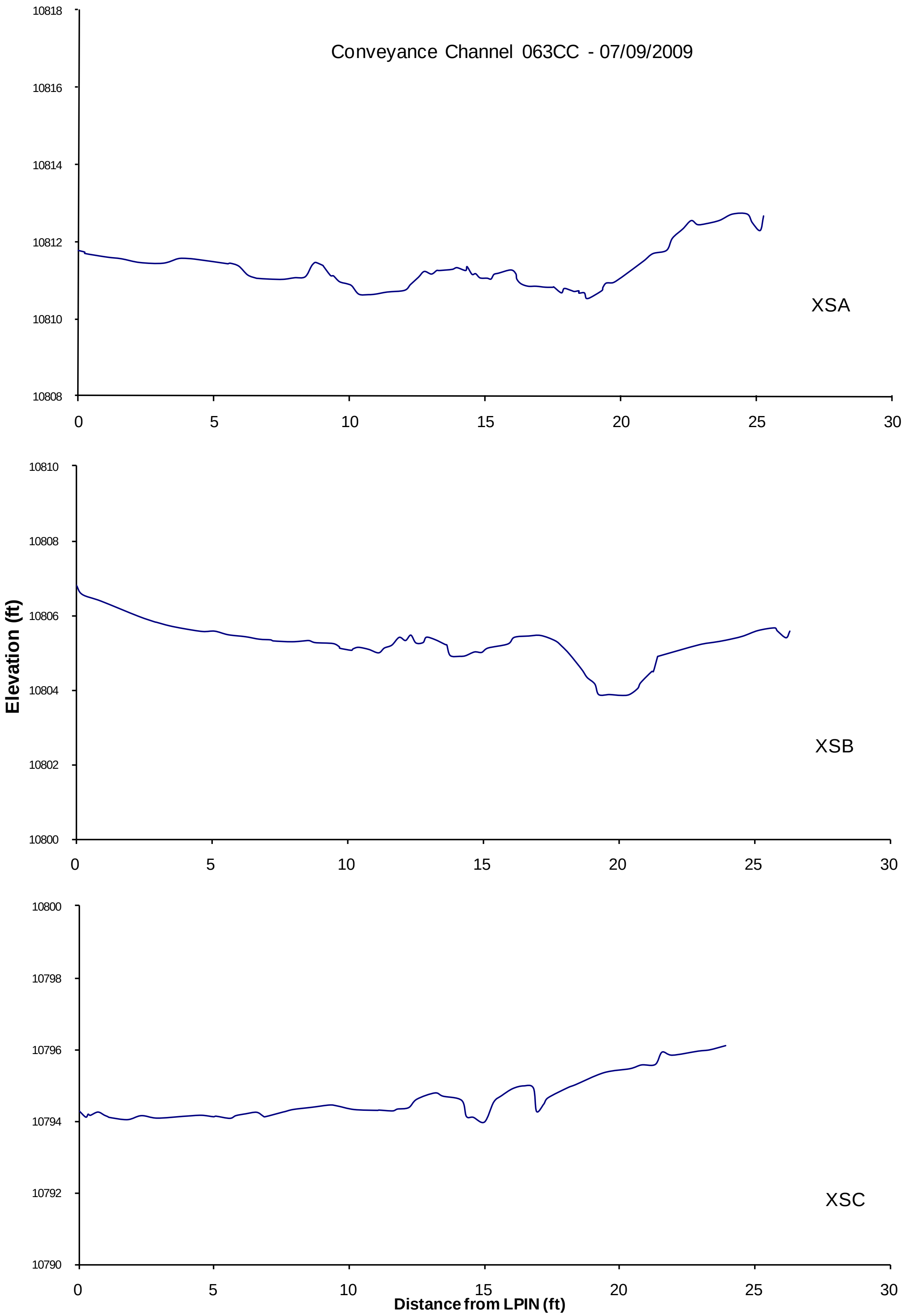

Conveyance Channel 037CC - 07/09/2009
XSA
XSB
XSC
Elevation (ft)
Distance from LPIN (ft)
9910
9908
9906
9904
9902
9900
9898
9896
9894
9892
9890
0
10
20
30
40
50
60
70



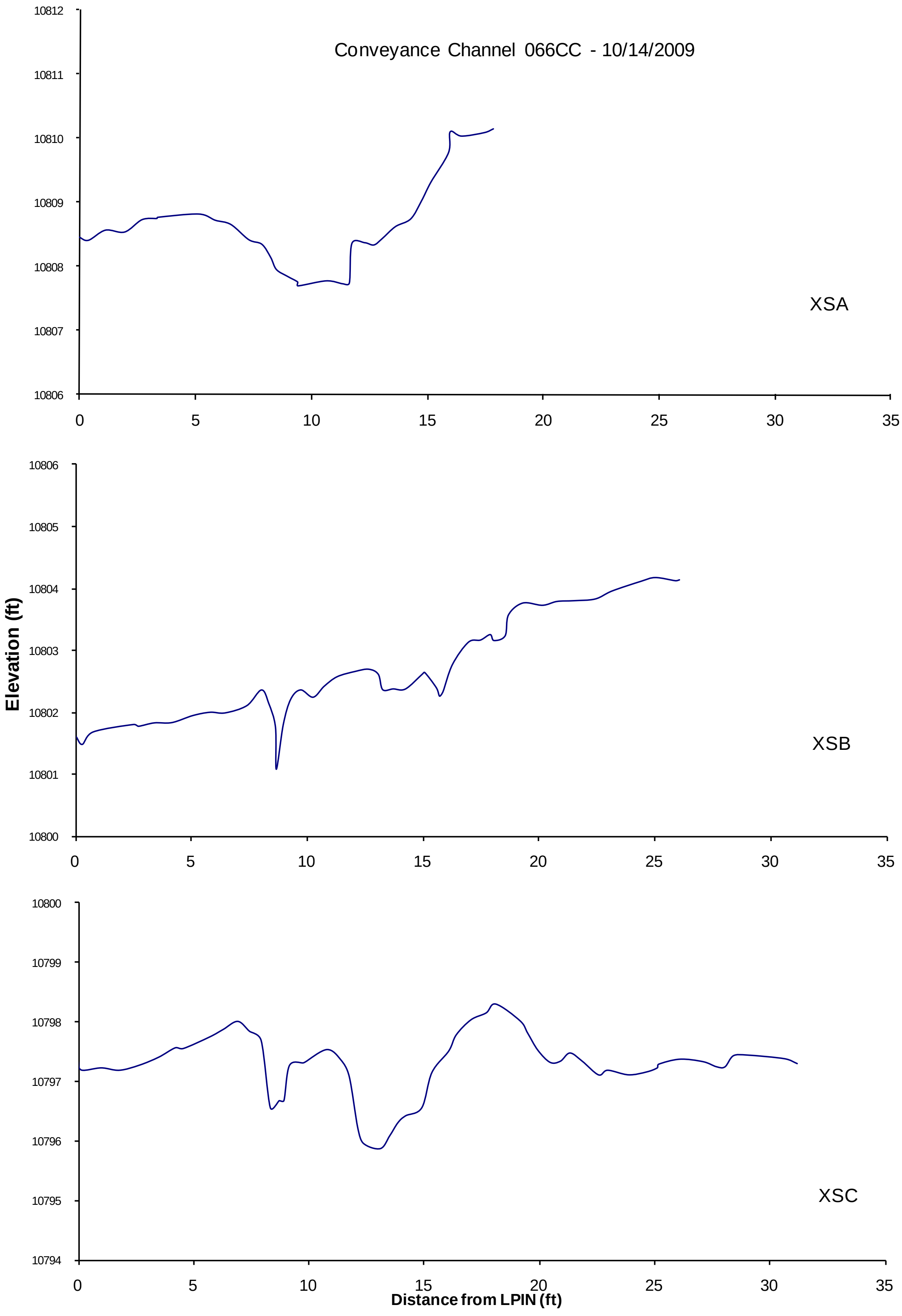
Conveyance Channel 040CC - 07/09/2009
XSA
XSB
XSC
Elevation (ft)
Distance from LPIN (ft)
9796
9795
9794
9793
9792
9791
9790
9789
9788
9787
9786
9785
9784
9783
9782
9781
9780
9779
9778
9777
0
5
10
15
20
25
30
35



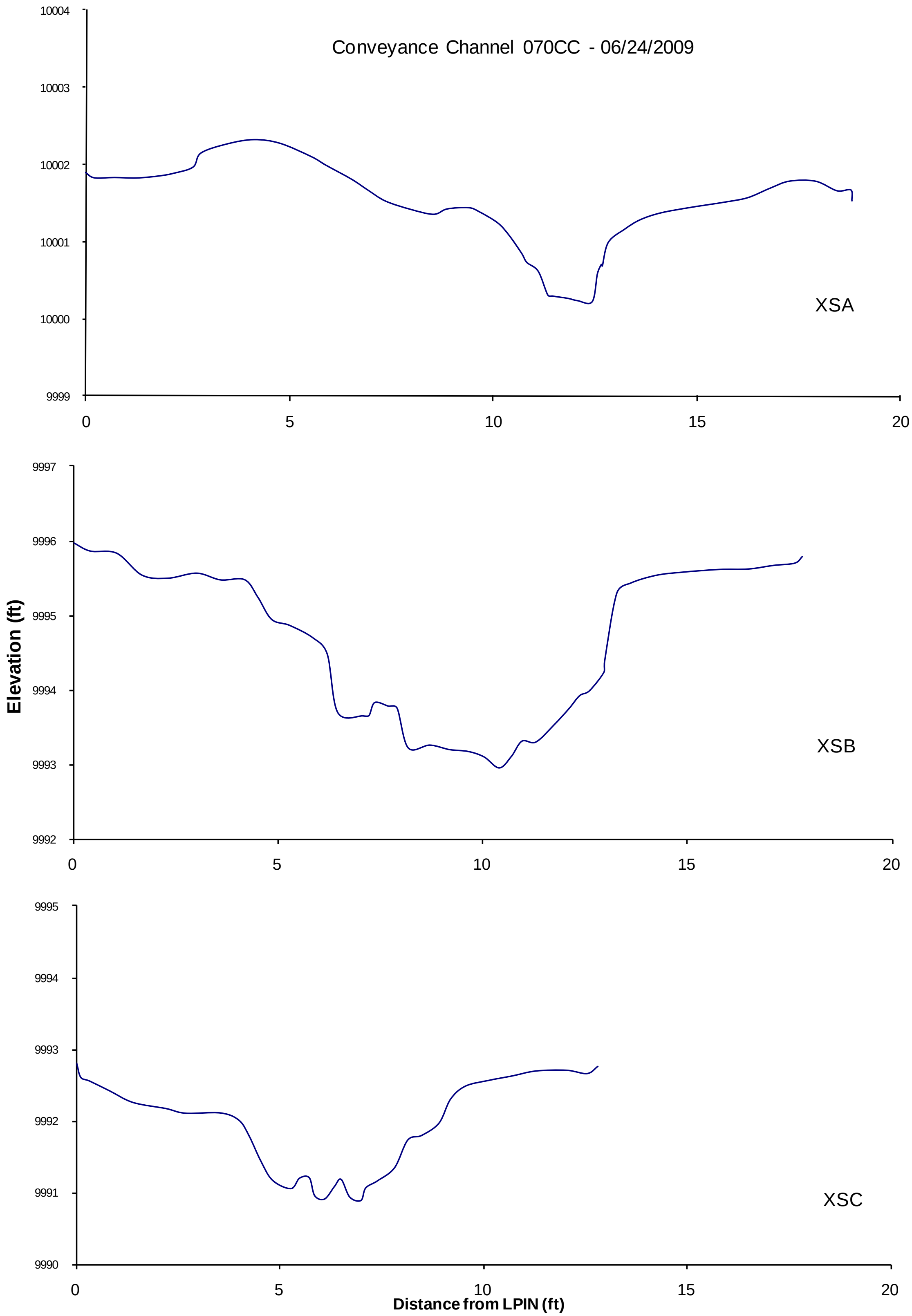
Conveyance Channel 058CC - 07/22/2009
10509
10508
10507
10506
10505
0
5
10
15
20
25
30
XSA
10498
10497
10496
10495
10494
XSB
Elevation (ft)
10489
10488
10487
10486
10485
XSC
Distance from LPIN (ft)



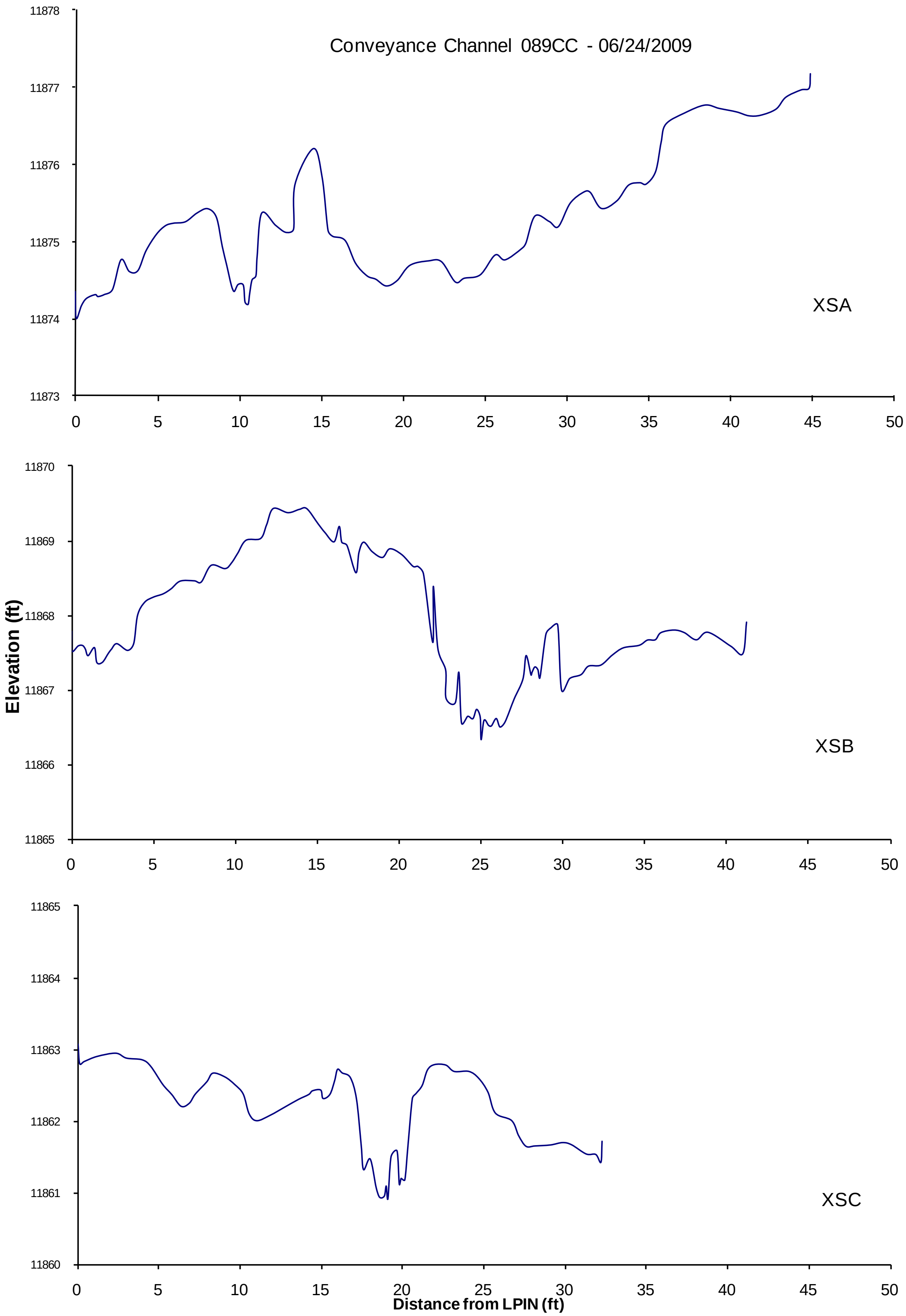
Conveyance Channel 063CC - 07/09/2009
XSA
XSB
XSC
Elevation (ft)
Distance from LPIN (ft)
10818
10816
10814
10812
10810
10808
10806
10804
10802
10800
10798
10796
10794
10792
10790
0
5
10
15
20
25
30

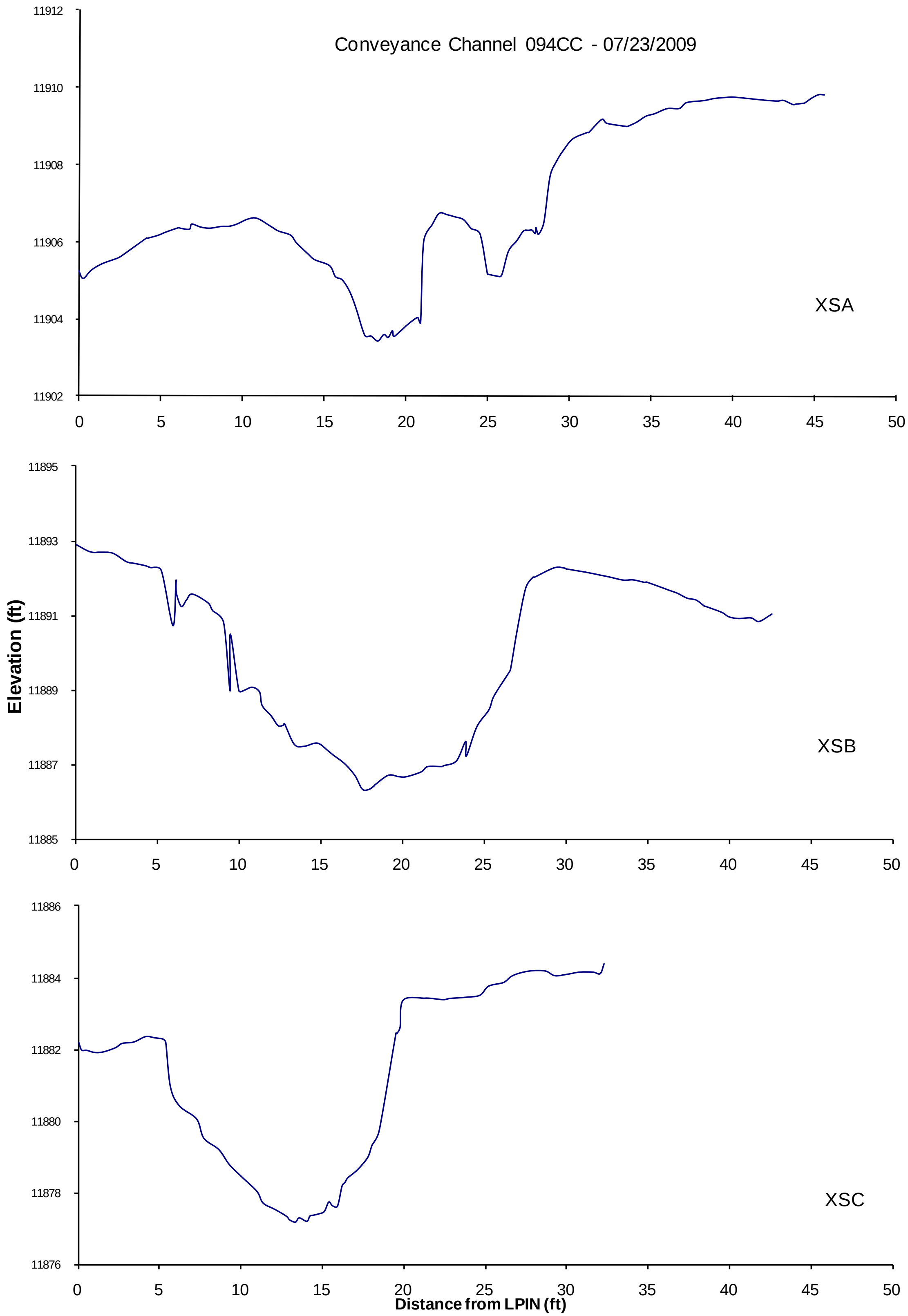


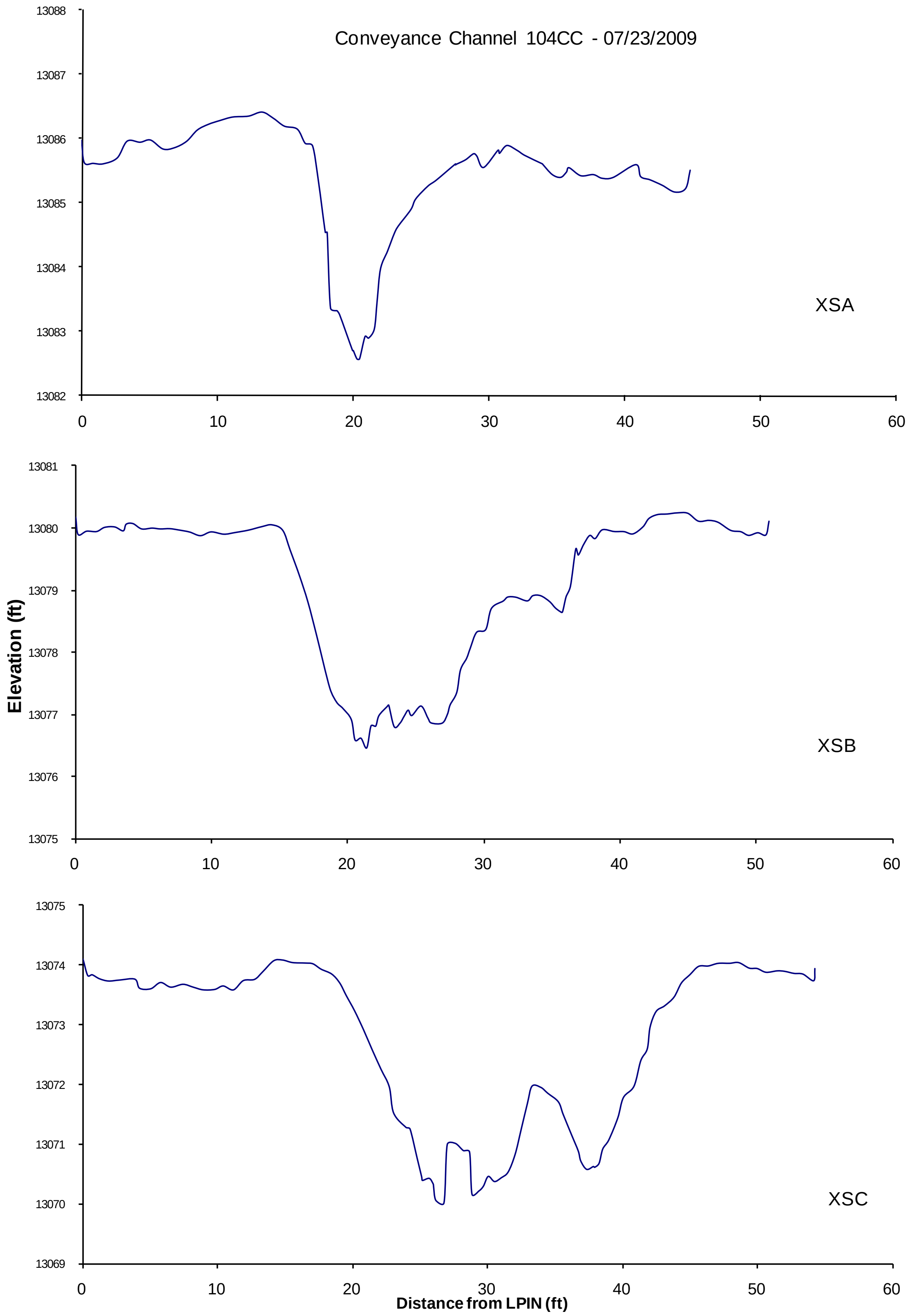
Conveyance Channel 066CC - 10/14/2009
Elevation (ft)
XSA
XSB
XSC
Distance from LPIN (ft)
10812
10811
10810
10809
10808
10807
10806
10805
10804
10803
10802
10801
10800
10799
10798
10797
10796
10795
10794
0
5
10
15
20
25
30
35

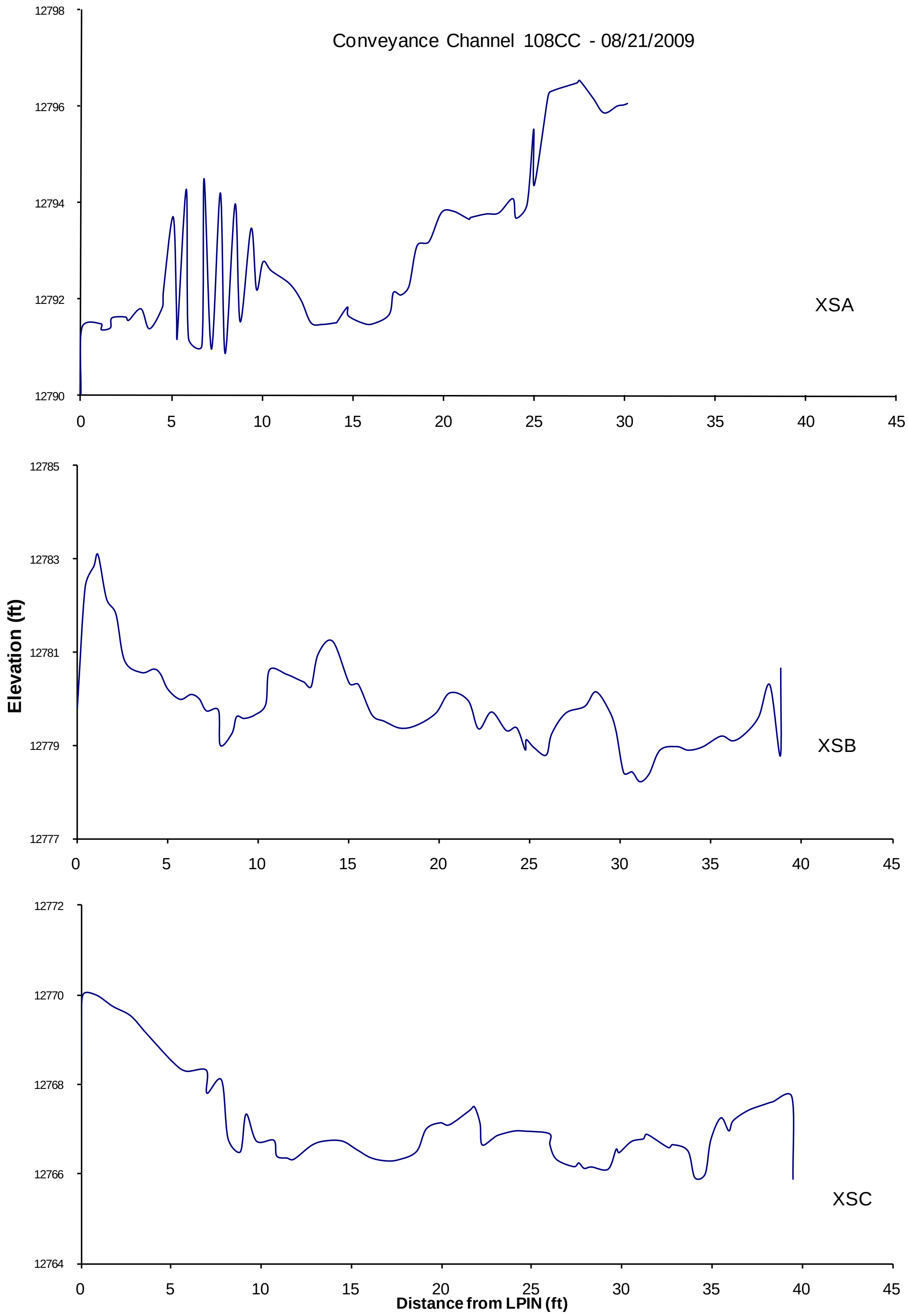


Conveyance Channel 070CC - 06/24/2009
XSA
XSB
XSC
Elevation (ft)
Distance from LPIN (ft)

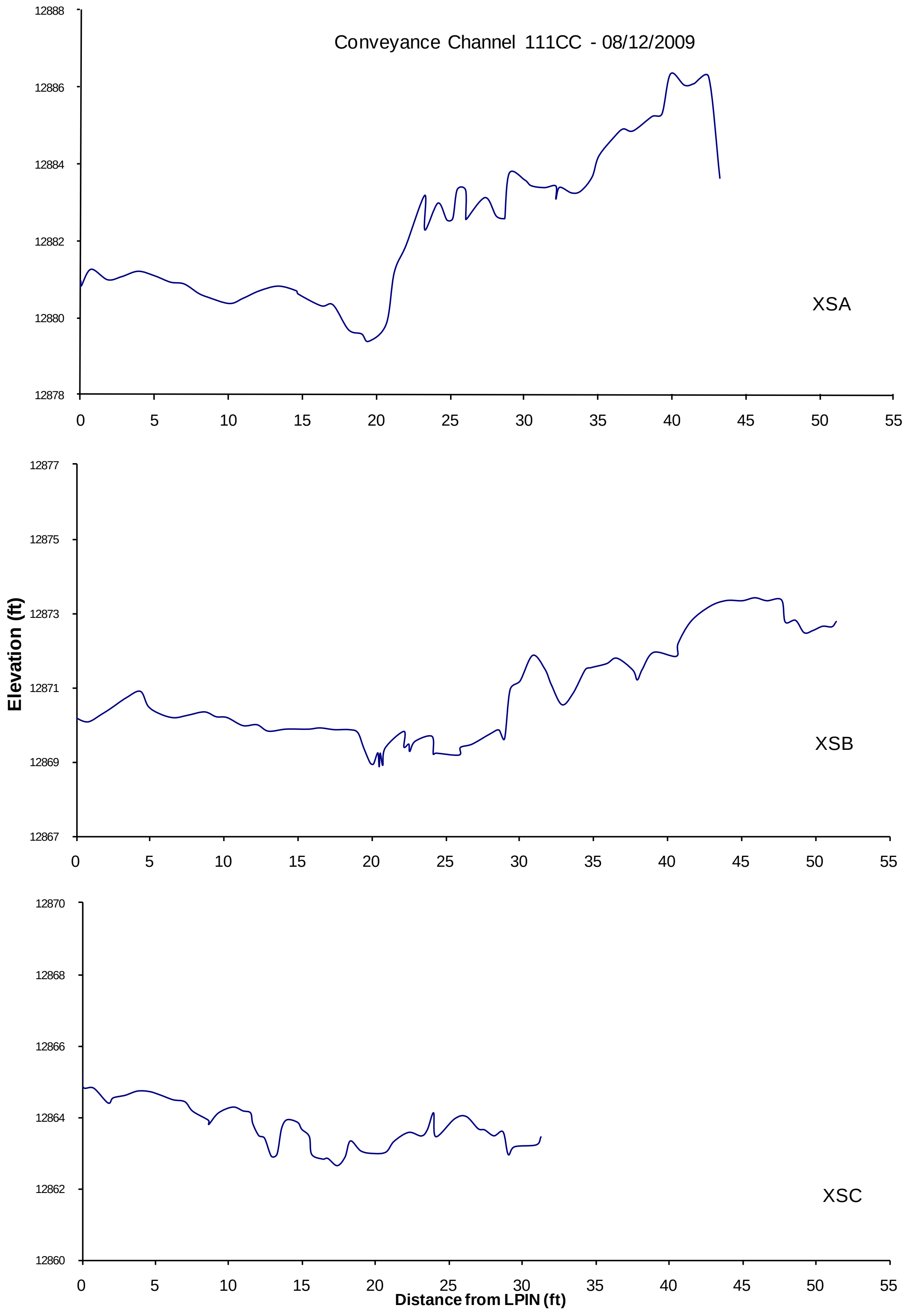

Conveyance Channel 089CC - 06/24/2009
XSA
XSB
XSC
Elevation (ft)
Distance from LPIN (ft)
11878
11877
11876
11875
11874
11873
11870
11869
11868
11867
11866
11865
11865
11864
11863
11862
11861
11860
0
5
10
15
20
25
30
35
40
45
50


Conveyance Channel 094CC - 07/23/2009
XSA
XSB
XSC
Elevation (ft)
Distance from LPIN (ft)
11912
11910
11908
11906
11904
11902
11895
11893
11891
11889
11887
11885
11886
11884
11882
11880
11878
11876
0
5
10
15
20
25
30
35
40
45
50

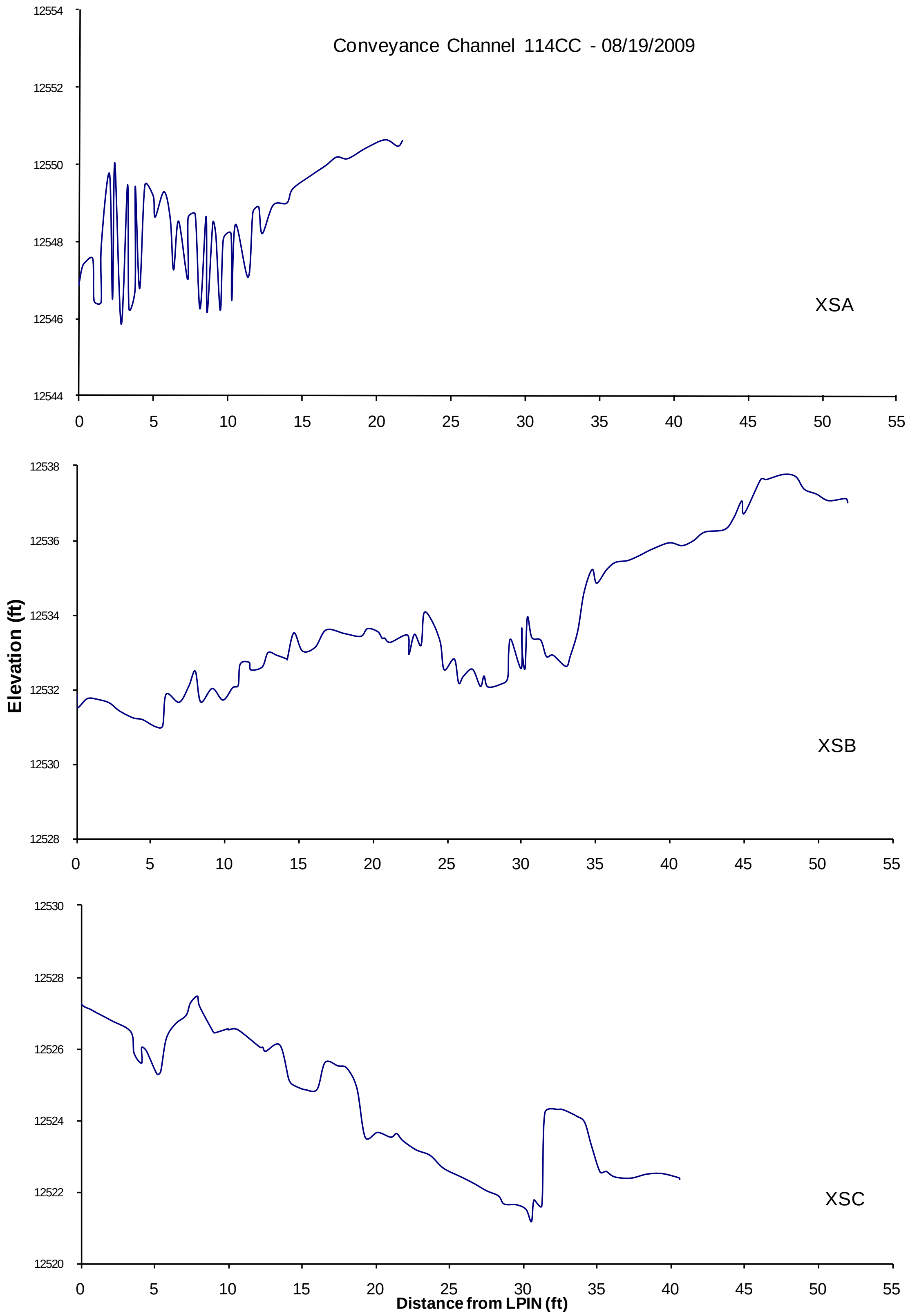

Conveyance Channel 104CC - 07/23/2009
XSA
XSB
XSC
Elevation (ft)
Distance from LPIN (ft)
13088
13087
13086
13085
13084
13083
13082
13081
13080
13079
13078
13077
13076
13075
13074
13073
13072
13071
13070
13069
0
10
20
30
40
50
60



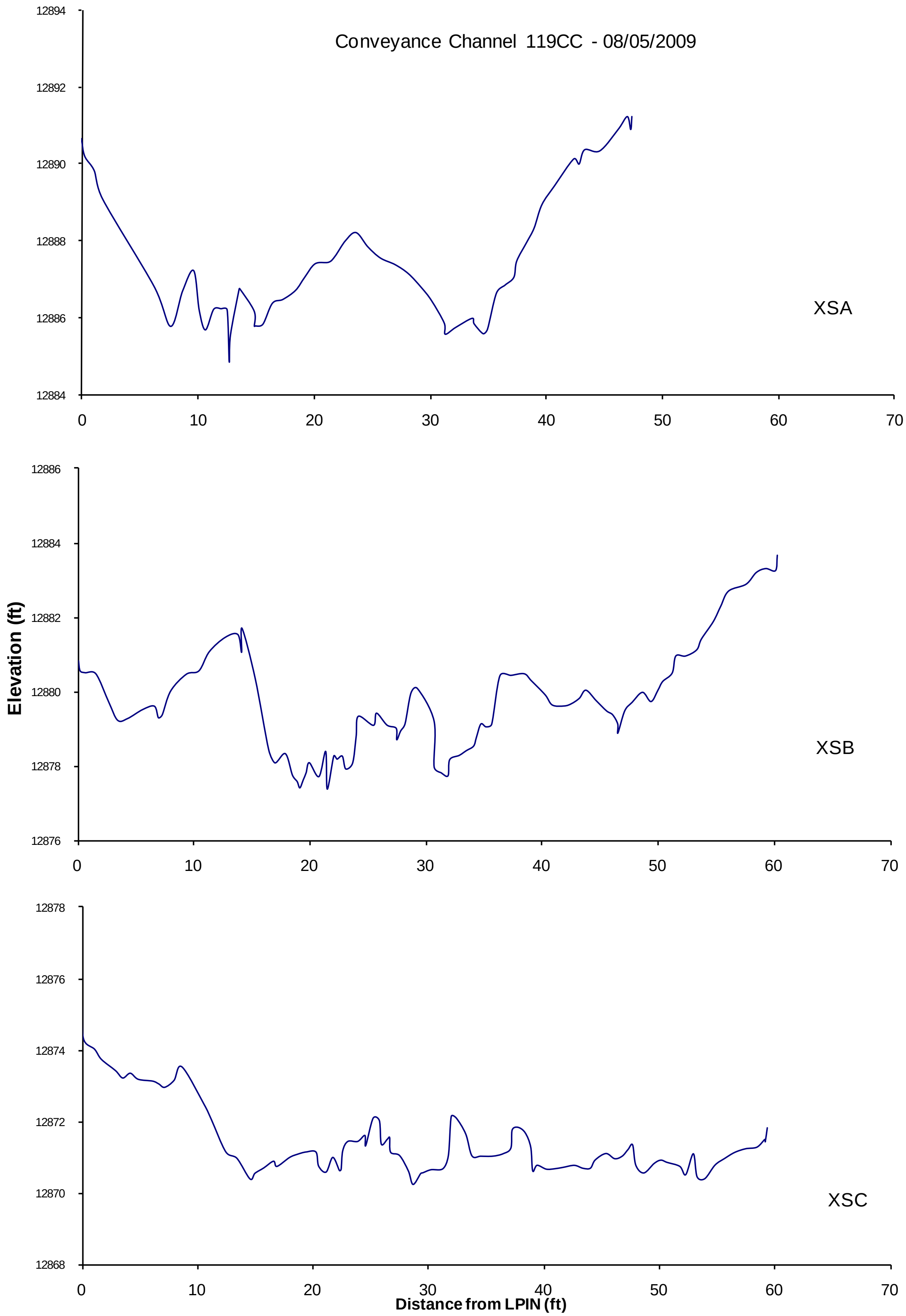
Conveyance Channel 108CC - 08/21/2009
XSA
XSB
XSC
Elevation (ft)
Distance from LPIN (ft)
12798
12796
12794
12792
12790
12785
12783
12781
12779
12777
12772
12770
12768
12766
12764
0
5
10
15
20
25
30
35
40
45

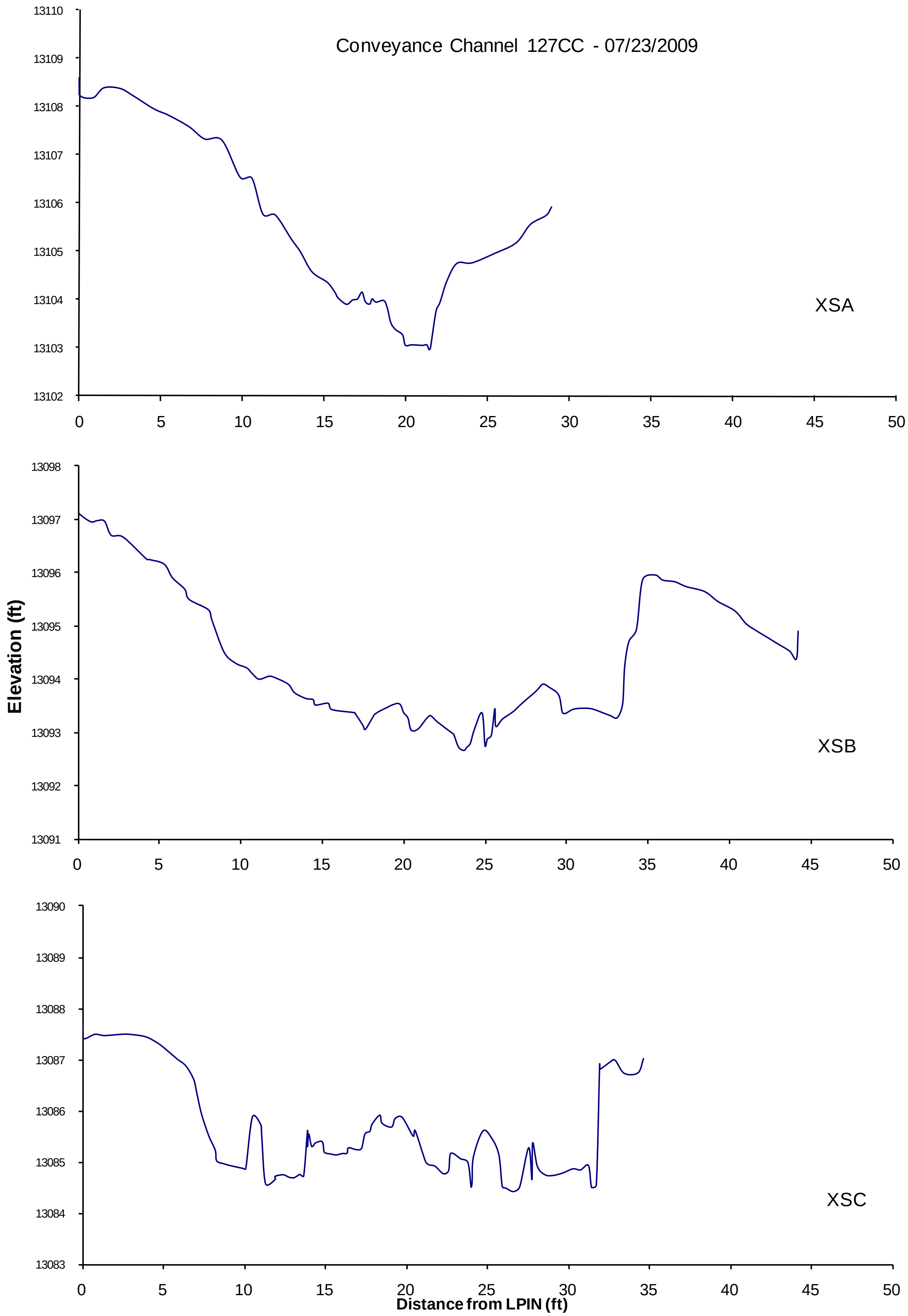


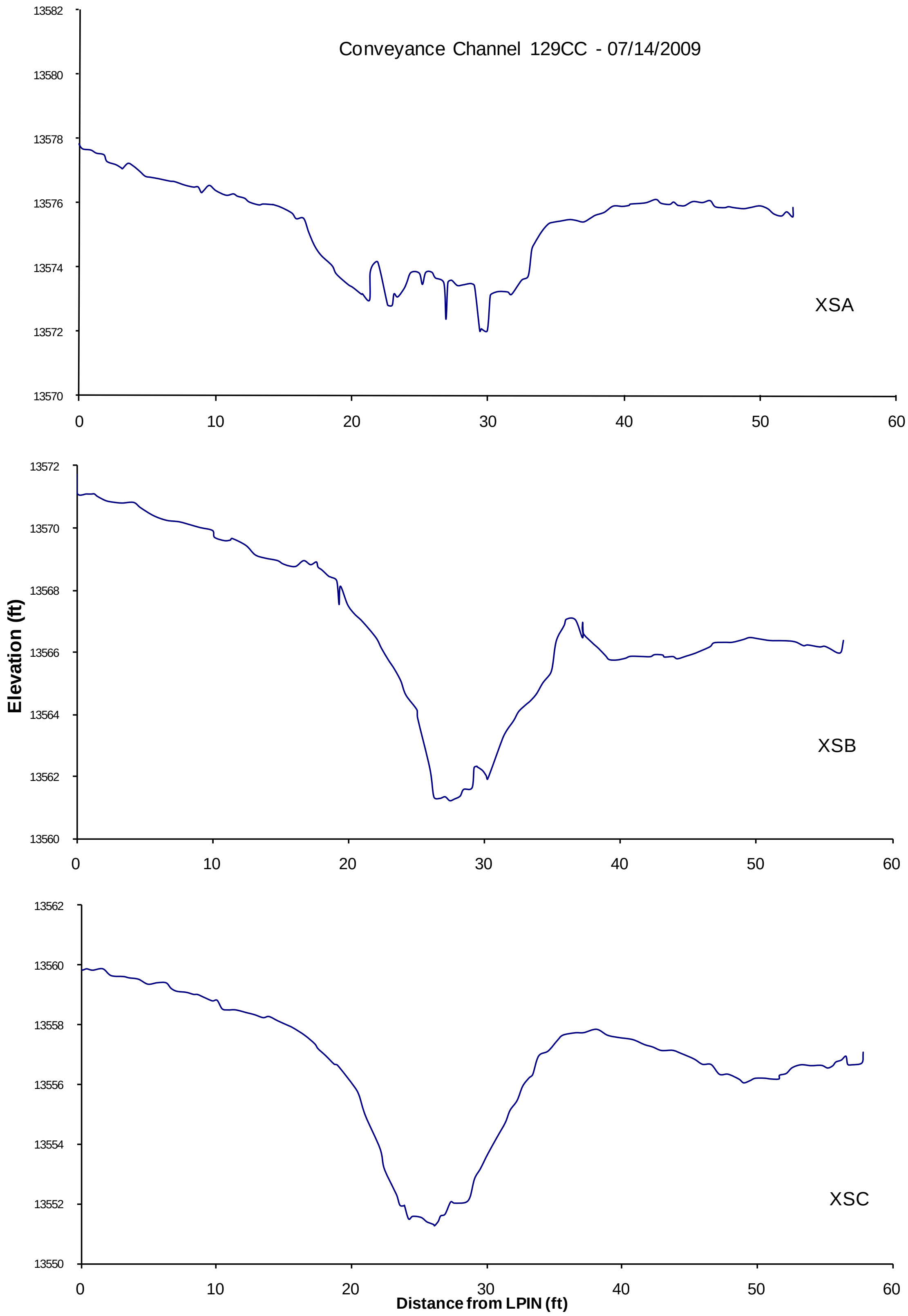
Conveyance Channel 111CC - 08/12/2009
XSA
XSB
XSC
Elevation (ft)
Distance from LPIN (ft)
12888
12886
12884
12882
12880
12878
12877
12875
12873
12871
12869
12867
12870
12868
12866
12864
12862
12860
0 5 10 15 20 25 30 35 40 45 50 55

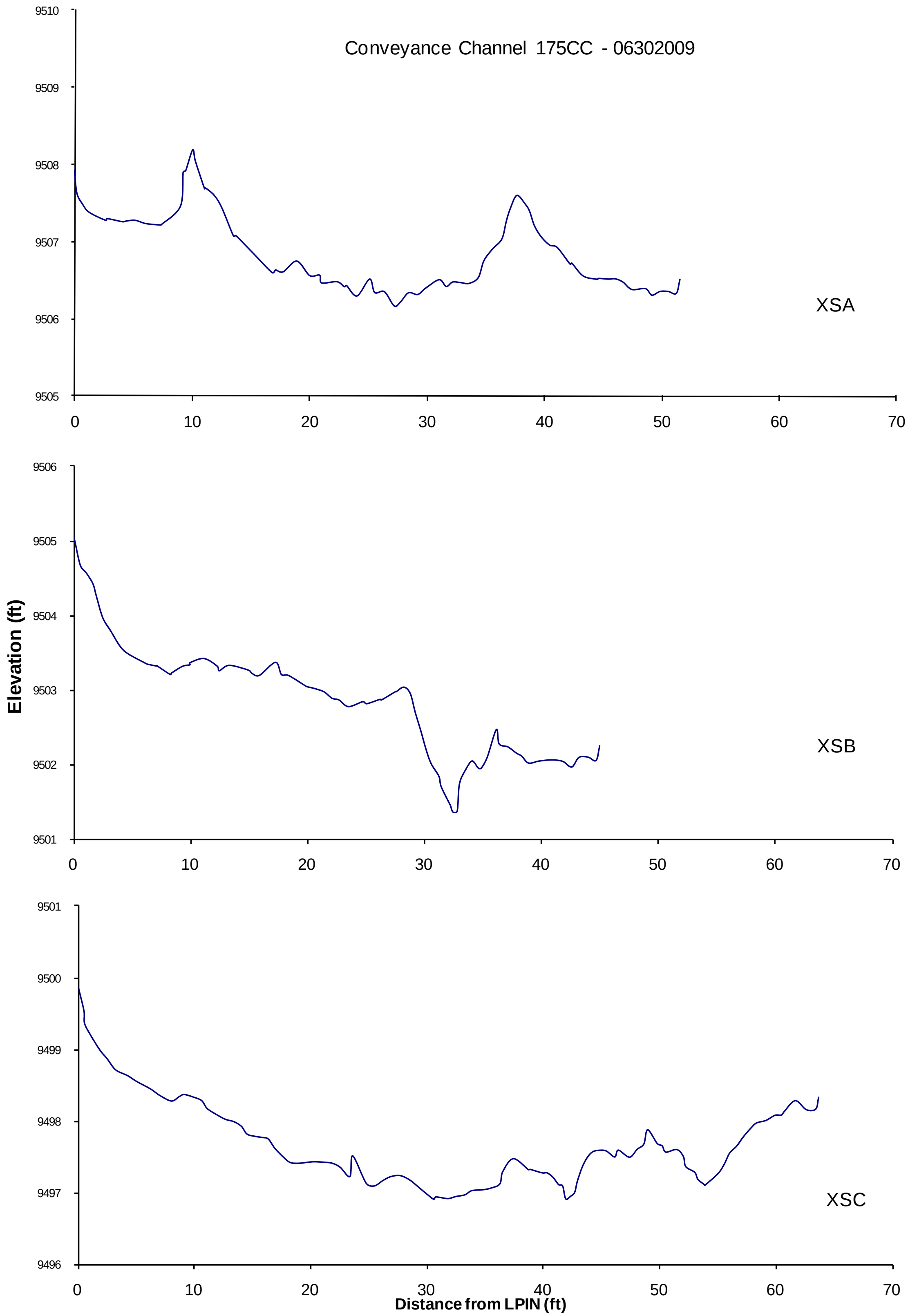


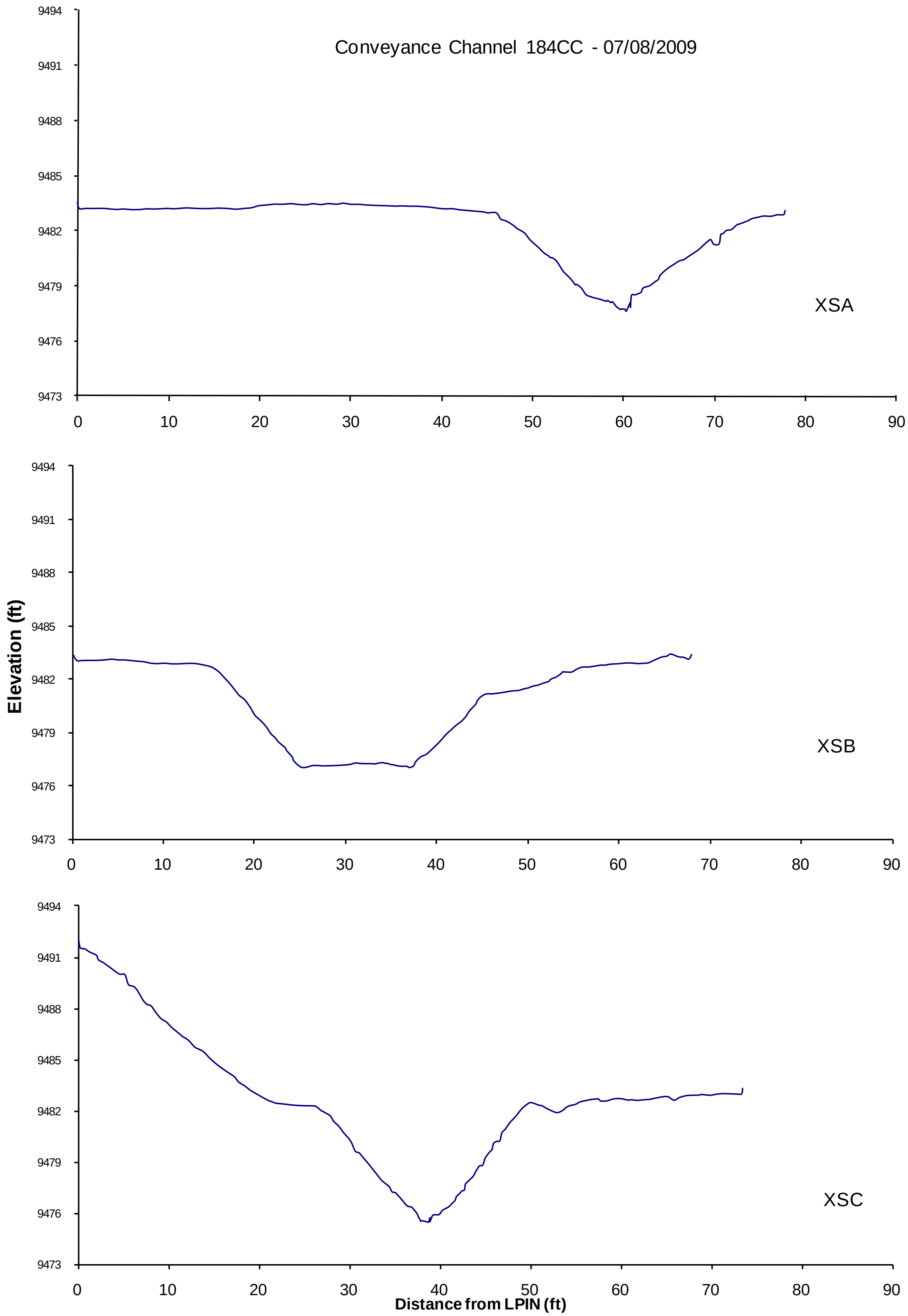
Conveyance Channel 114CC - 08/19/2009
12554
12552
12550
12548
12546
12544
0 5 10 15 20 25 30 35 40 45 50 55
XSA
12538
12536
12534
12532
12530
12528
Elevation (ft)
XSB
12530
12528
12526
12524
12522
12520
XSC
Distance from LPIN (ft)

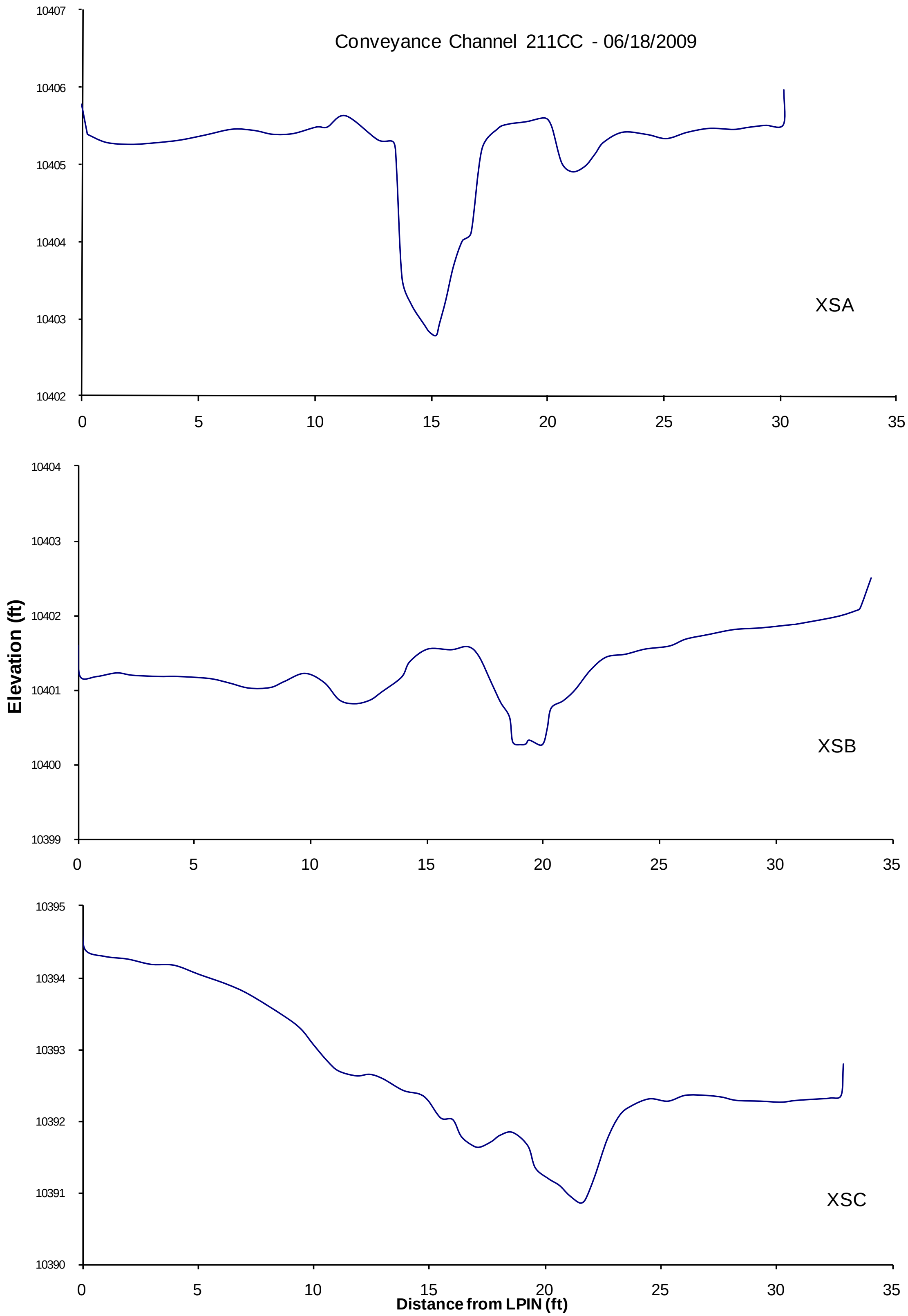

Conveyance Channel 119CC - 08/05/2009
XSA
XSB
XSC
Elevation (ft)
Distance from LPIN (ft)
12894
12892
12890
12888
12886
12884
12882
12880
12878
12876
12874
12872
12870
12868
0
10
20
30
40
50
60
70

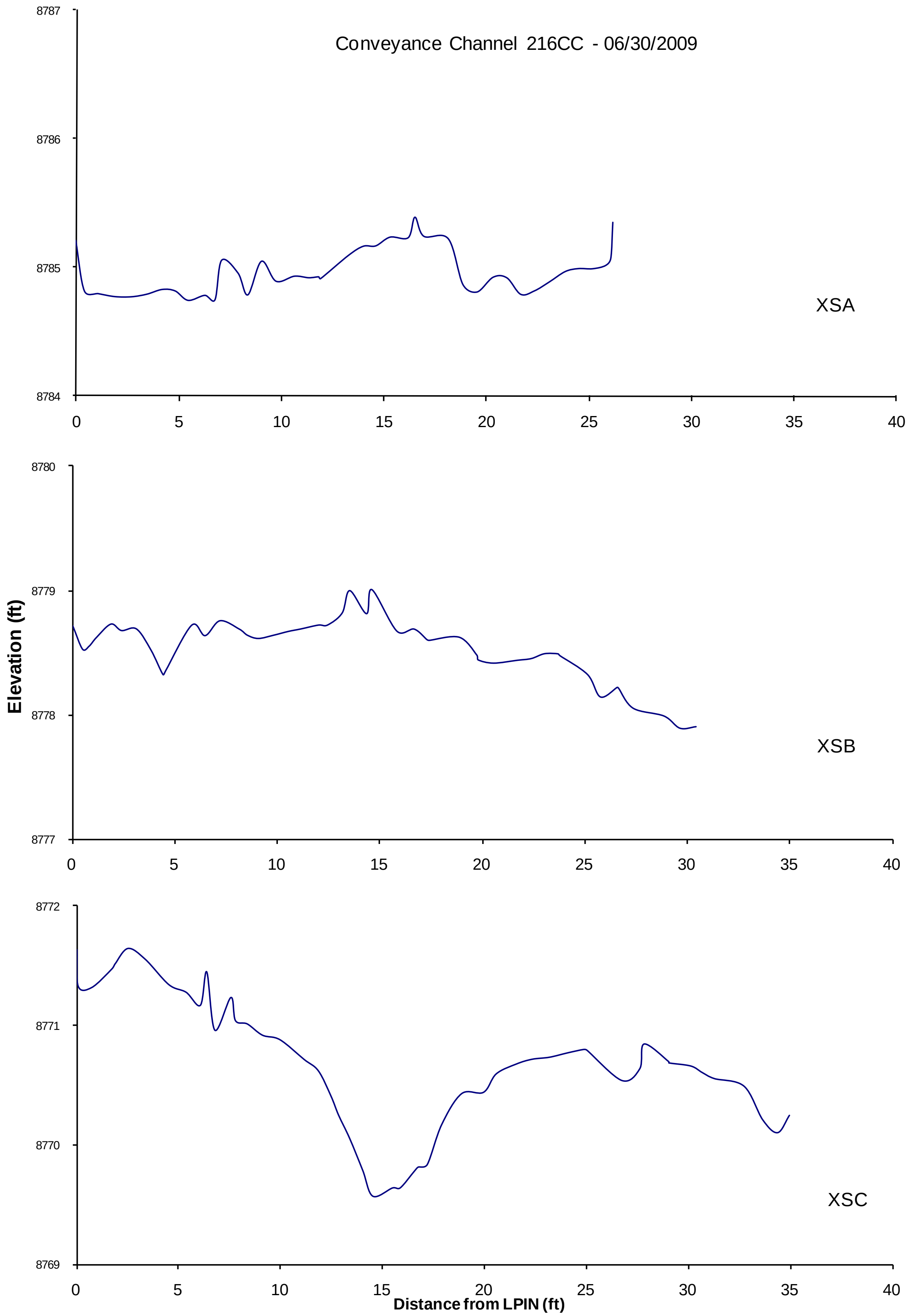

Conveyance Channel 127CC - 07/23/2009
XSA
XSB
XSC
Elevation (ft)
Distance from LPIN (ft)
13110
13109
13108
13107
13106
13105
13104
13103
13102
13098
13097
13096
13095
13094
13093
13092
13091
13090
13089
13088
13087
13086
13085
13084
13083
0
5
10
15
20
25
30
35
40
45
50

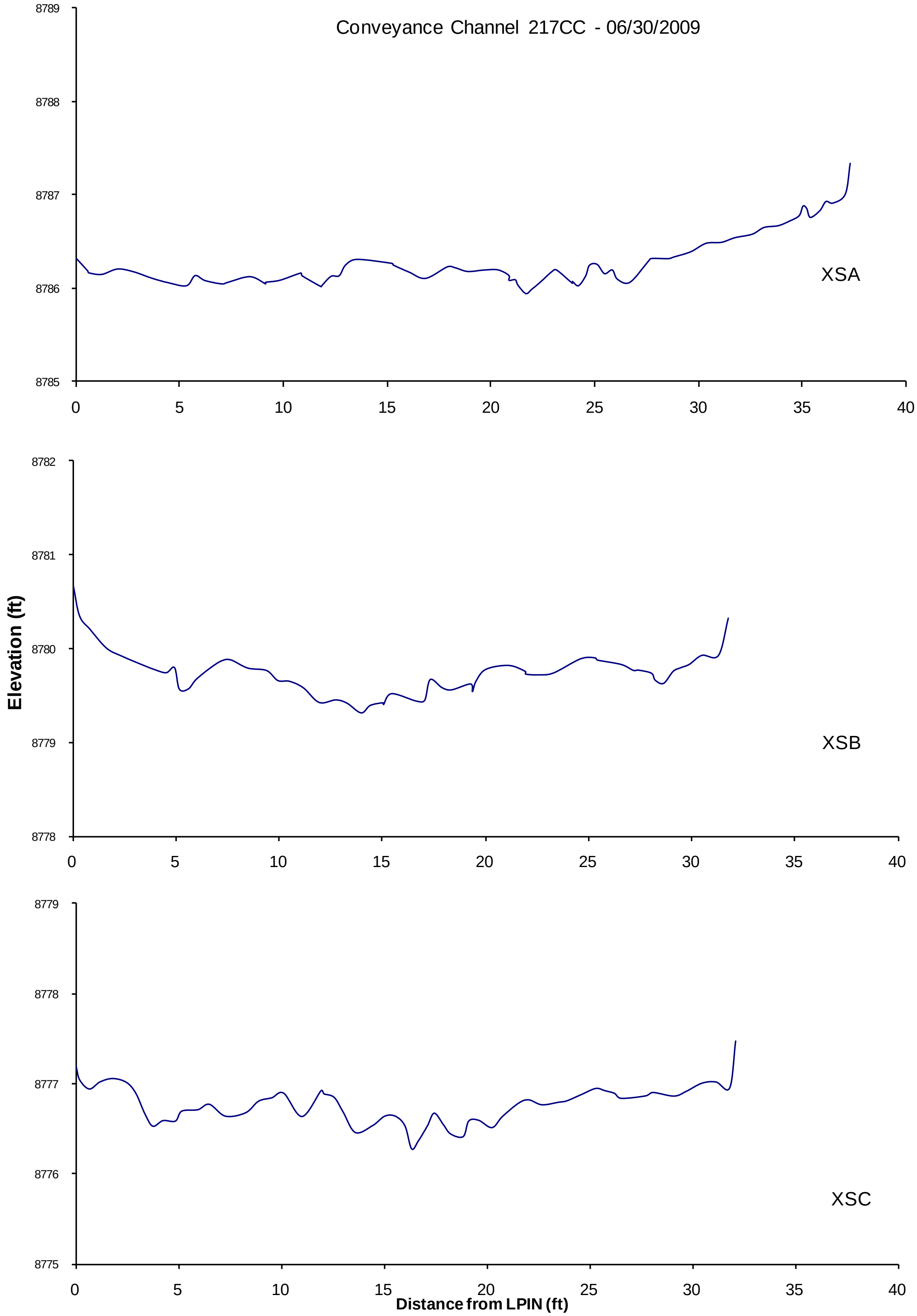

Conveyance Channel 129CC - 07/14/2009
XSA
XSB
XSC
Elevation (ft)
Distance from LPIN (ft)
13582
13580
13578
13576
13574
13572
13570
13568
13566
13564
13562
13560
13558
13556
13554
13552
13550
0
10
20
30
40
50
60

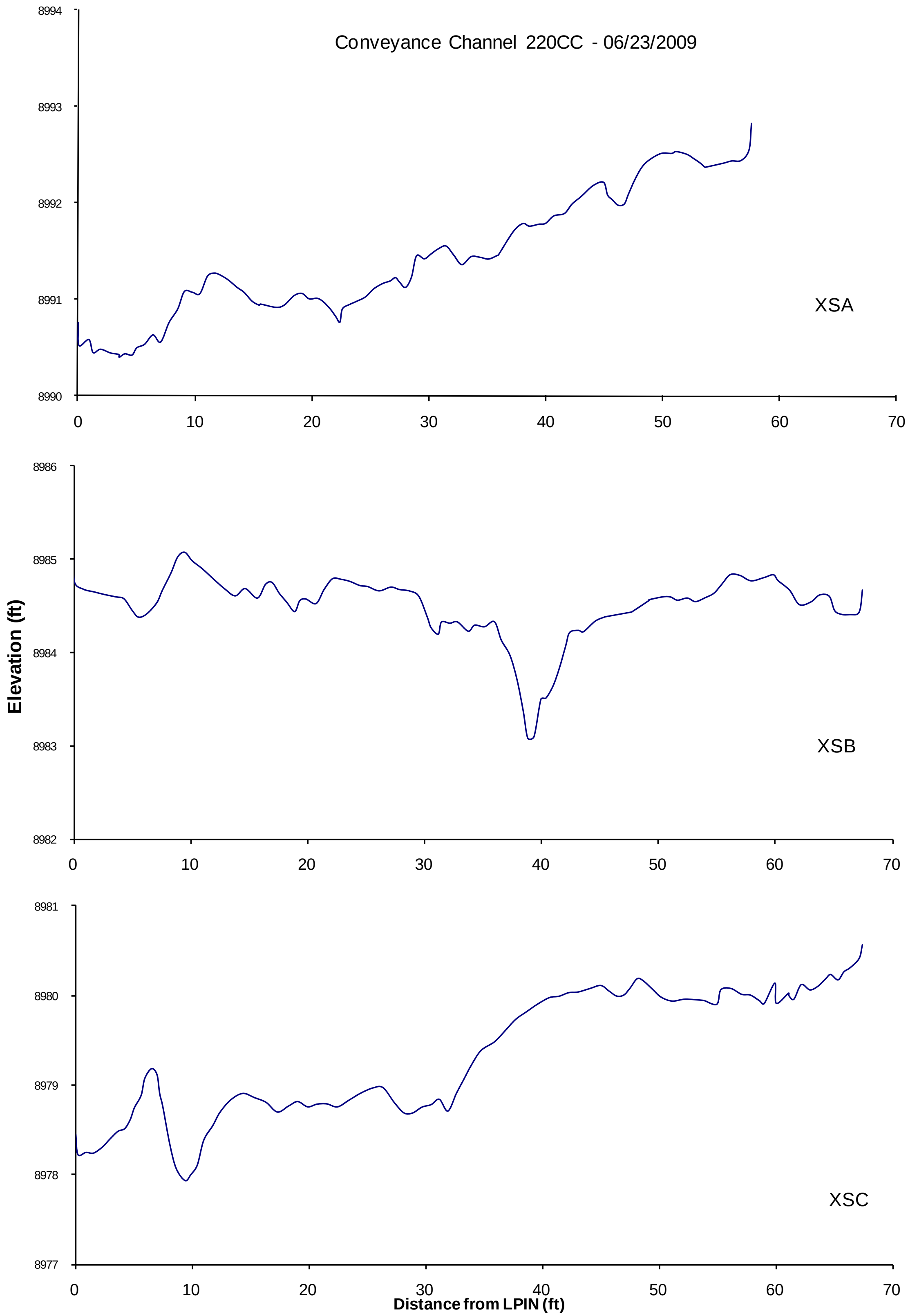

Conveyance Channel 175CC - 06302009
9510
9509
9508
9507
9506
9505
0
10
20
30
40
50
60
70
XSA
9506
9505
9504
9503
9502
9501
XSB
Elevation (ft)
9501
9500
9499
9498
9497
9496
XSC
Distance from LPIN (ft)


Conveyance Channel 184CC - 07/08/2009
Elevation (ft)
Distance from LPIN (ft)
XSA
XSB
XSC
9494
9491
9488
9485
9482
9479
9476
9473
0
10
20
30
40
50
60
70
80
90

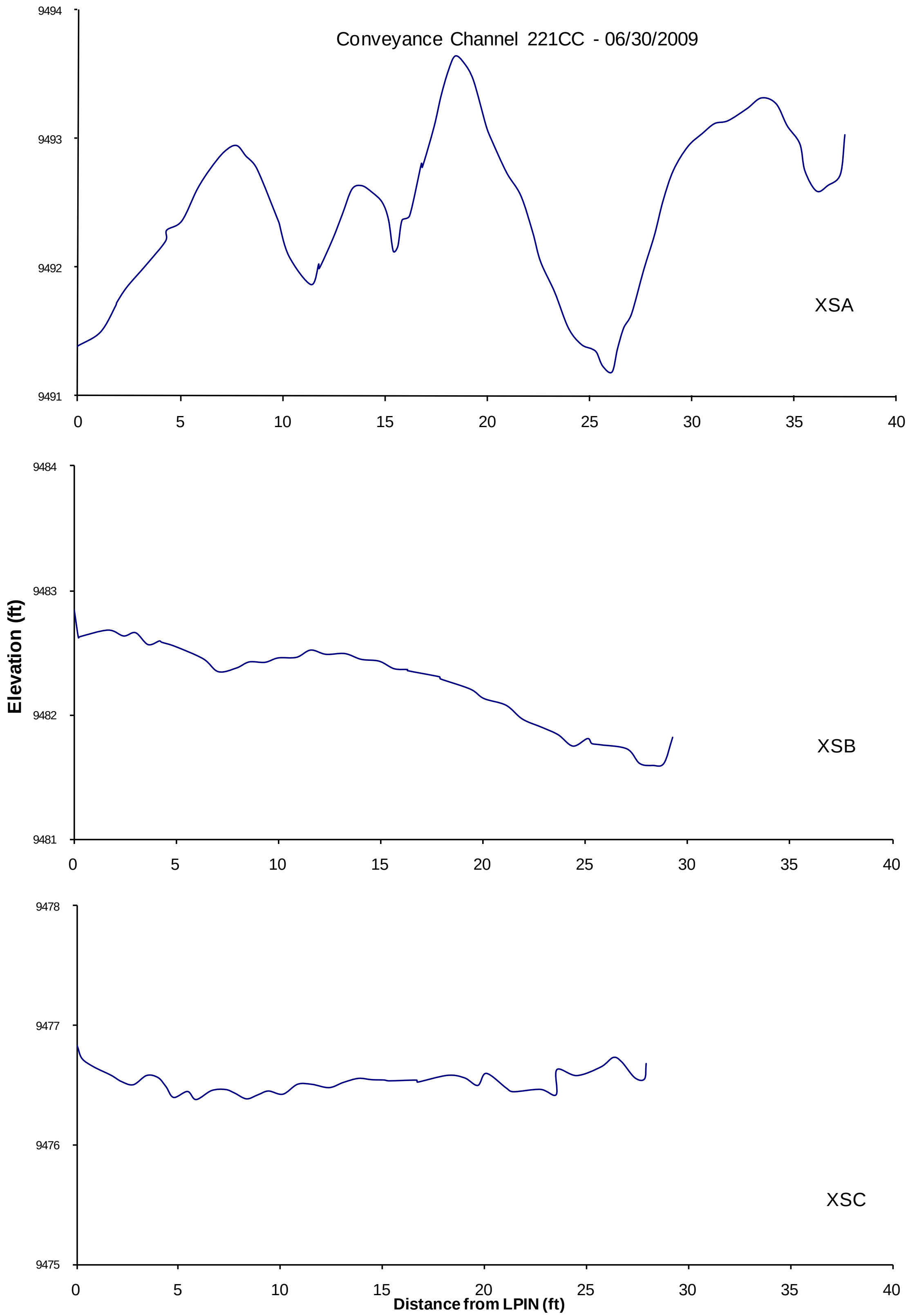

Conveyance Channel 211CC - 06/18/2009
XSA
XSB
XSC
Elevation (ft)
Distance from LPIN (ft)
10407
10406
10405
10404
10403
10402
10401
10400
10399
10395
10394
10393
10392
10391
10390
0
5
10
15
20
25
30
35


Conveyance Channel 216CC - 06/30/2009
XSA
XSB
XSC
Elevation (ft)
Distance from LPIN (ft)
8787
8786
8785
8784
8780
8779
8778
8777
8772
8771
8770
8769
0
5
10
15
20
25
30
35
40

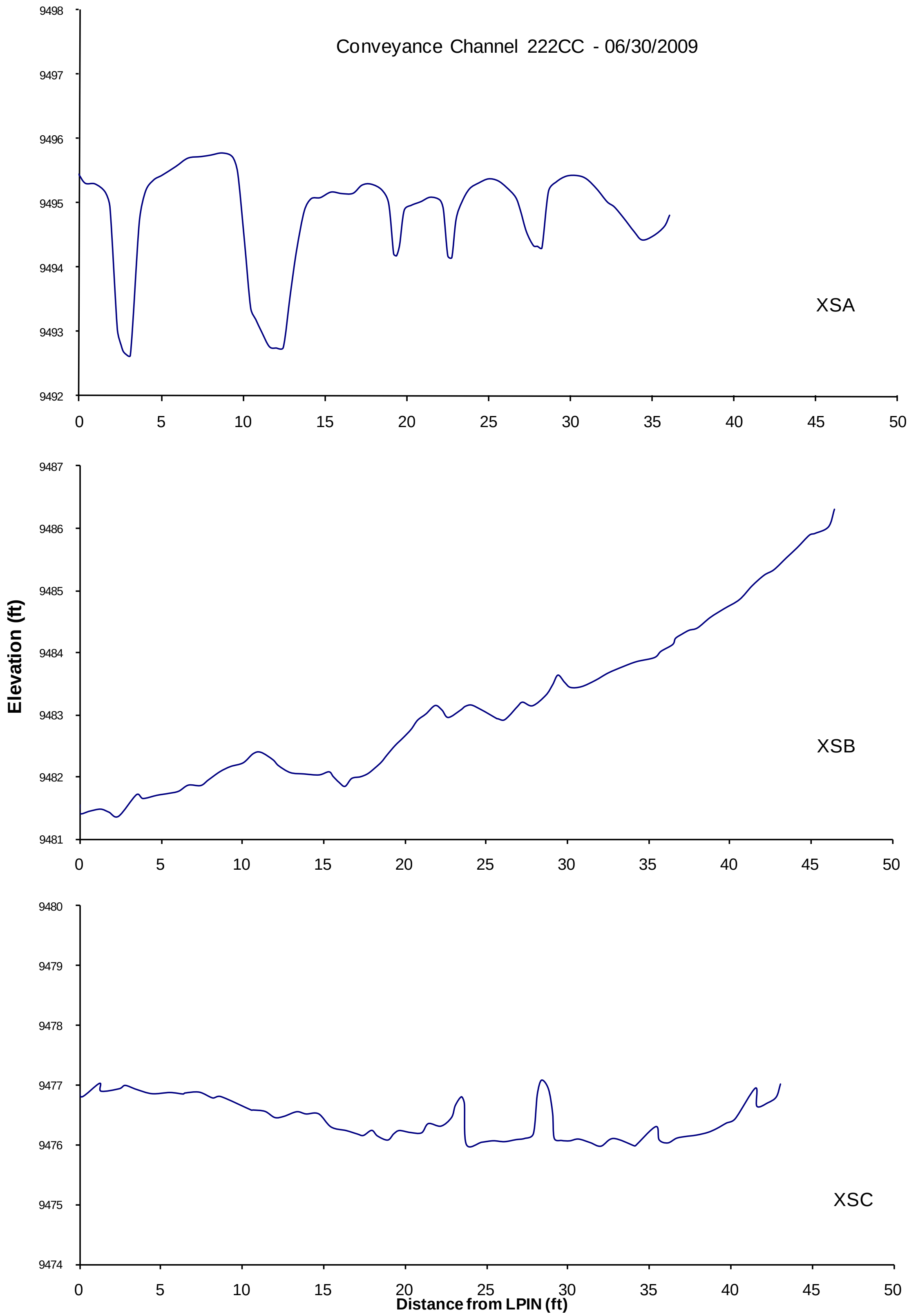

Conveyance Channel 217CC - 06/30/2009
Elevation (ft)
Distance from LPIN (ft)
XSA
XSB
XSC
8789
8788
8787
8786
8785
8782
8781
8780
8779
8778
8779
8778
8777
8776
8775
0
5
10
15
20
25
30
35
40



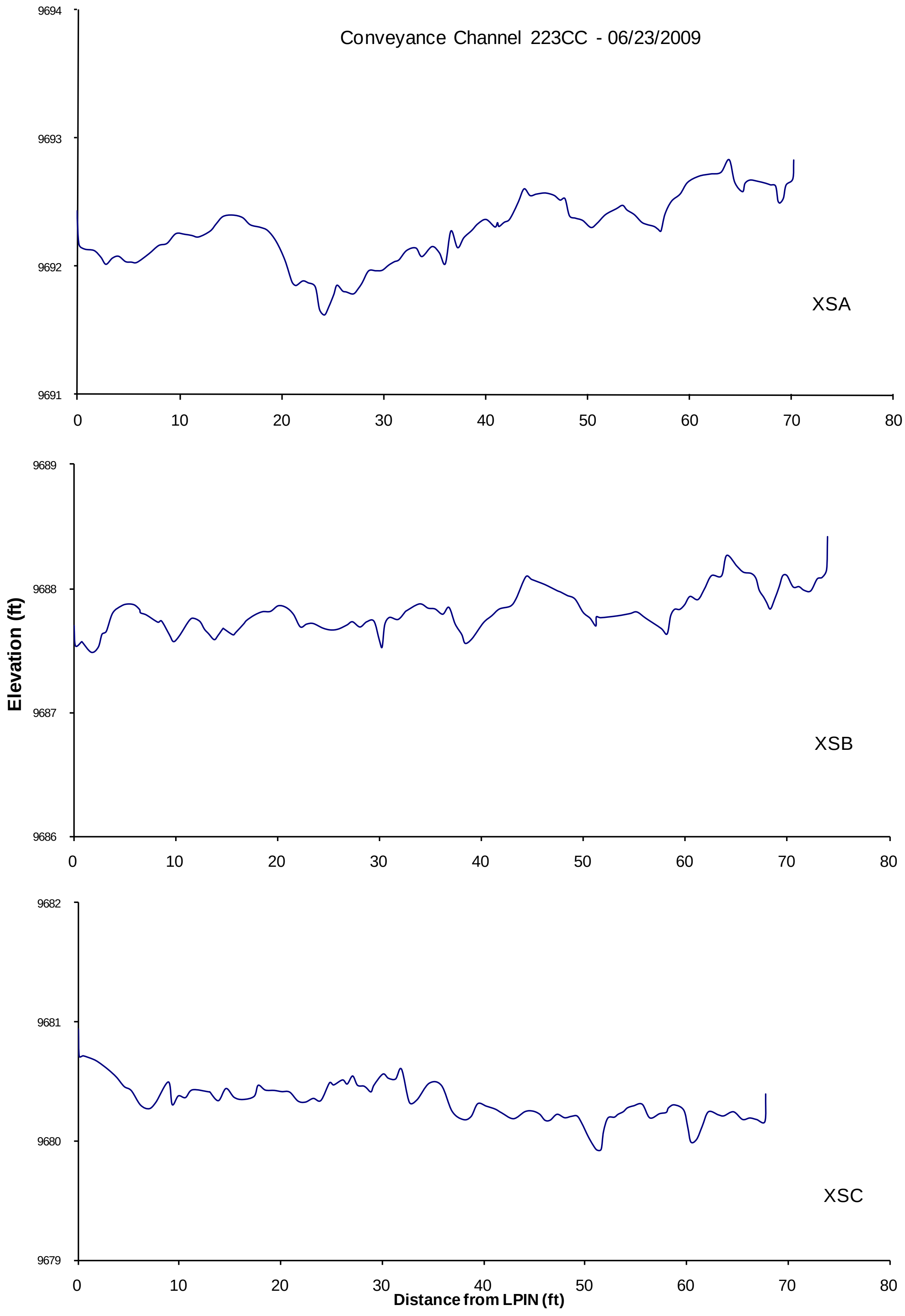
Conveyance Channel 220CC - 06/23/2009
XSA
XSB
XSC
Elevation (ft)
Distance from LPIN (ft)
8994
8993
8992
8991
8990
8986
8985
8984
8983
8982
8981
8980
8979
8978
8977
0
10
20
30
40
50
60
70

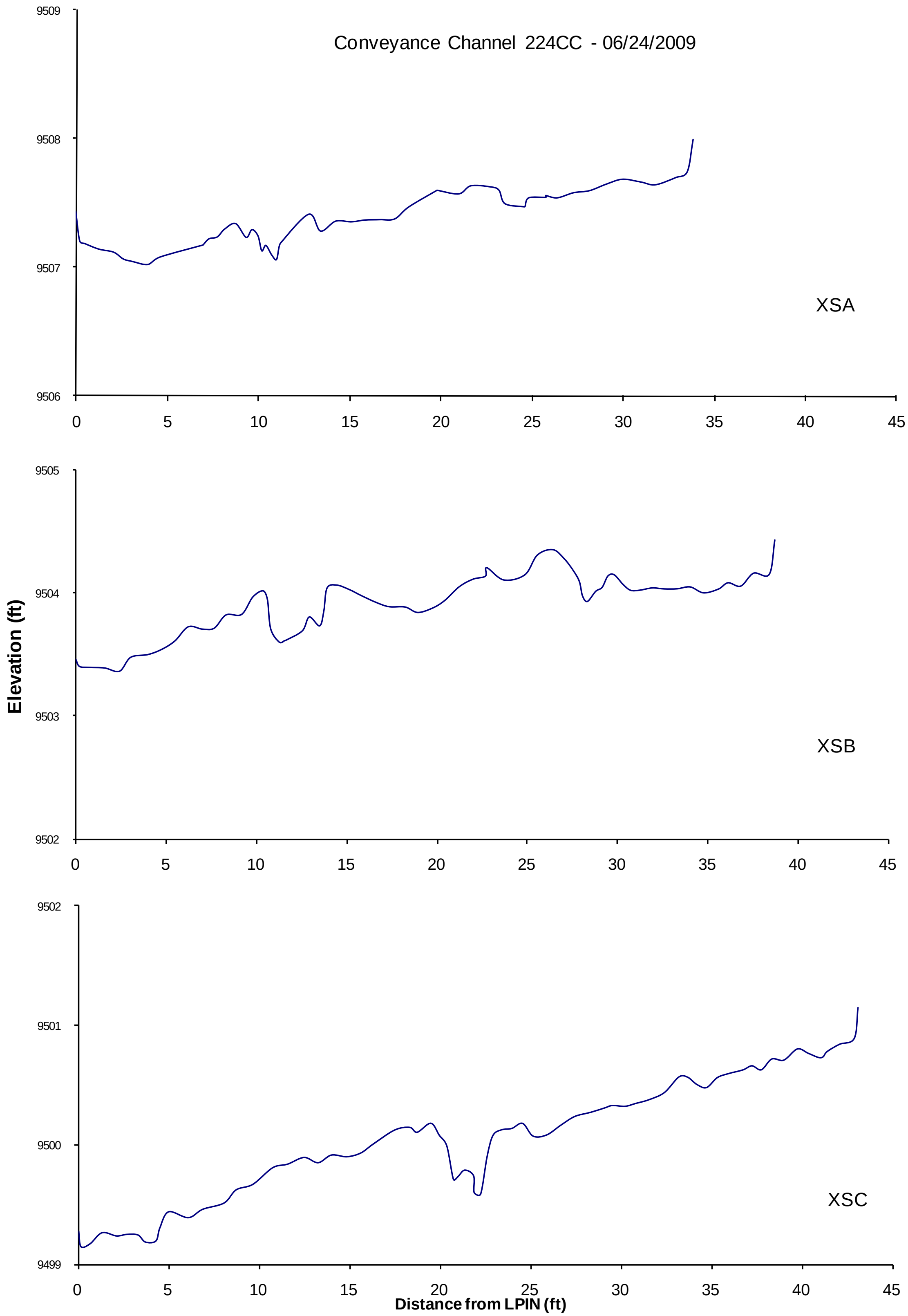


Conveyance Channel 221CC - 06/30/2009
9494
9493
9492
9491
0
5
10
15
20
25
30
35
40
XSA
Elevation (ft)
9484
9483
9482
9481
XSB
9478
9477
9476
9475
XSC
Distance from LPIN (ft)

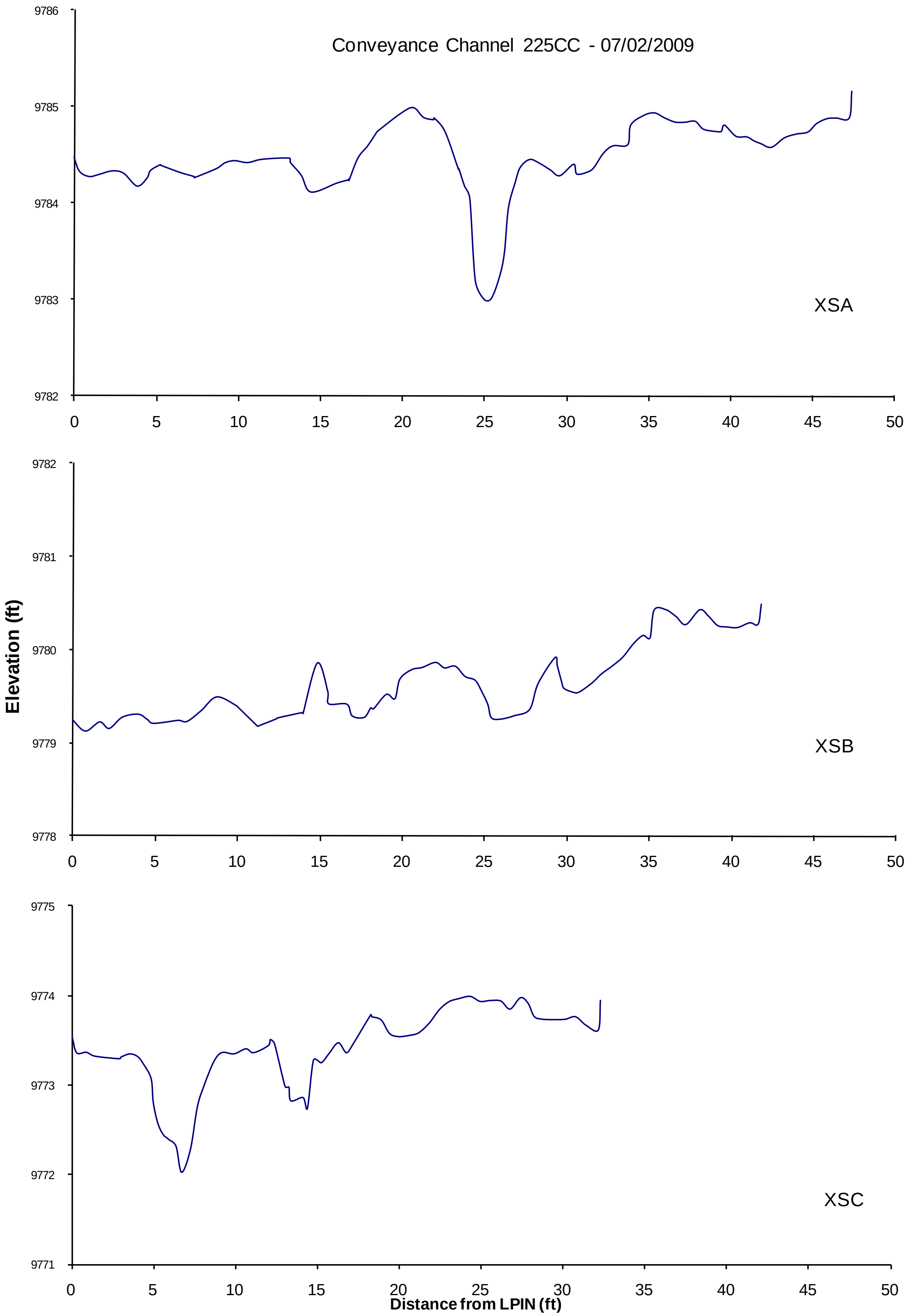


Conveyance Channel 222CC - 06/30/2009
Elevation (ft)
XSA
XSB
XSC
Distance from LPIN (ft)
9498
9497
9496
9495
9494
9493
9492
9487
9486
9485
9484
9483
9482
9481
9480
9479
9478
9477
9476
9475
9474
0
5
10
15
20
25
30
35
40
45
50

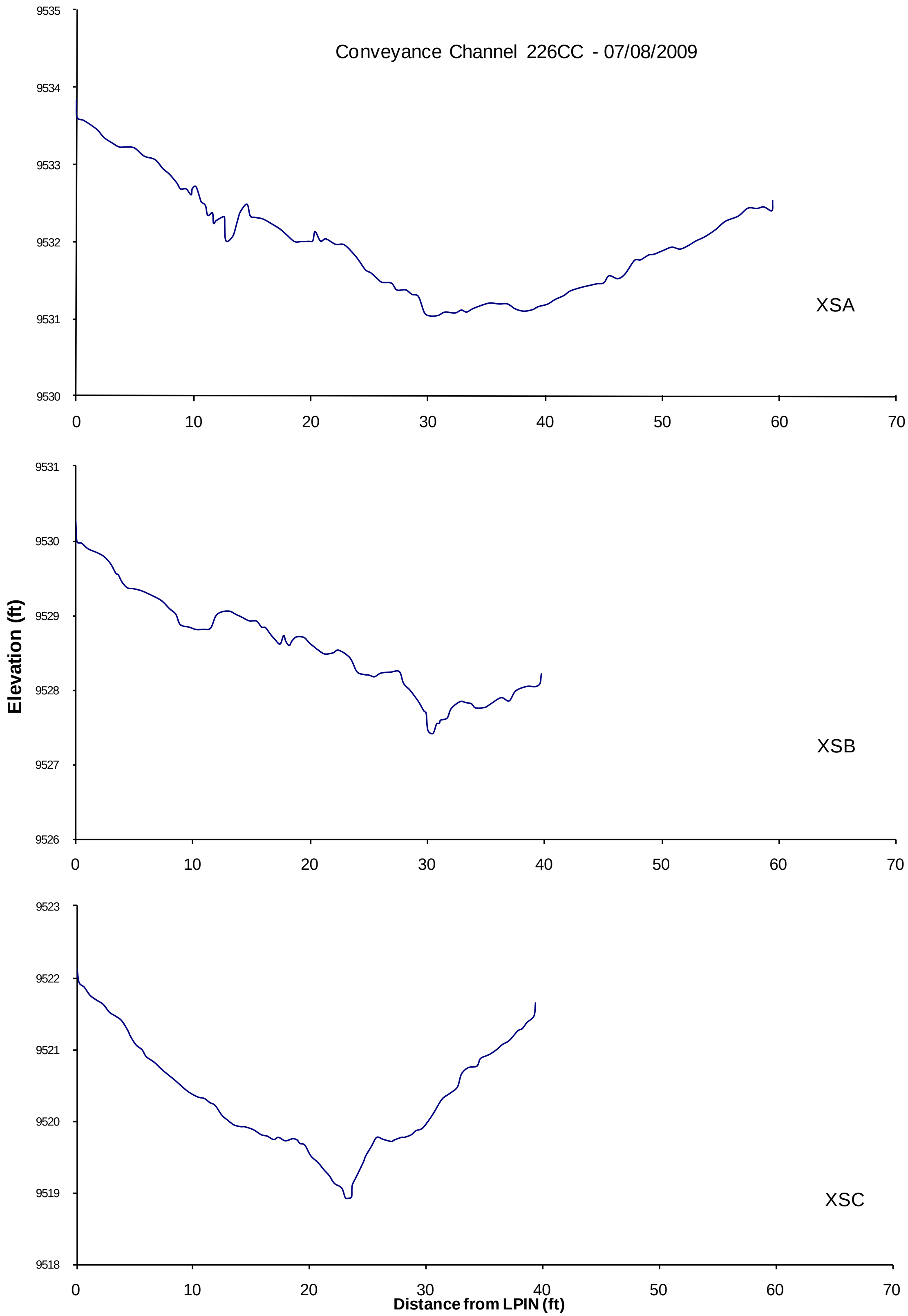

Conveyance Channel 223CC - 06/23/2009
9694
9693
9692
9691
XSA
0
10
20
30
40
50
60
70
80
9689
9688
9687
9686
XSB
9682
9681
9680
9679
XSC
Elevation (ft)
Distance from LPIN (ft)

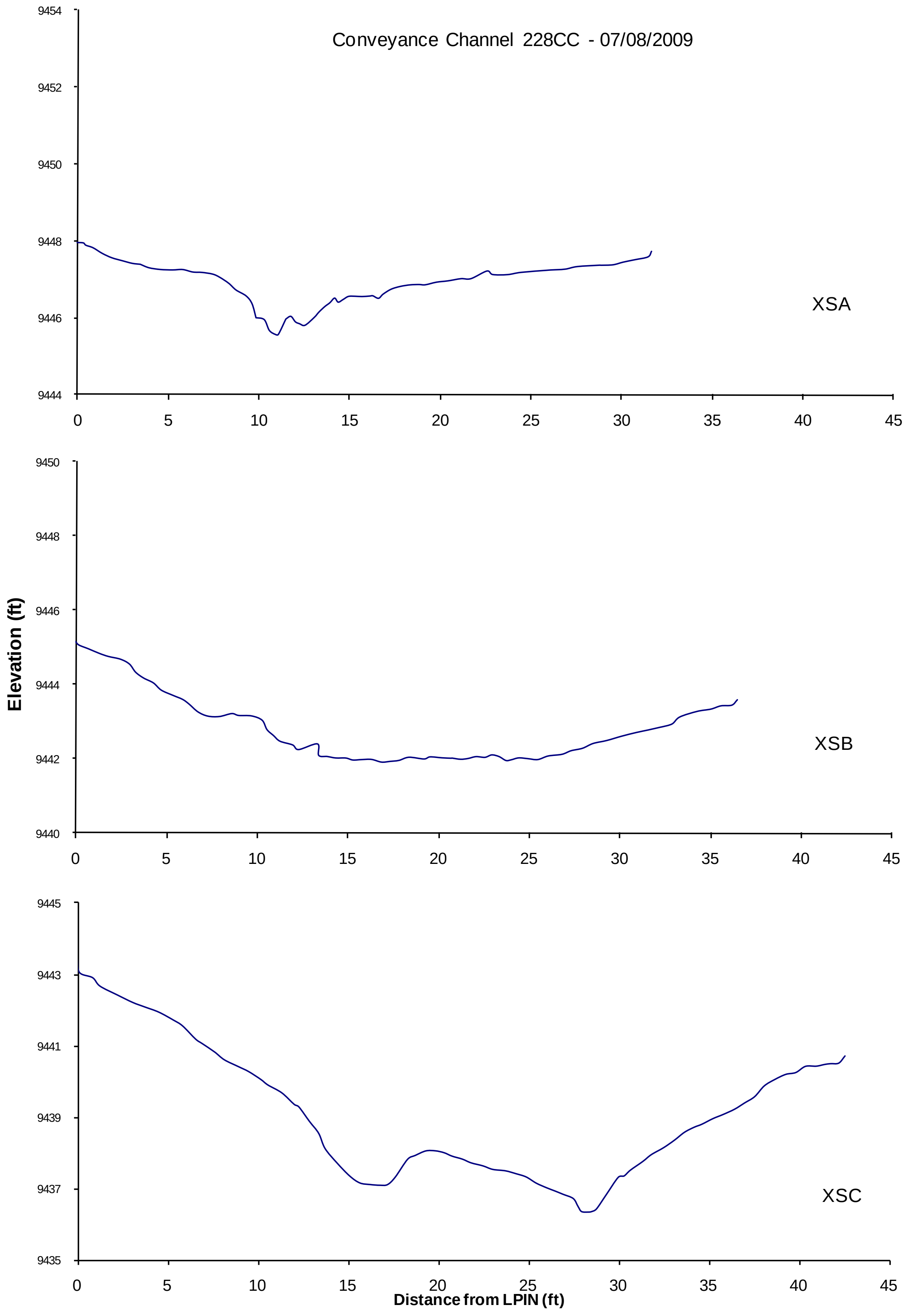


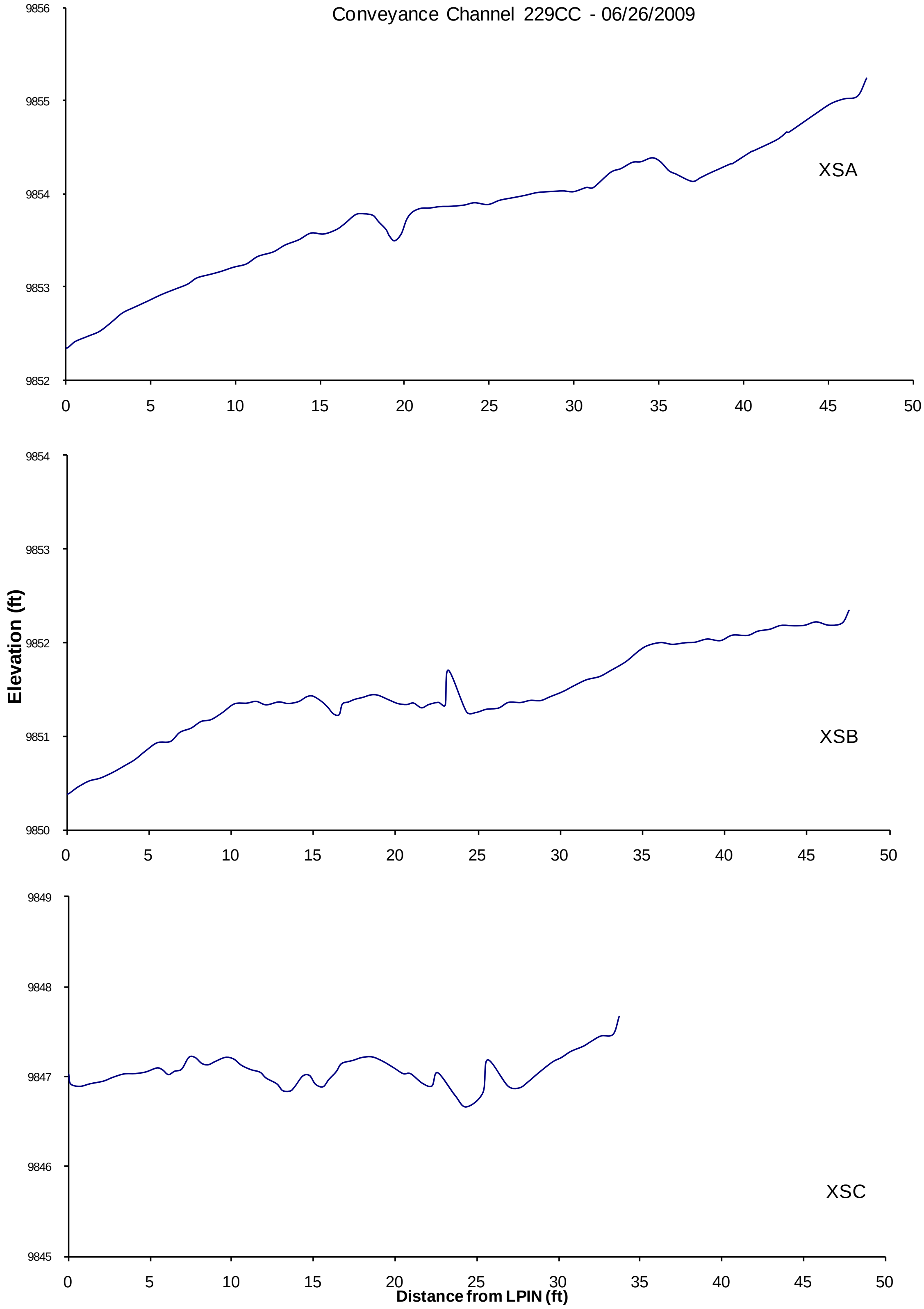
Conveyance Channel 224CC - 06/24/2009
9509
9508
9507
9506
0
5
10
15
20
25
30
35
40
45
XSA
9505
9504
9503
9502
XSB
9502
9501
9500
9499
XSC
Elevation (ft)
Distance from LPIN (ft)

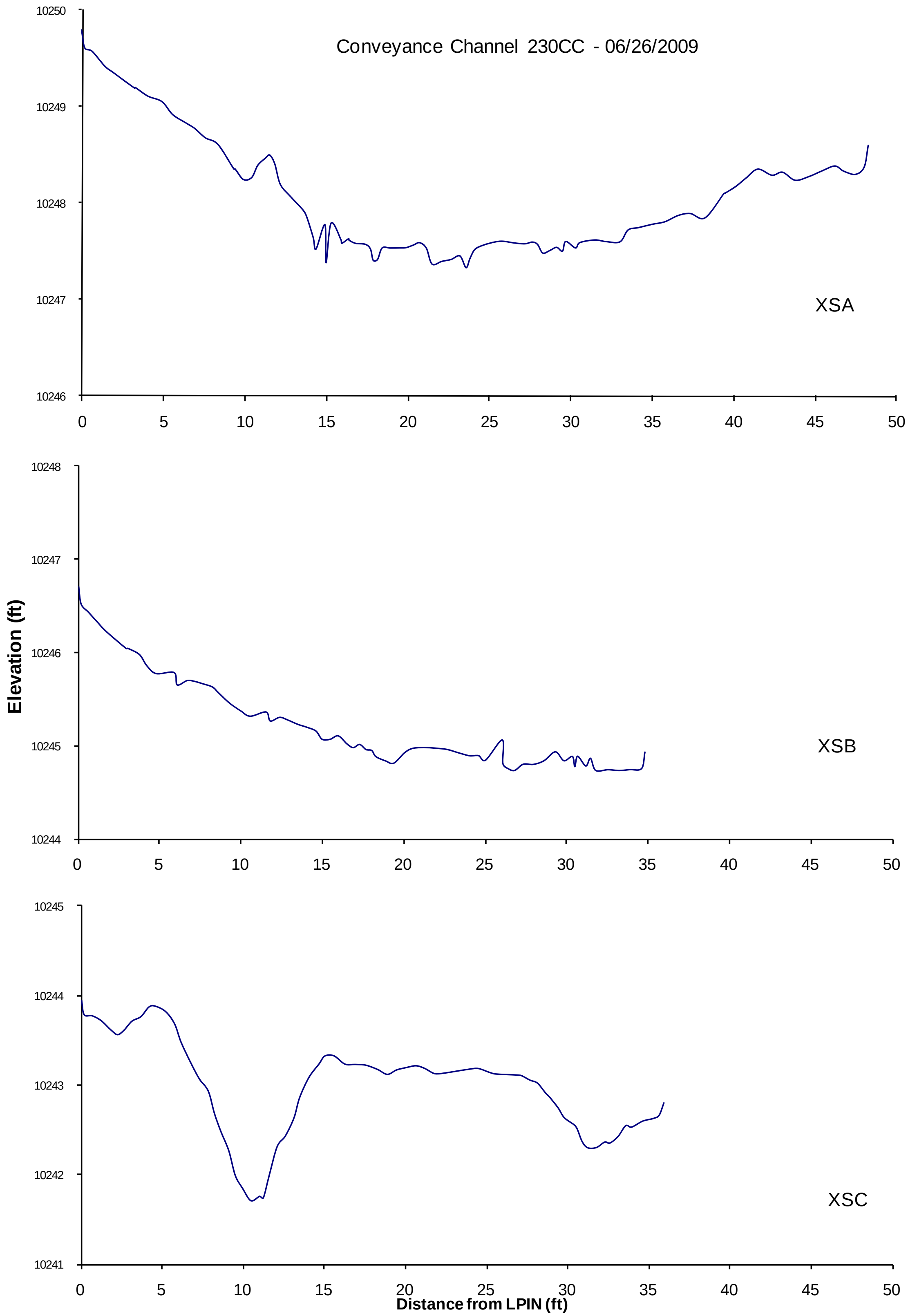


Conveyance Channel 225CC - 07/02/2009
XSA
XSB
XSC
Elevation (ft)
Distance from LPIN (ft)
9786
9785
9784
9783
9782
9781
9780
9779
9778
9775
9774
9773
9772
9771
0
5
10
15
20
25
30
35
40
45
50

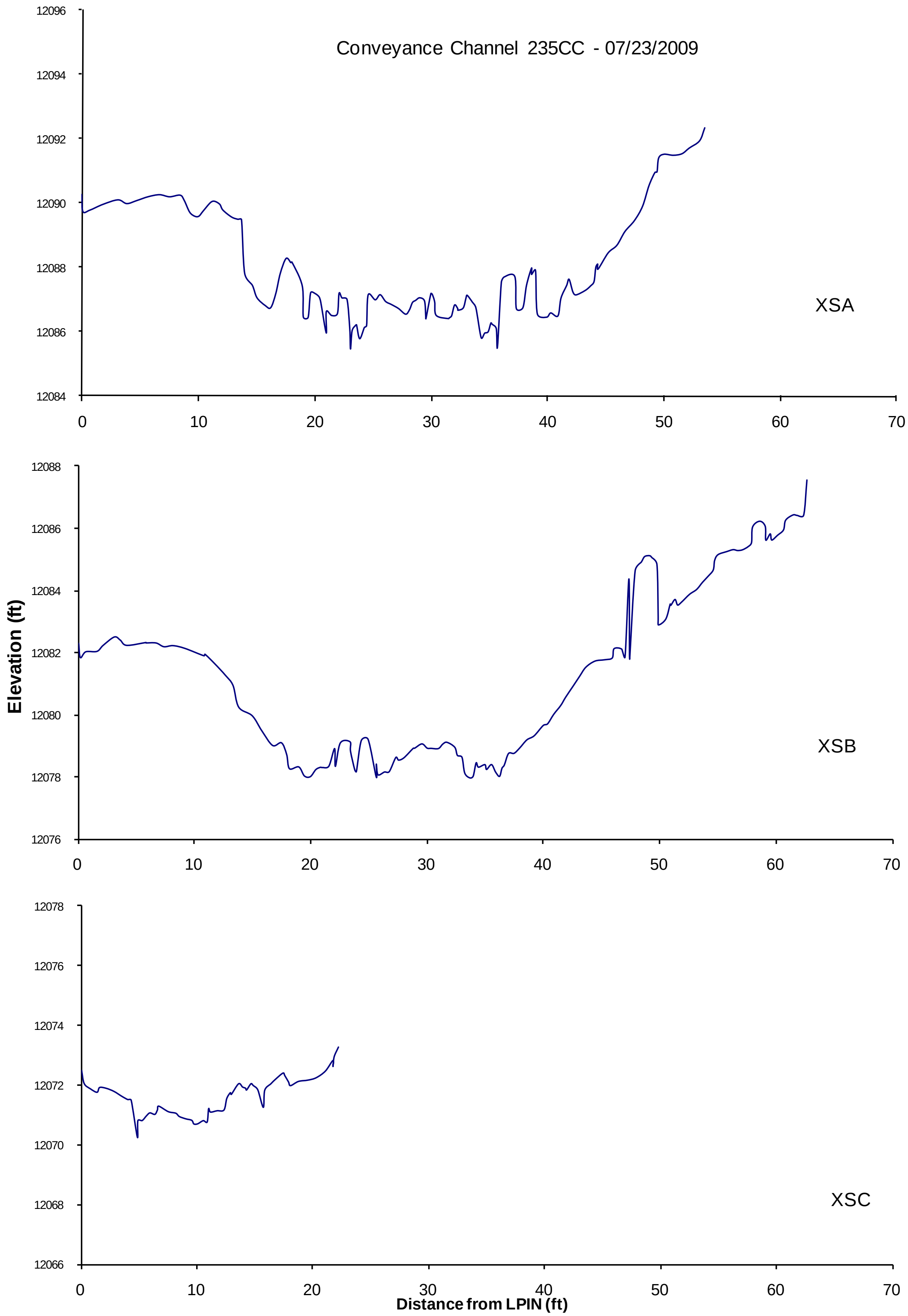

Conveyance Channel 226CC - 07/08/2009
XSA
XSB
XSC
Elevation (ft)
Distance from LPIN (ft)
9535
9534
9533
9532
9531
9530
9529
9528
9527
9526
9523
9522
9521
9520
9519
9518
0
10
20
30
40
50
60
70

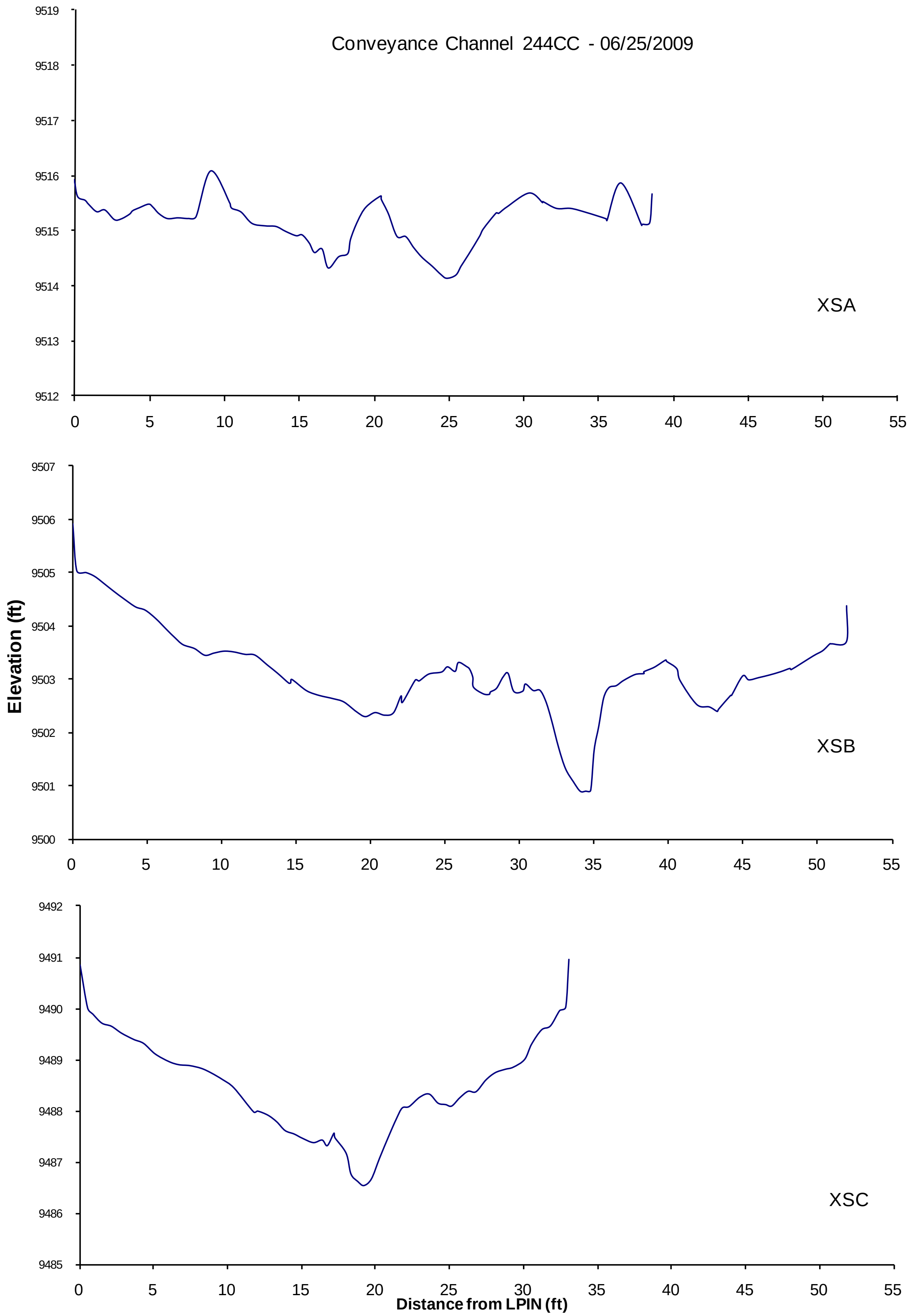

Conveyance Channel 228CC - 07/08/2009
Elevation (ft)
9454
9452
9450
9448
9446
9444
0
5
10
15
20
25
30
35
40
45
XSA
9450
9448
9446
9444
9442
9440
XSB
9445
9443
9441
9439
9437
9435
XSC
Distance from LPIN (ft)

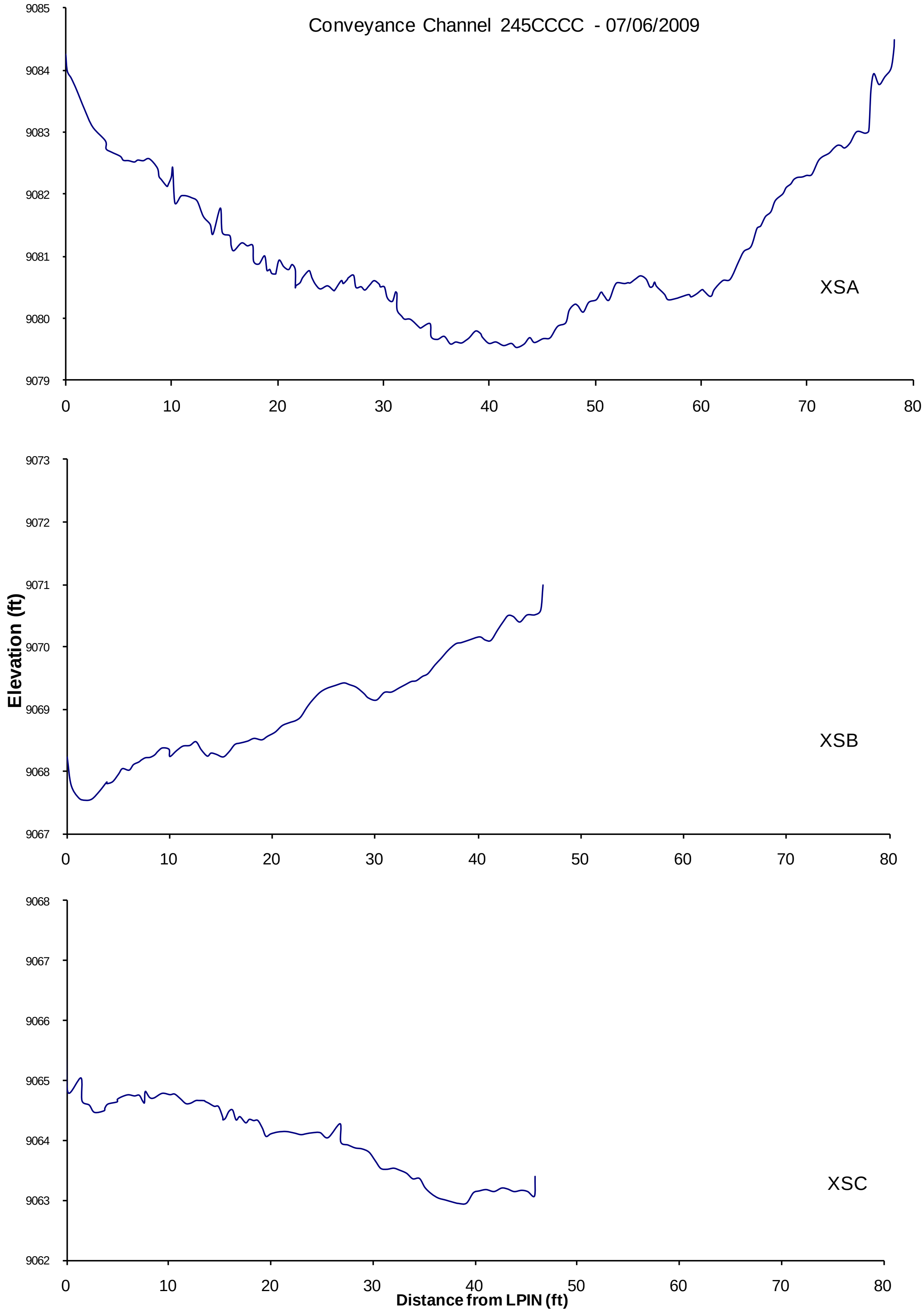

Conveyance Channel 229CC - 06/26/2009
XSA
XSB
XSC
Elevation (ft)
Distance from LPIN (ft)
9856
9855
9854
9853
9852
9851
9850
9849
9848
9847
9846
9845
0
5
10
15
20
25
30
35
40
45
50



Conveyance Channel 230CC - 06/26/2009
XSA
XSB
XSC
Elevation (ft)
Distance from LPIN (ft)
10250
10249
10248
10247
10246
10245
10244
10243
10242
10241
0
5
10
15
20
25
30
35
40
45
50


Conveyance Channel 235CC - 07/23/2009
Elevation (ft)
12096
12094
12092
12090
12088
12086
12084
0
10
20
30
40
50
60
70
XSA
12088
12086
12084
12082
12080
12078
12076
XSB
12078
12076
12074
12072
12070
12068
12066
XSC
Distance from LPIN (ft)


Conveyance Channel 244CC - 06/25/2009
XSA
XSB
XSC
Elevation (ft)
Distance from LPIN (ft)
9519
9518
9517
9516
9515
9514
9513
9512
9507
9506
9505
9504
9503
9502
9501
9500
9492
9491
9490
9489
9488
9487
9486
9485
0 5 10 15 20 25 30 35 40 45 50 55

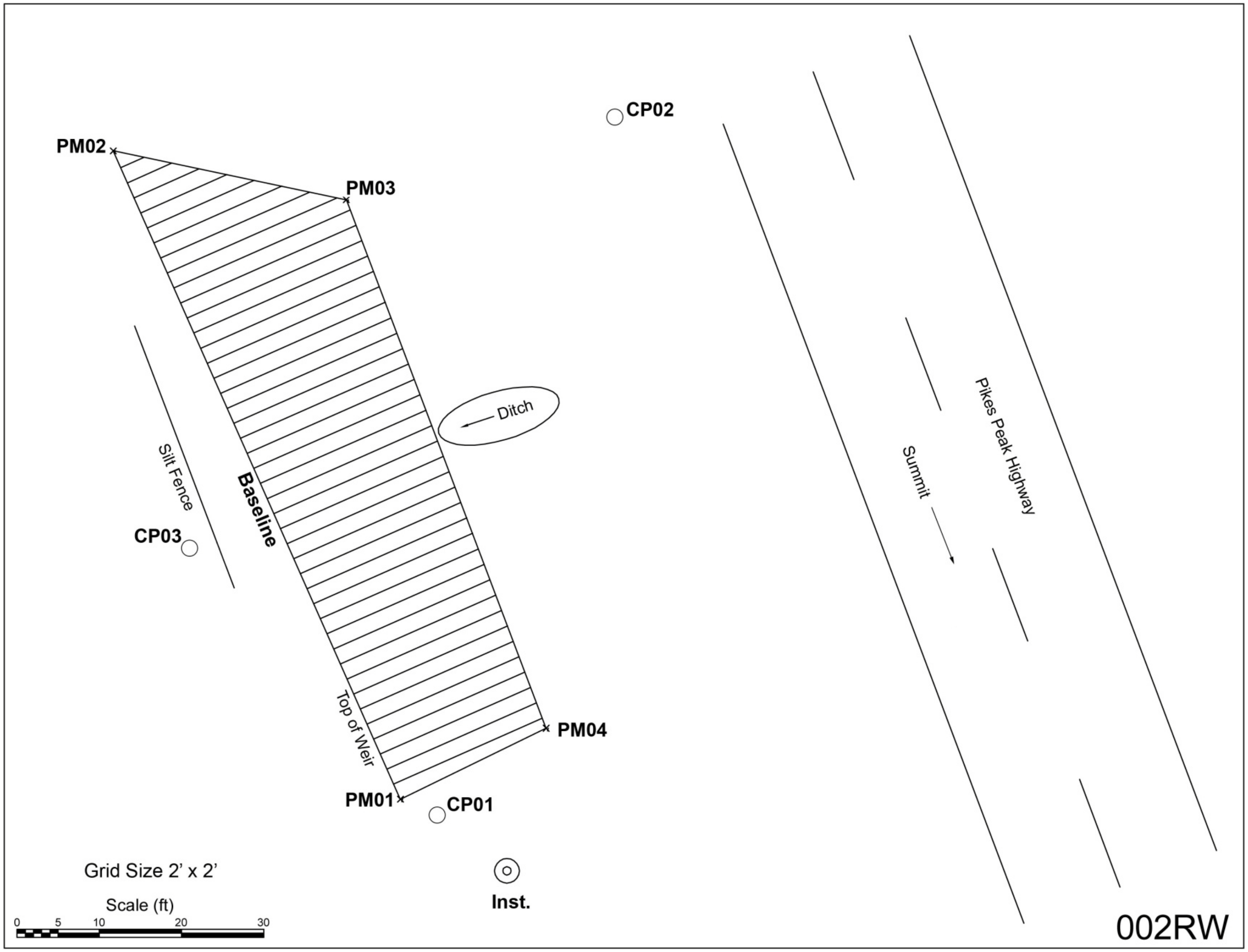

Conveyance Channel 245CCCC - 07/06/2009
XSA
XSB
XSC
Elevation (ft)
Distance from LPIN (ft)
9085
9084
9083
9082
9081
9080
9079
9073
9072
9071
9070
9069
9068
9067
9068
9067
9066
9065
9064
9063
9062
0
10
20
30
40
50
60
70
80

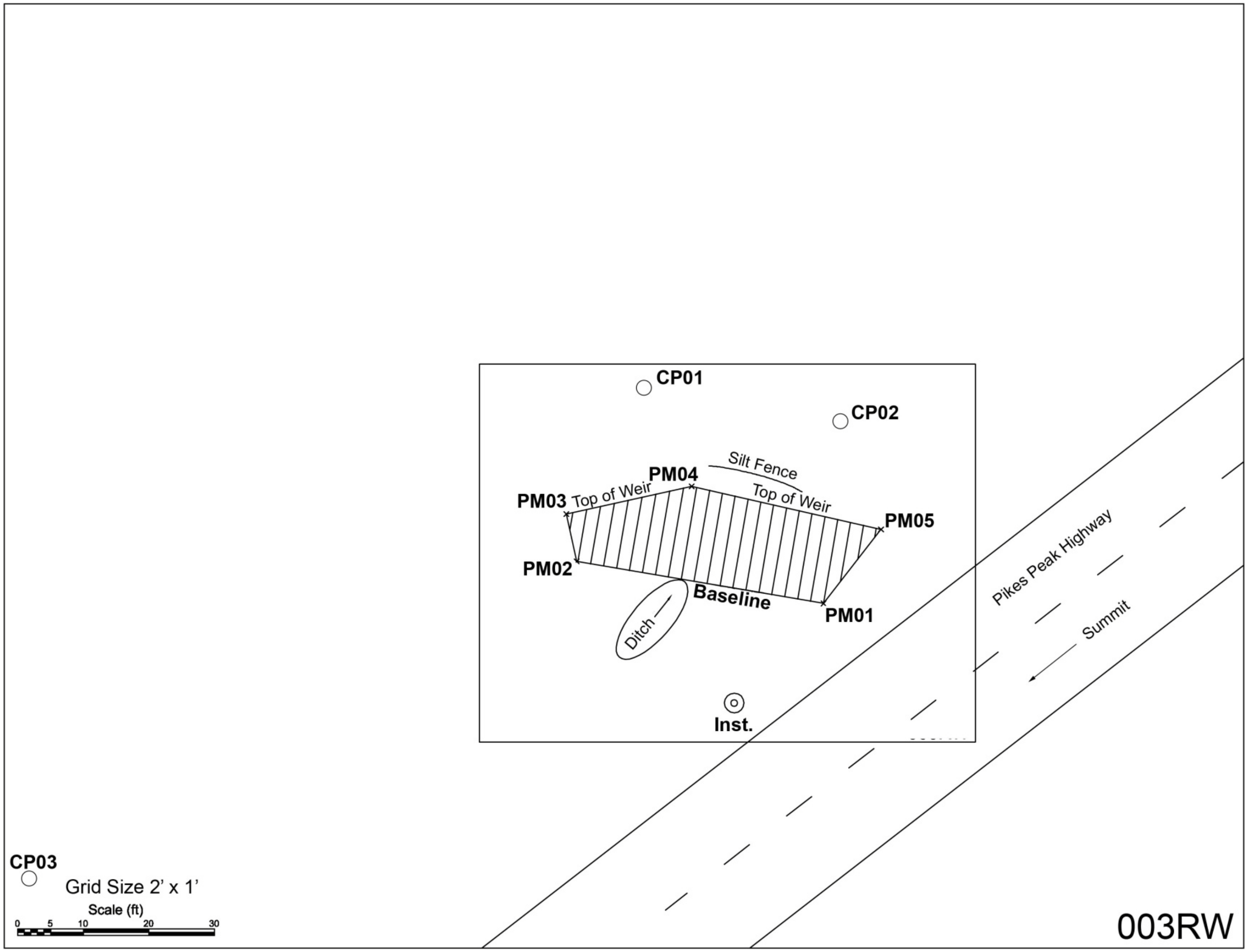
Appendix J

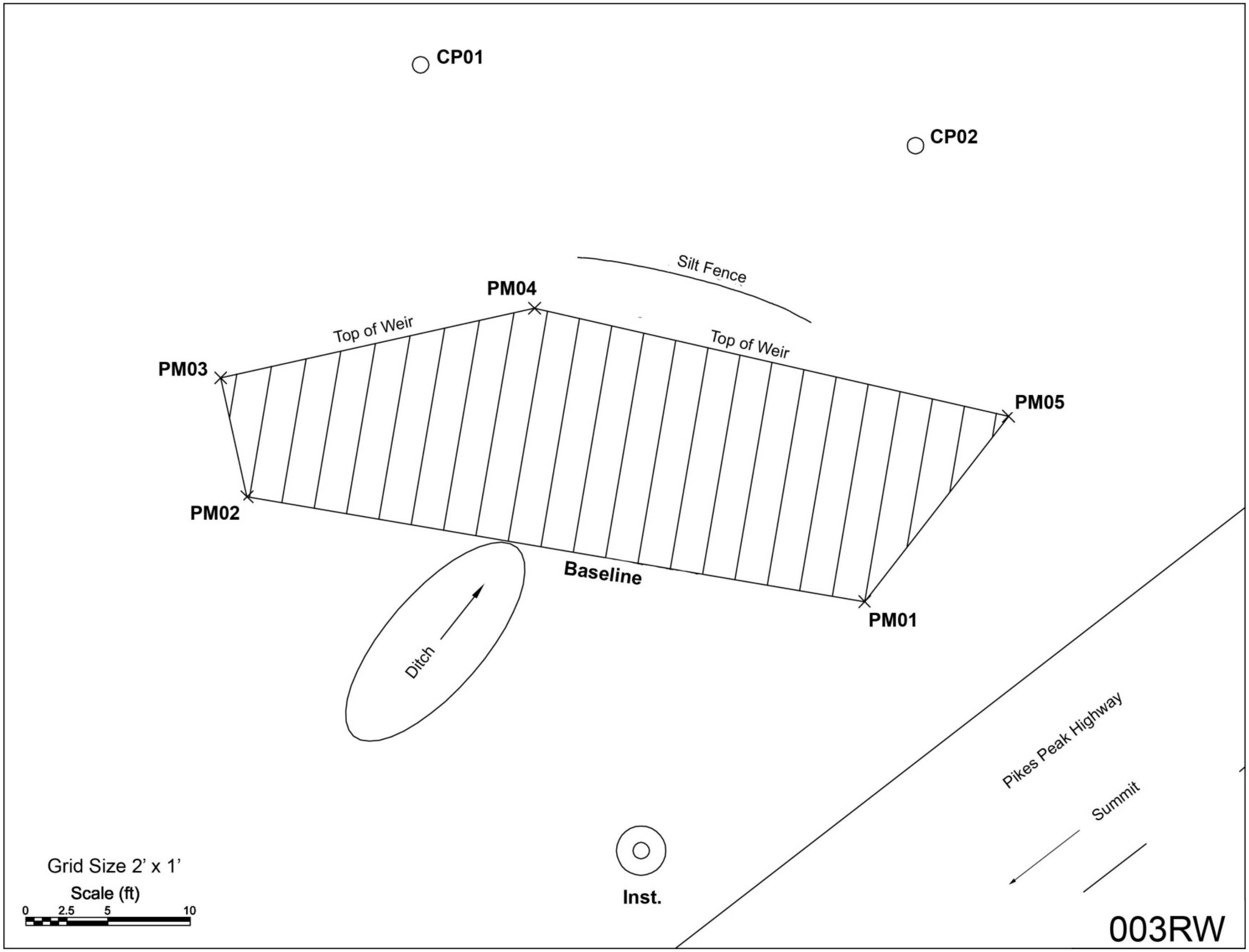
Rock Weir

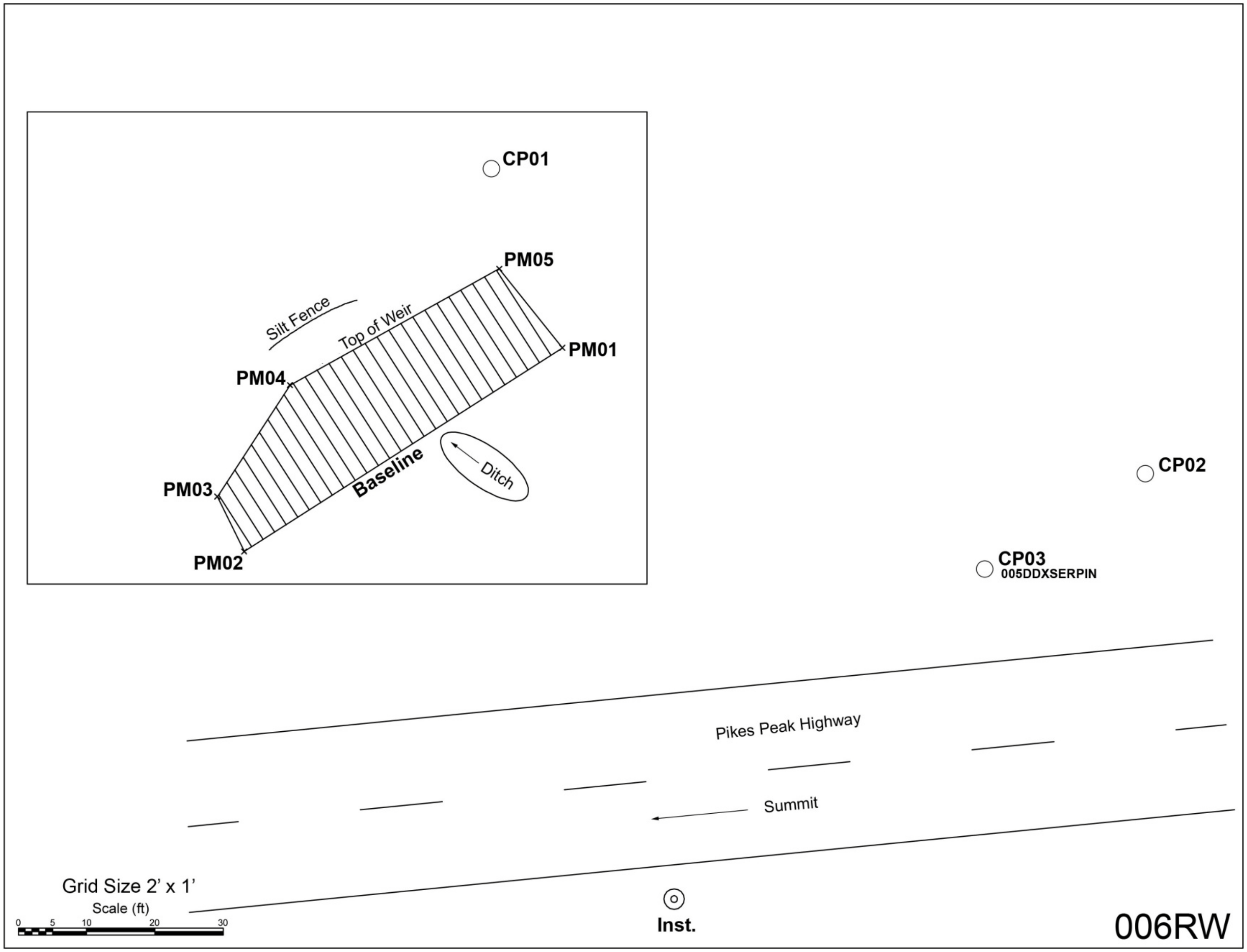
Survey Maps

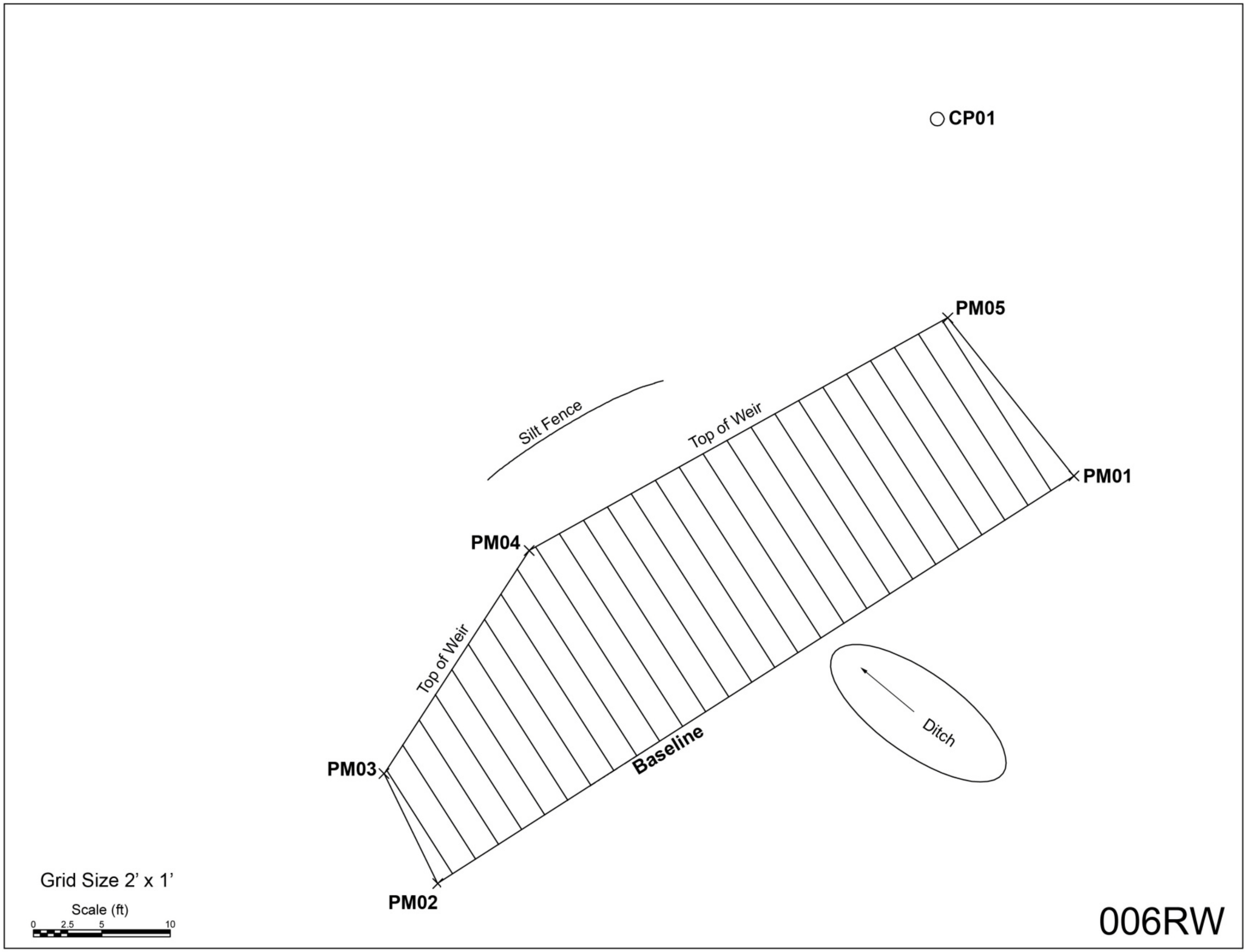
2009

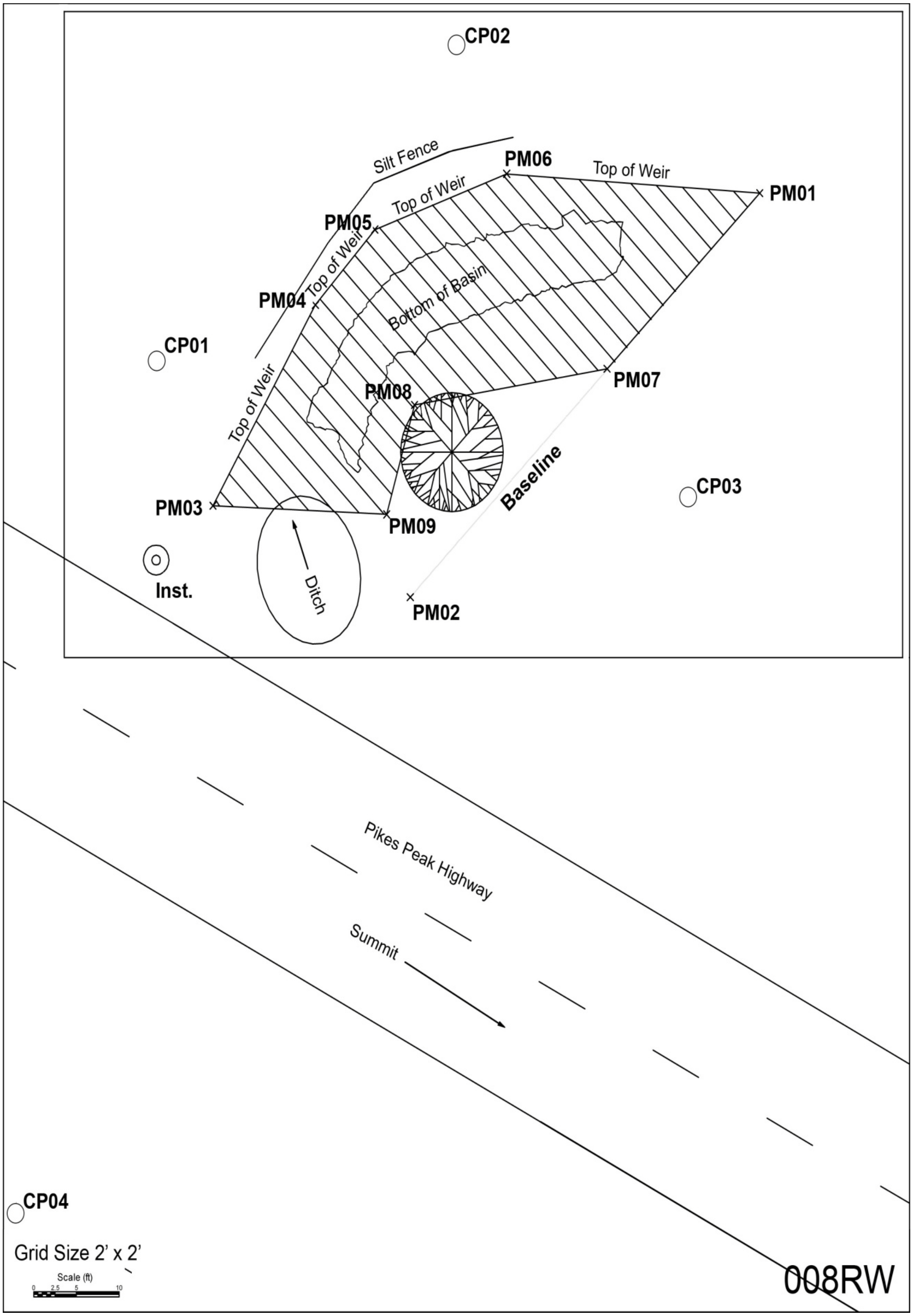

CP02
PM02
PM03
Ditch
Silt Fence
Baseline
CP03
Summit
Pikes Peak Highway
Top of Weir
PM04
PM01
CP01
Grid Size 2' x 2'
Scale (ft)
0 5 10 20 30
Inst.
002RW


CP01
CP02
Silt Fence
PM04
PM03
Top of Weir
Top of Weir
PM05
PM02
Baseline
PM01
Ditch
Inst.
Pikes Peak Highway
Summit
CP03
Grid Size 2' x 1'
Scale (ft)
0 5 10 20 30
003RW

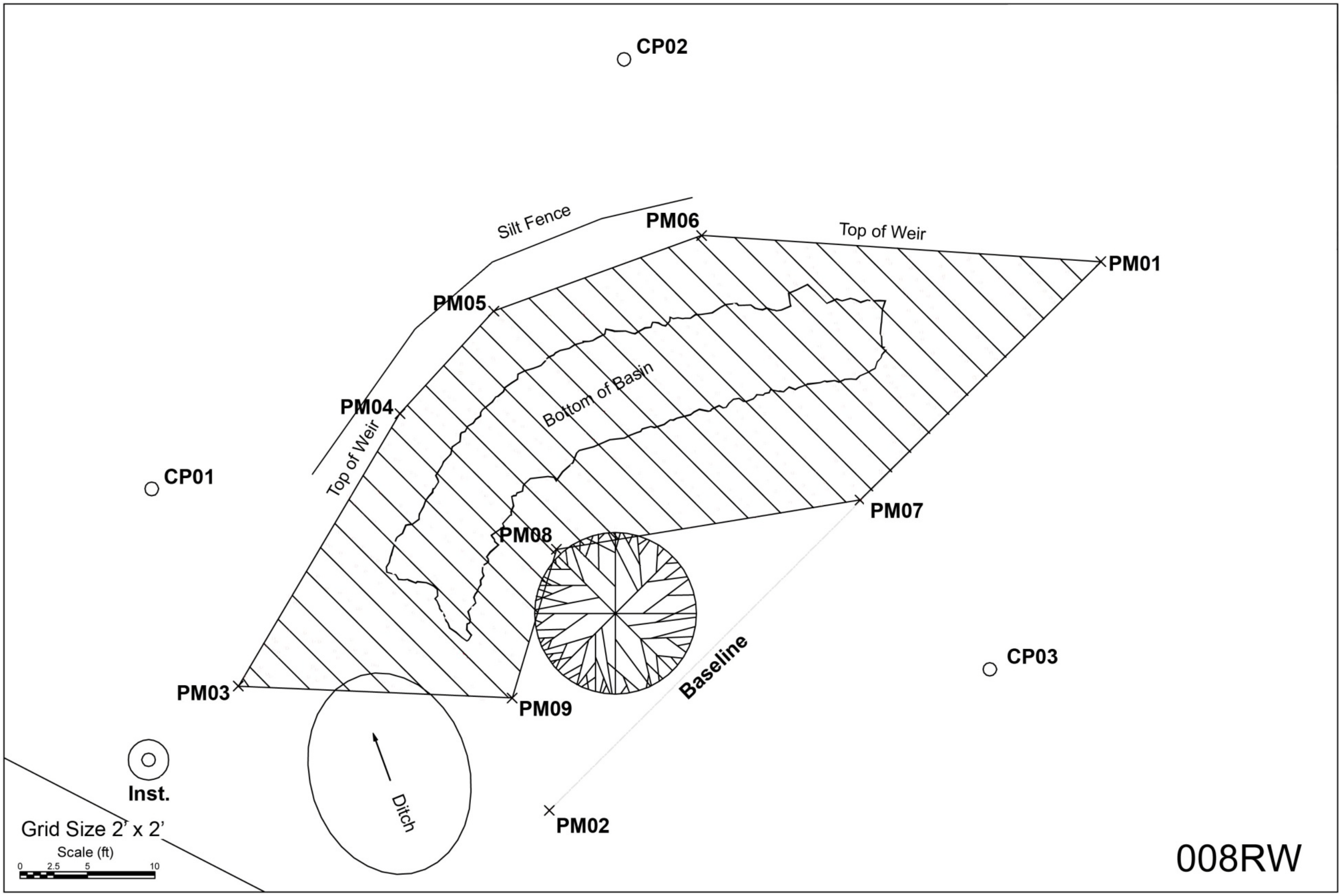

CP01
CP02
Silt Fence
PM04
Top of Weir
Top of Weir
PM03
PM05
PM02
Baseline
PM01
Ditch
Pikes Peak Highway
Summit
Grid Size 2' x 1'
Scale (ft)
0 2.5 5 10
Inst.
003RW

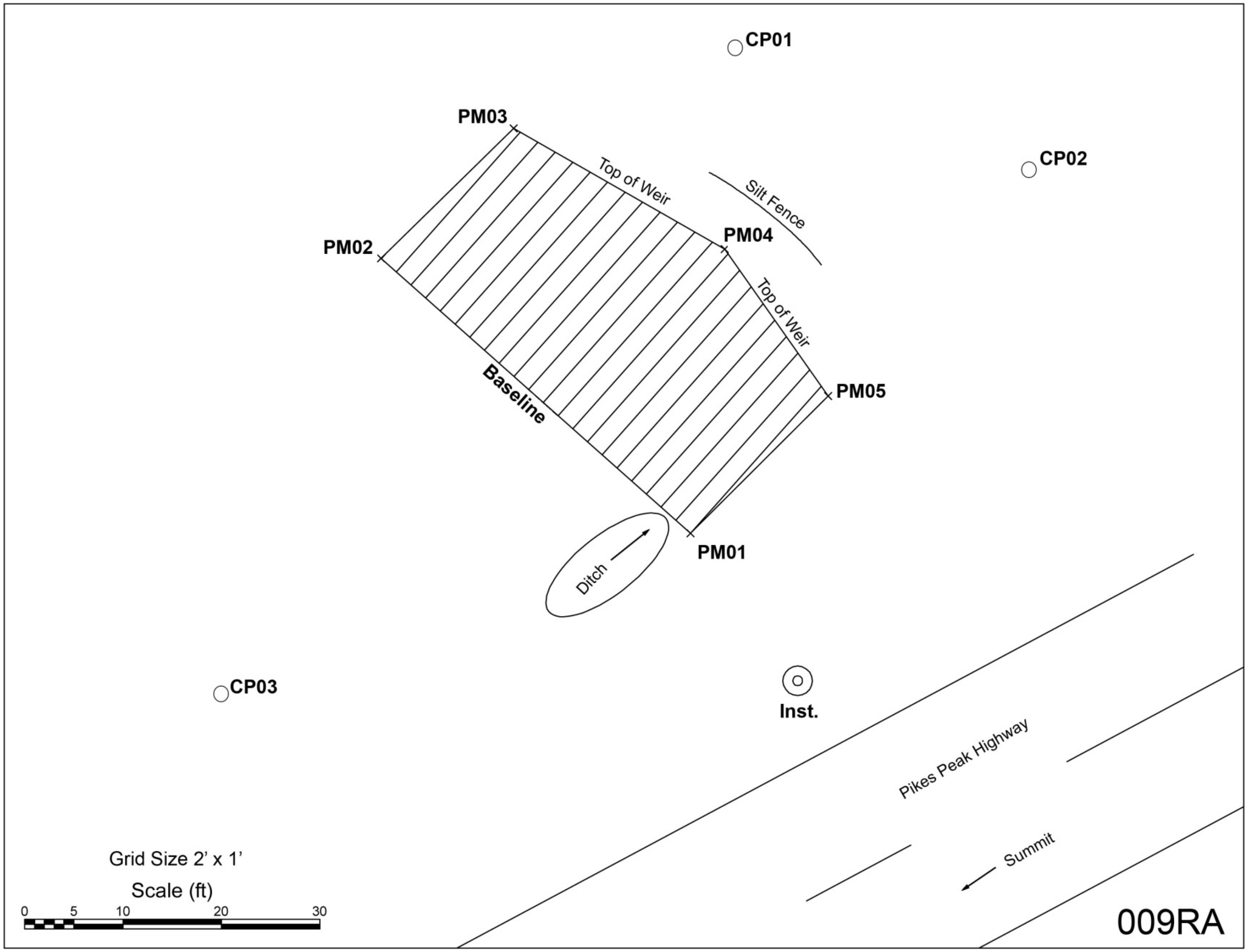

CP01
PM05
Silt Fence
Top of Weir
PM01
PM04
Baseline
Ditch
PM03
PM02
CP02
CP03
005DDXSERPIN
Pikes Peak Highway
Summit
Grid Size 2' x 1'
Scale (ft)
0
5
10
20
30
Inst.
006RW

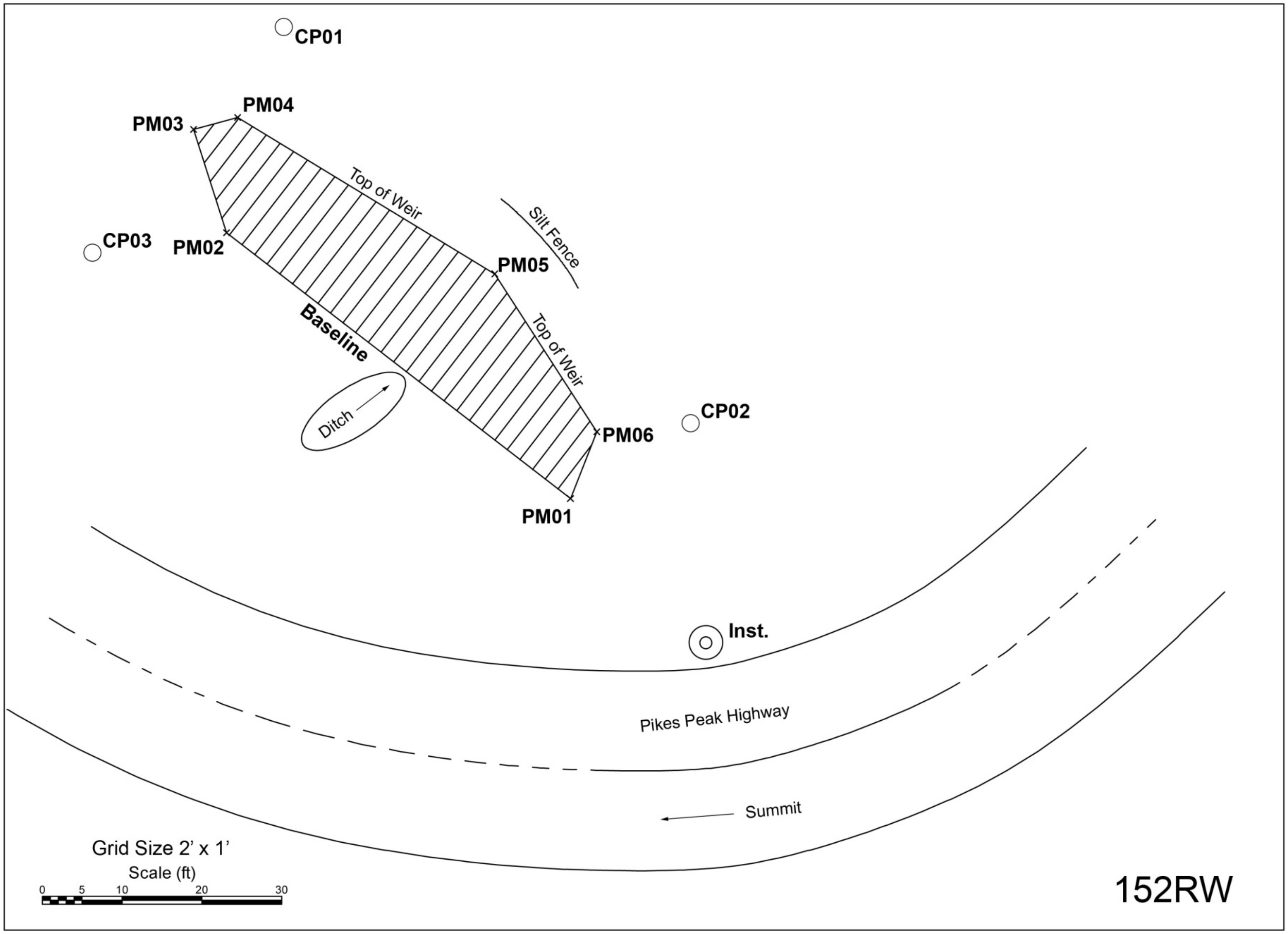

CP01
PM05
PM01
PM04
PM03
PM02
Silt Fence
Top of Weir
Top of Weir
Baseline
Ditch
Grid Size 2' x 1'
Scale (ft)
0 2.5 5 10
006RW

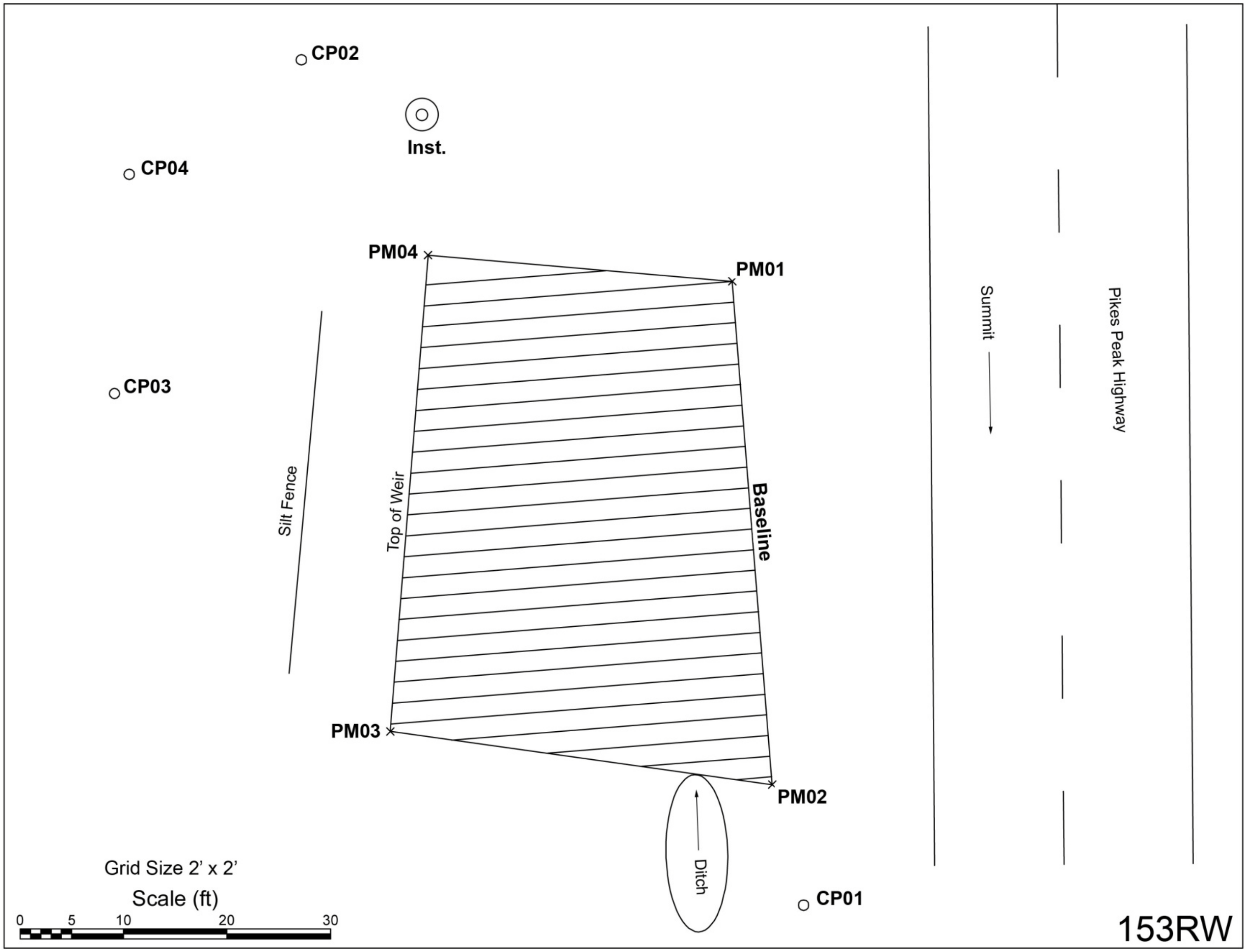


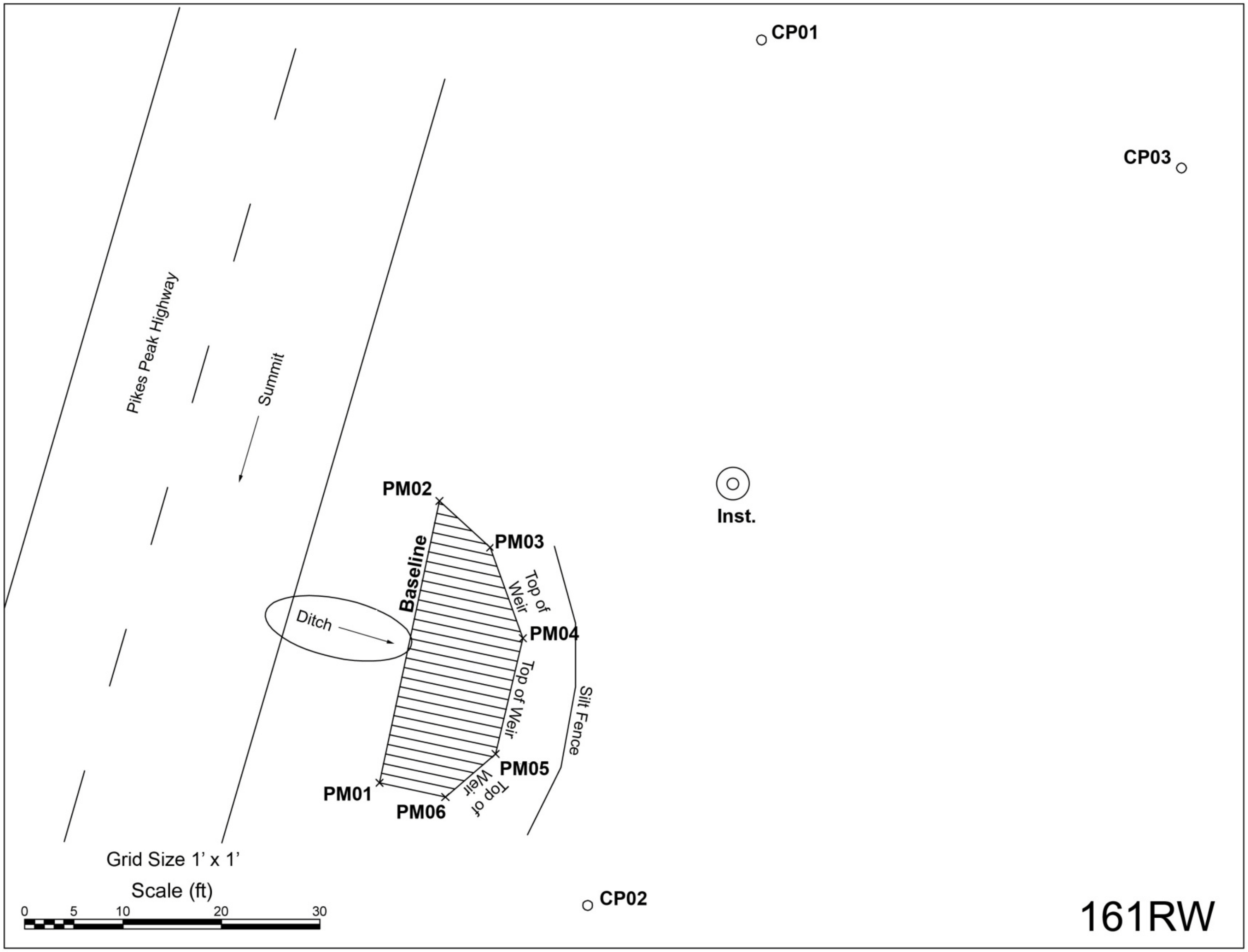
CP02
Silt Fence
PM06
Top of Weir
PM01
Top of Weir
PM05
Top of Weir
PM04
Bottom of Basin
CP01
Top of Weir
PM08
PM07
Baseline
CP03
PM03
PM09
Inst.
Ditch
PM02
Pikes Peak Highway
Summit
CP04
Grid Size 2' x 2'
Scale (ft)
0 2.5 5 10
008RW


CP02
Silt Fence
PM06
Top of Weir
PM01
PM05
Bottom of Basin
PM04
Top of Weir
CP01
PM07
PM08
Baseline
CP03
PM03
PM09
Inst.
Ditch
PM02
Grid Size 2' x 2'
Scale (ft)
0
2.5
5
10
008RW

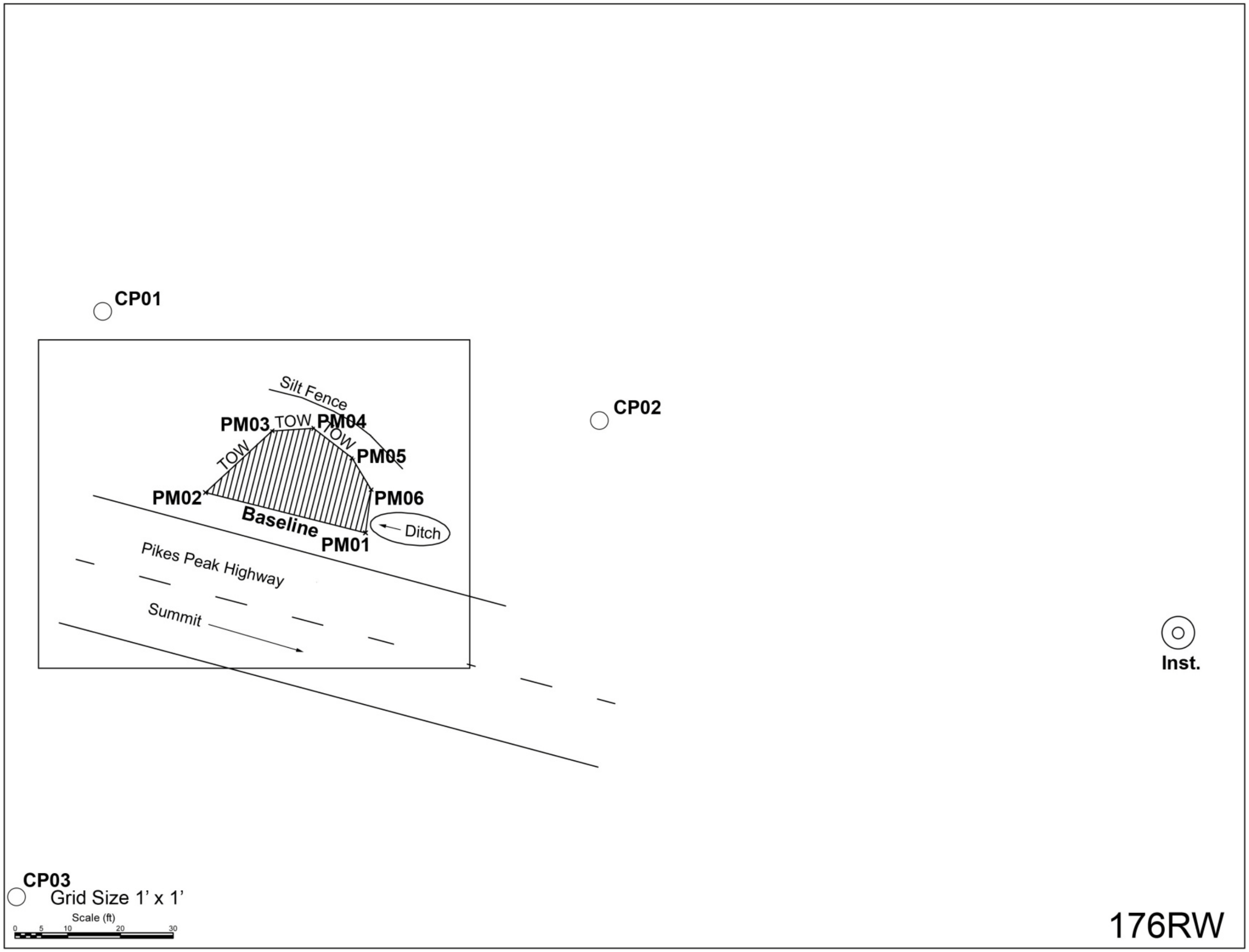

CP01
PM03
CP02
Top of Weir
Silt Fence
PM02
PM04
Top of Weir
PM05
Baseline
PM01
Ditch
CP03
Inst.
Pikes Peak Highway
Summit
Grid Size 2' x 1'
Scale (ft)
0 5 10 20 30
009RA

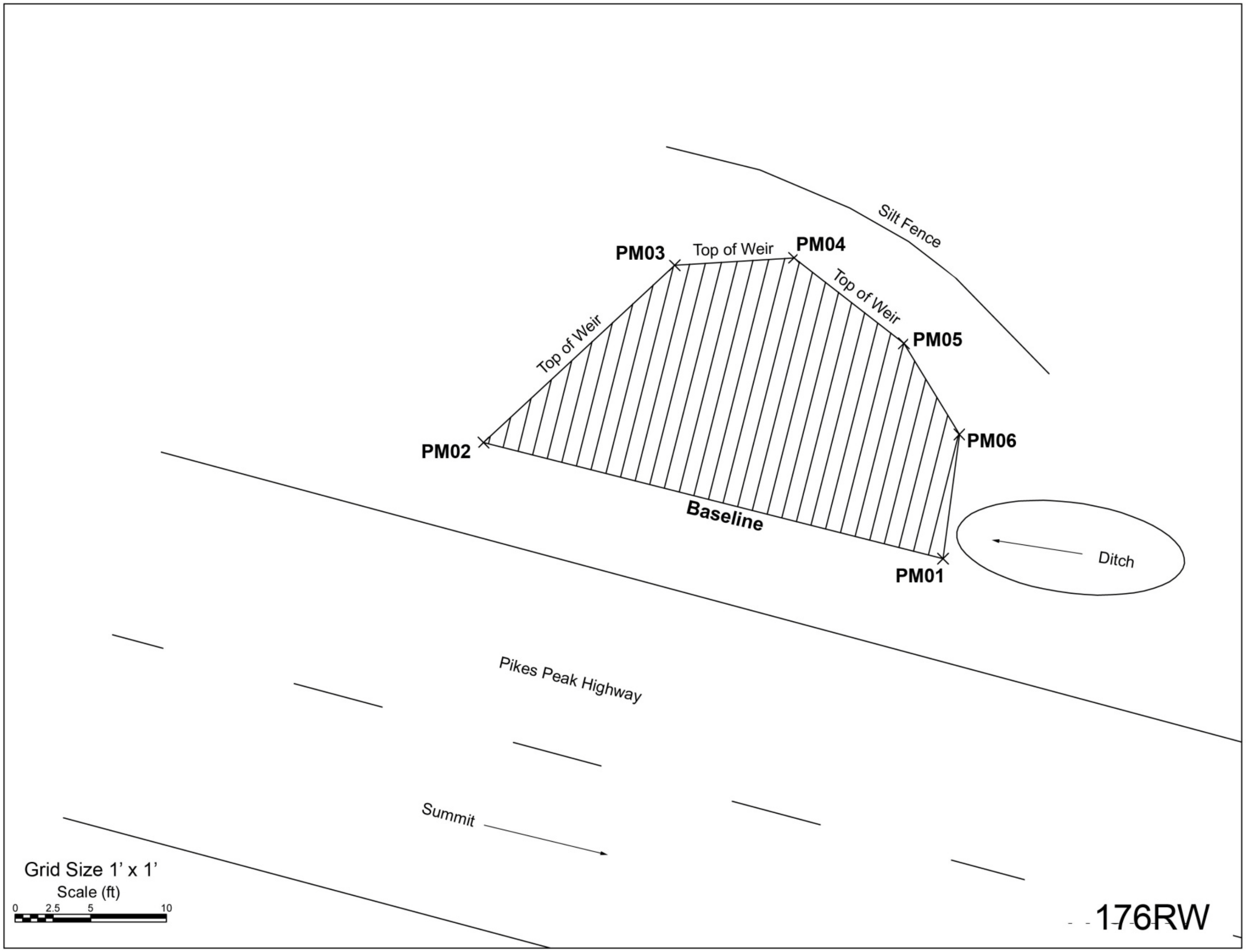

CP01
PM04
PM03
Top of Weir
Silt Fence
CP03
PM02
PM05
Baseline
Top of Weir
Ditch
CP02
PM06
PM01
Inst.
Pikes Peak Highway
Summit
Grid Size 2' x 1'
Scale (ft)
0
5
10
20
30
152RW

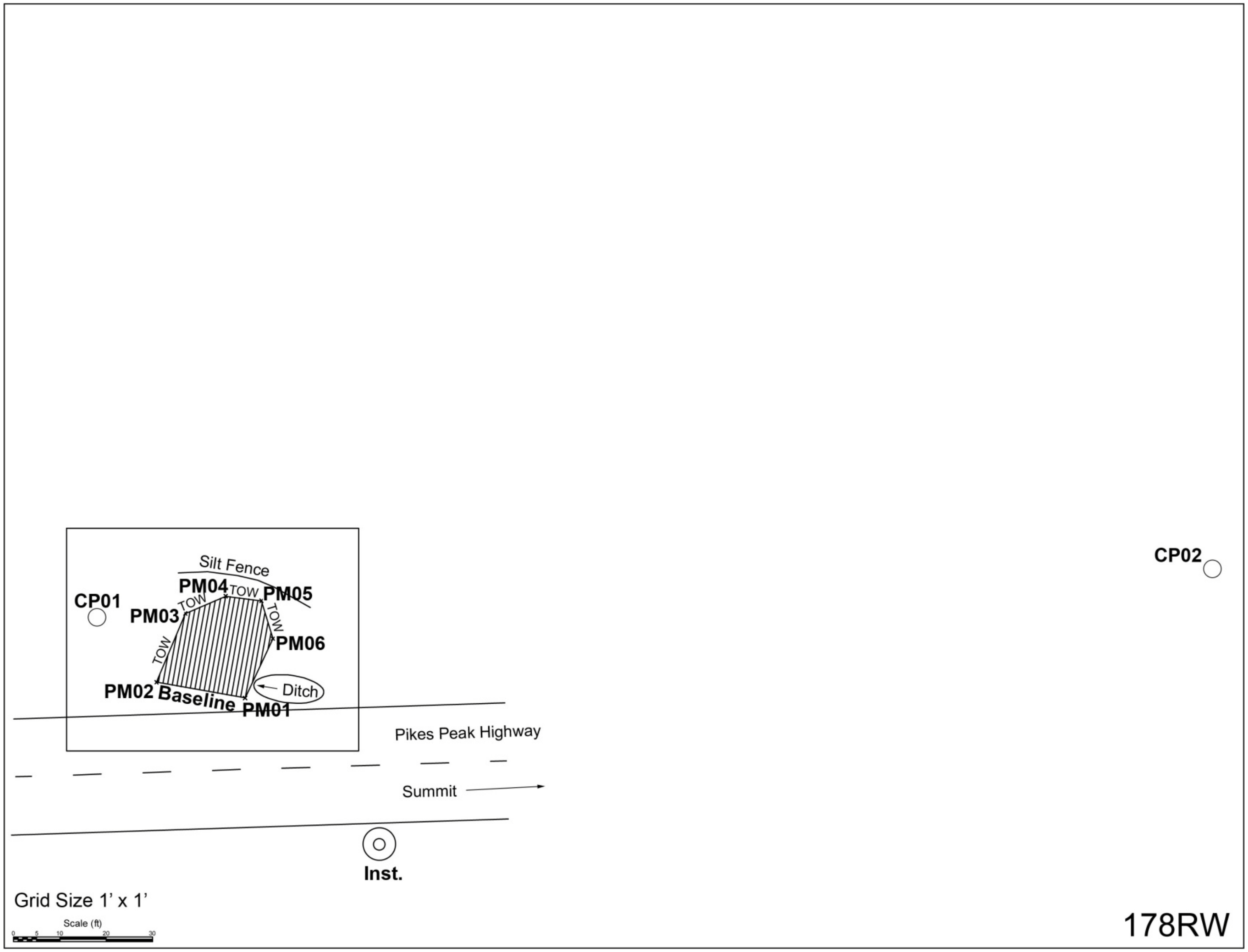

CP02
Inst.
CP04
CP03
PM04
PM01
Silt Fence
Top of Weir
Baseline
Summit
Pikes Peak Highway
PM03
PM02
Ditch
CP01
Grid Size 2' x 2'
Scale (ft)
0
5
10
20
30
153RW

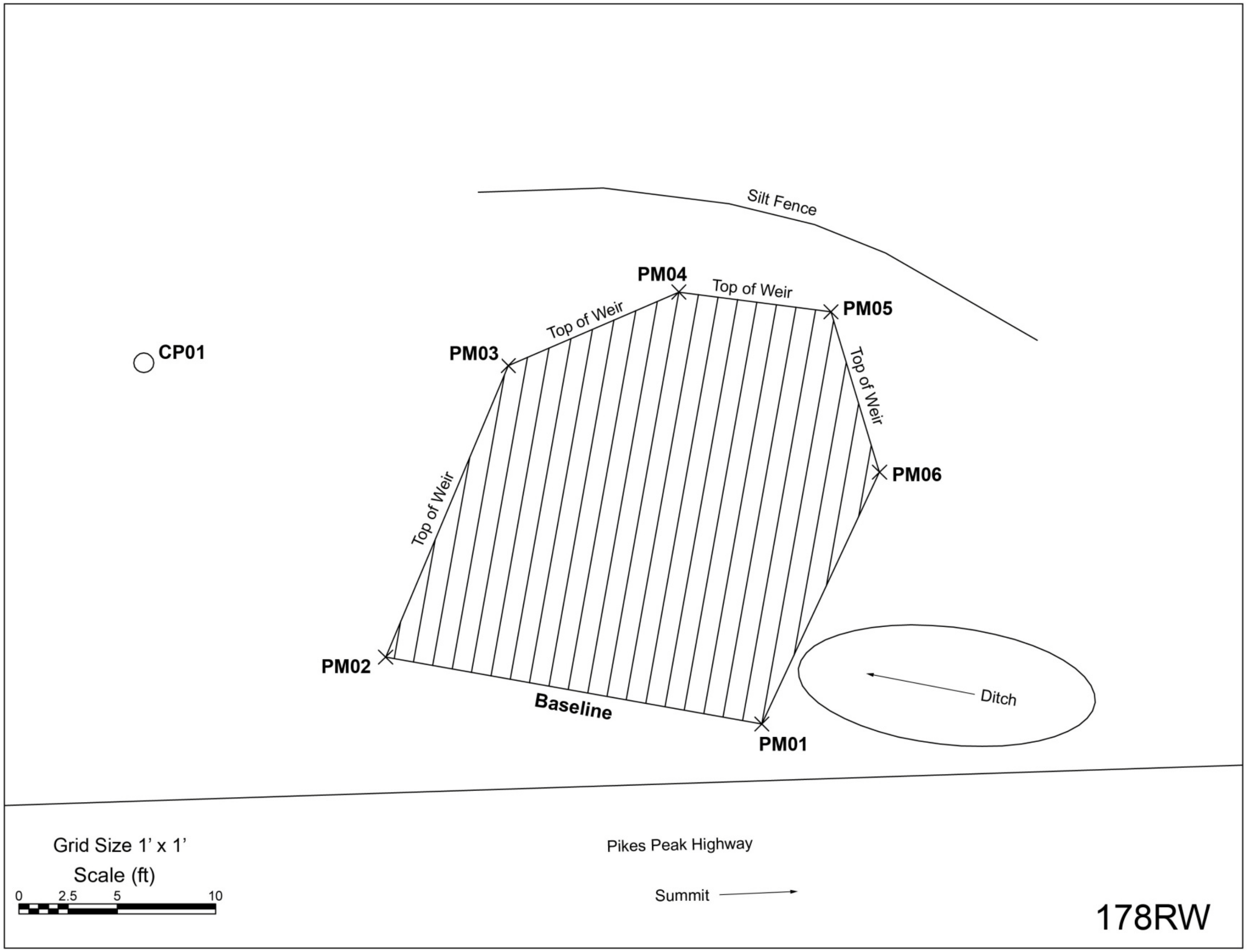


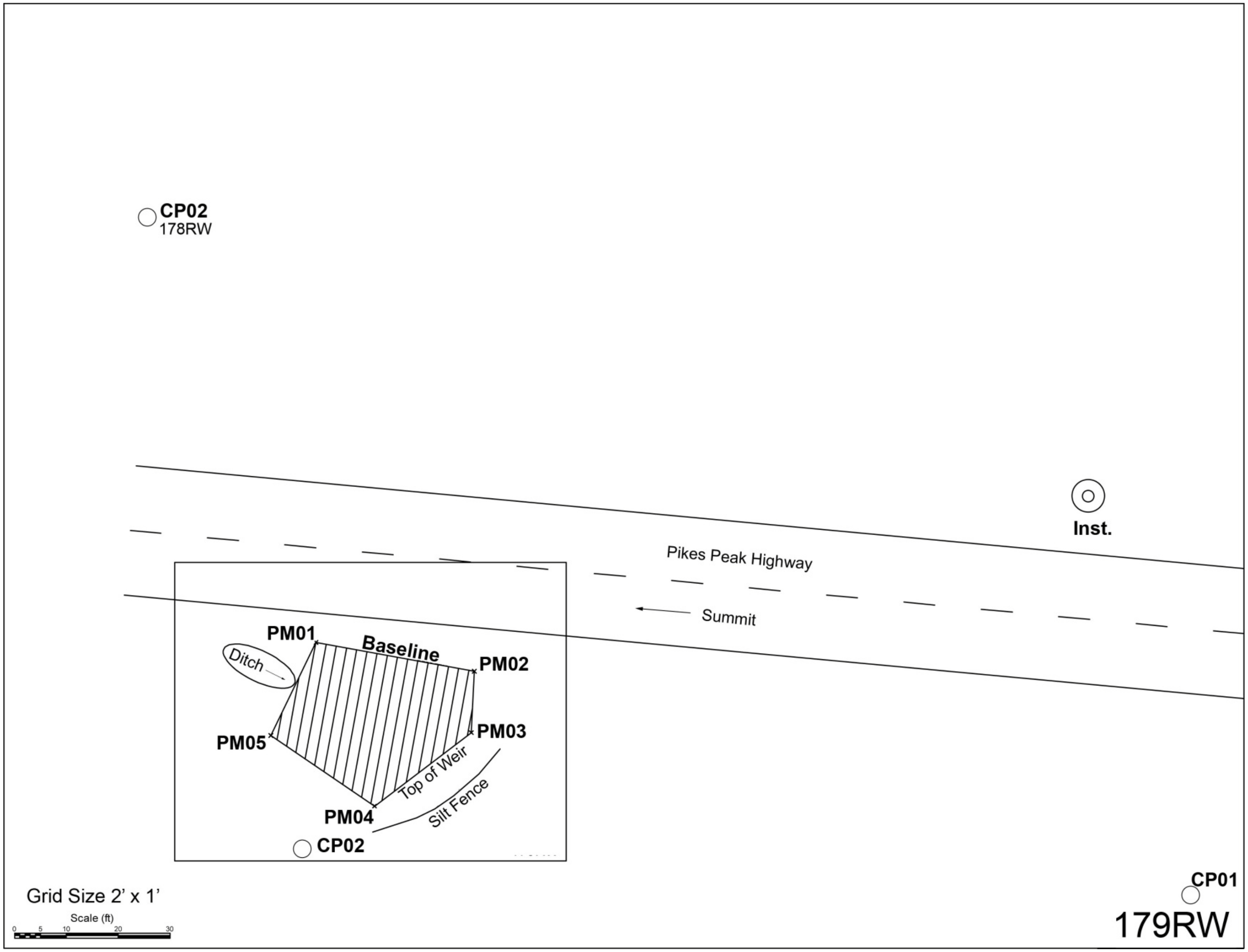
CP01
CP03
Pikes Peak Highway
Summit
PM02
PM03
Inst.
Baseline
Top of Weir
Ditch
PM04
Top of Weir
Silt Fence
PM05
Top of Weir
PM01
PM06
Grid Size 1' x 1'
Scale (ft)
0
5
10
20
30
CP02
161RW

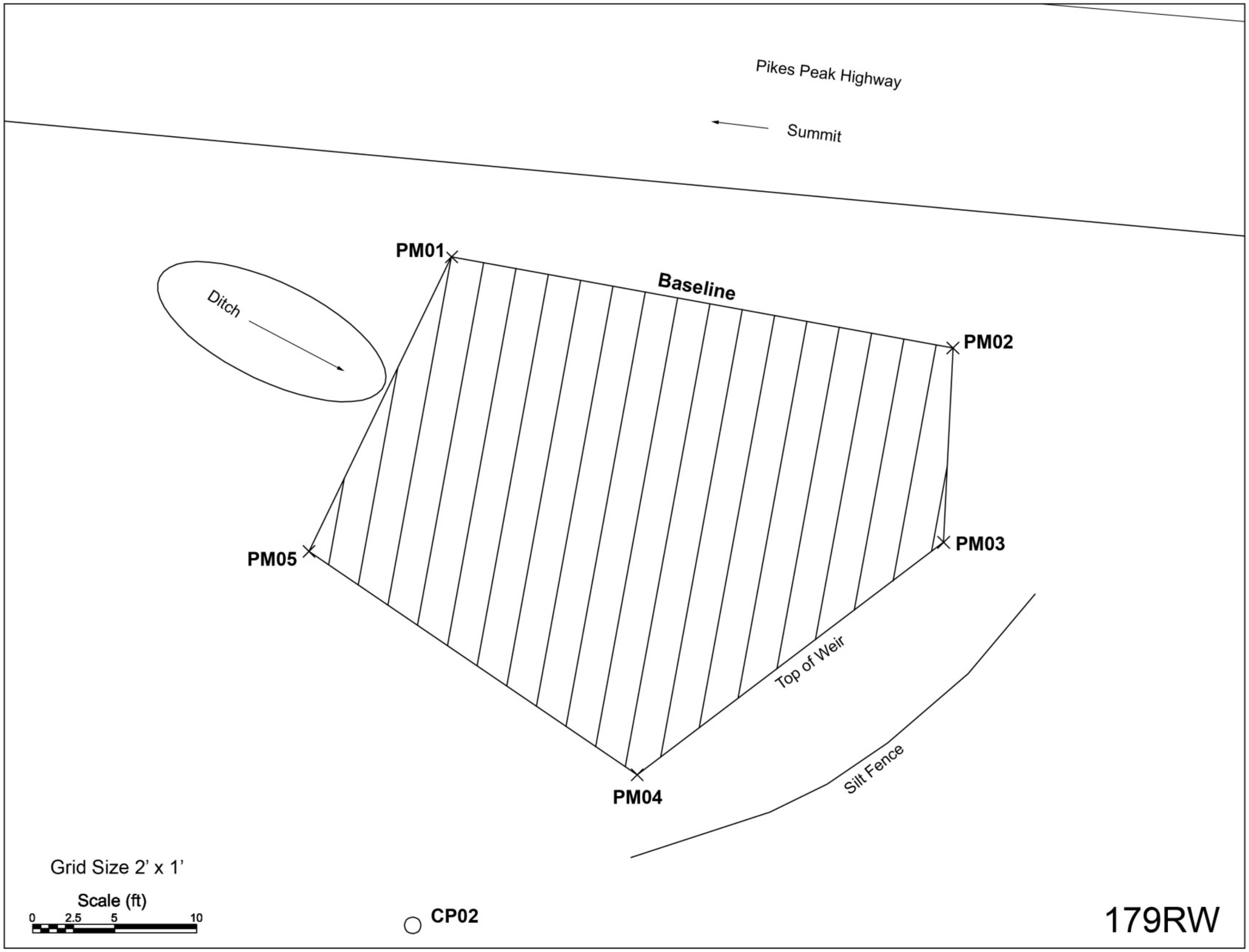

CP01
CP02
CP03
Silt Fence
PM03
TOW
PM04
TOW
TOW
PM05
PM02
PM06
Baseline
PM01
Ditch
Pikes Peak Highway
Summit
Inst.
Grid Size 1’ x 1’
Scale (ft)
0
5
10
20
30
176RW

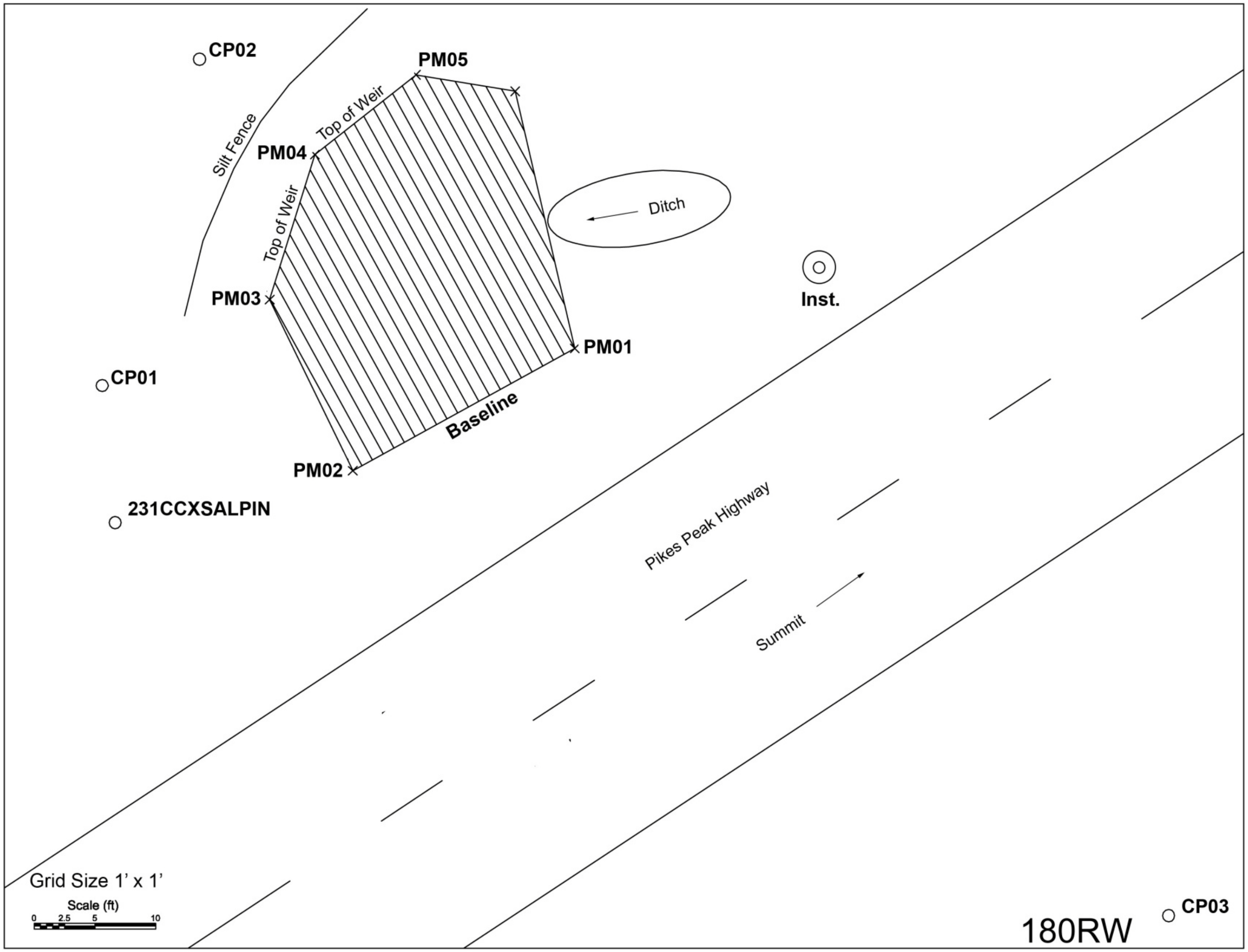

Silt Fence
PM03
Top of Weir
PM04
Top of Weir
Top of Weir
PM05
PM02
PM06
Baseline
PM01
Ditch
Pikes Peak Highway
Summit
Grid Size 1’ x 1’
Scale (ft)
0
2.5
5
10
176RW

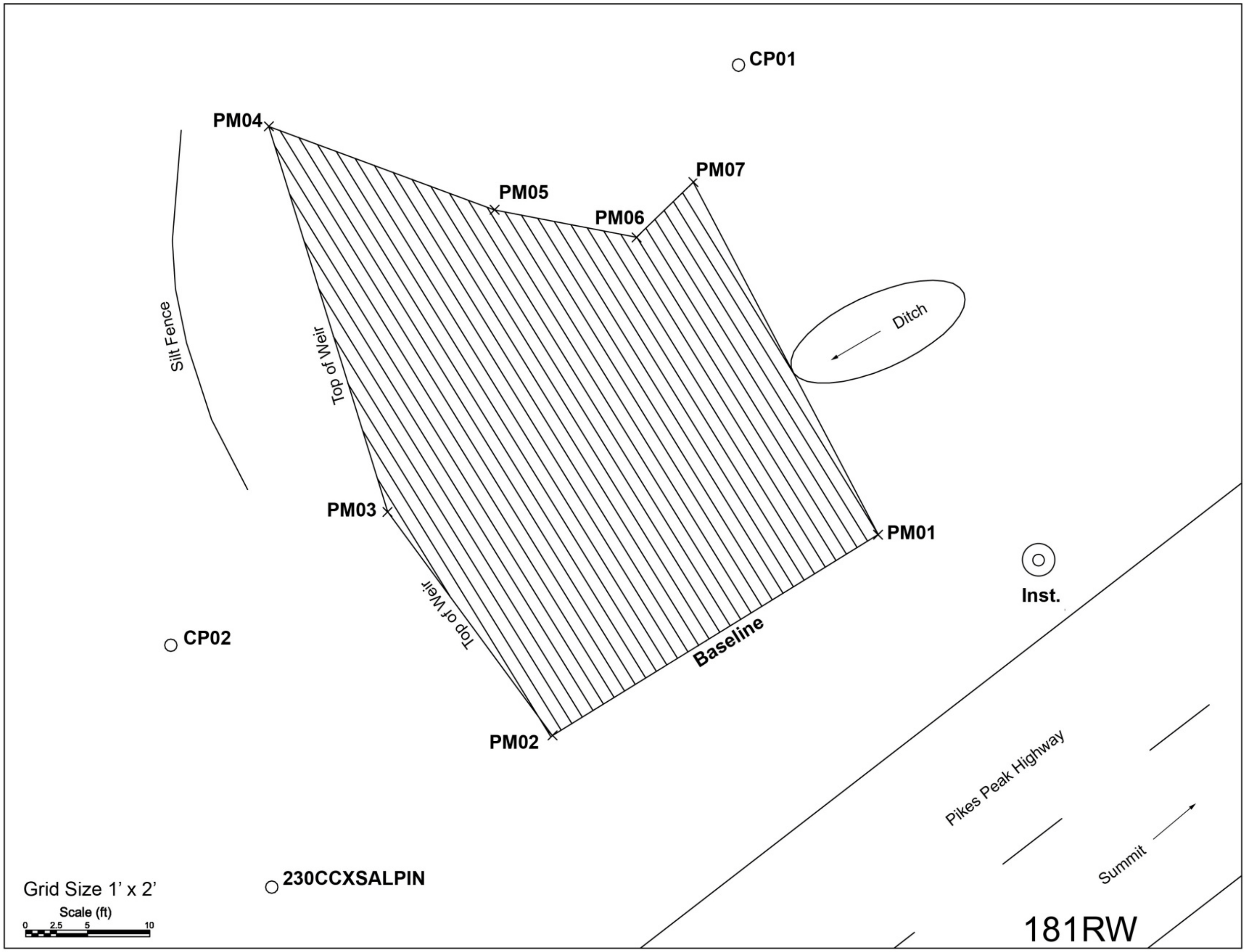

Silt Fence
PM04
TOW
PM05
CP01
PM03
TOW
TOW
TOW
PM06
PM02
Baseline
PM01
Ditch
Pikes Peak Highway
Summit
Inst.
CP02
Grid Size 1' x 1'
Scale (ft)
178RW


Silt Fence
PM04
Top of Weir
PM05
Top of Weir
PM03
CP01
Top of Weir
Top of Weir
PM06
PM02
Baseline
PM01
Ditch
Grid Size 1’ x 1’
Scale (ft)
0
2.5
5
10
Pikes Peak Highway
Summit
178RW

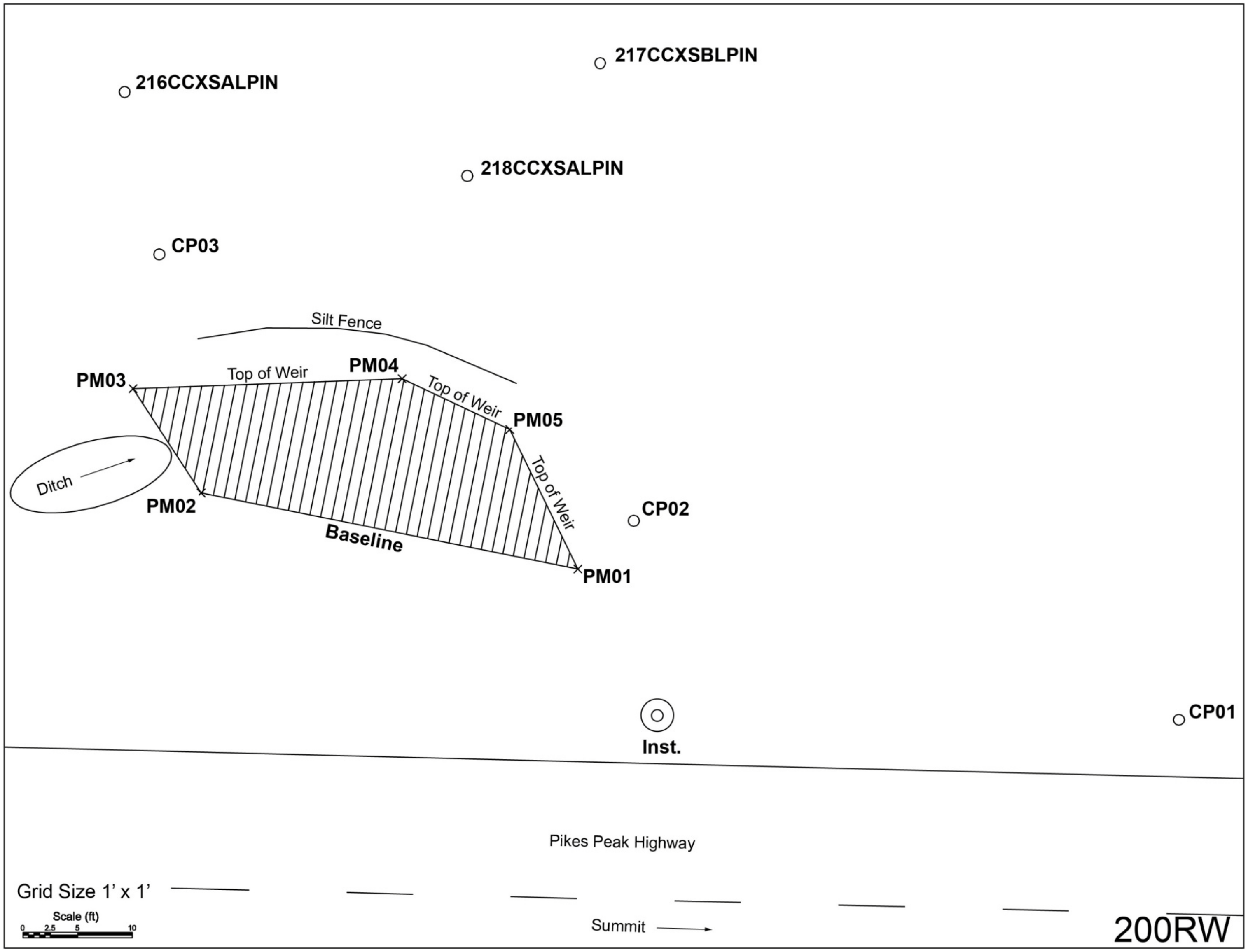

CP02
178RW
Inst.
Pikes Peak Highway
Summit
PM01
Baseline
PM02
Ditch
PM03
PM05
Top of Weir
Silt Fence
PM04
CP02
CP01
Grid Size 2' x 1'
Scale (ft)
0
5
10
20
30
179RW

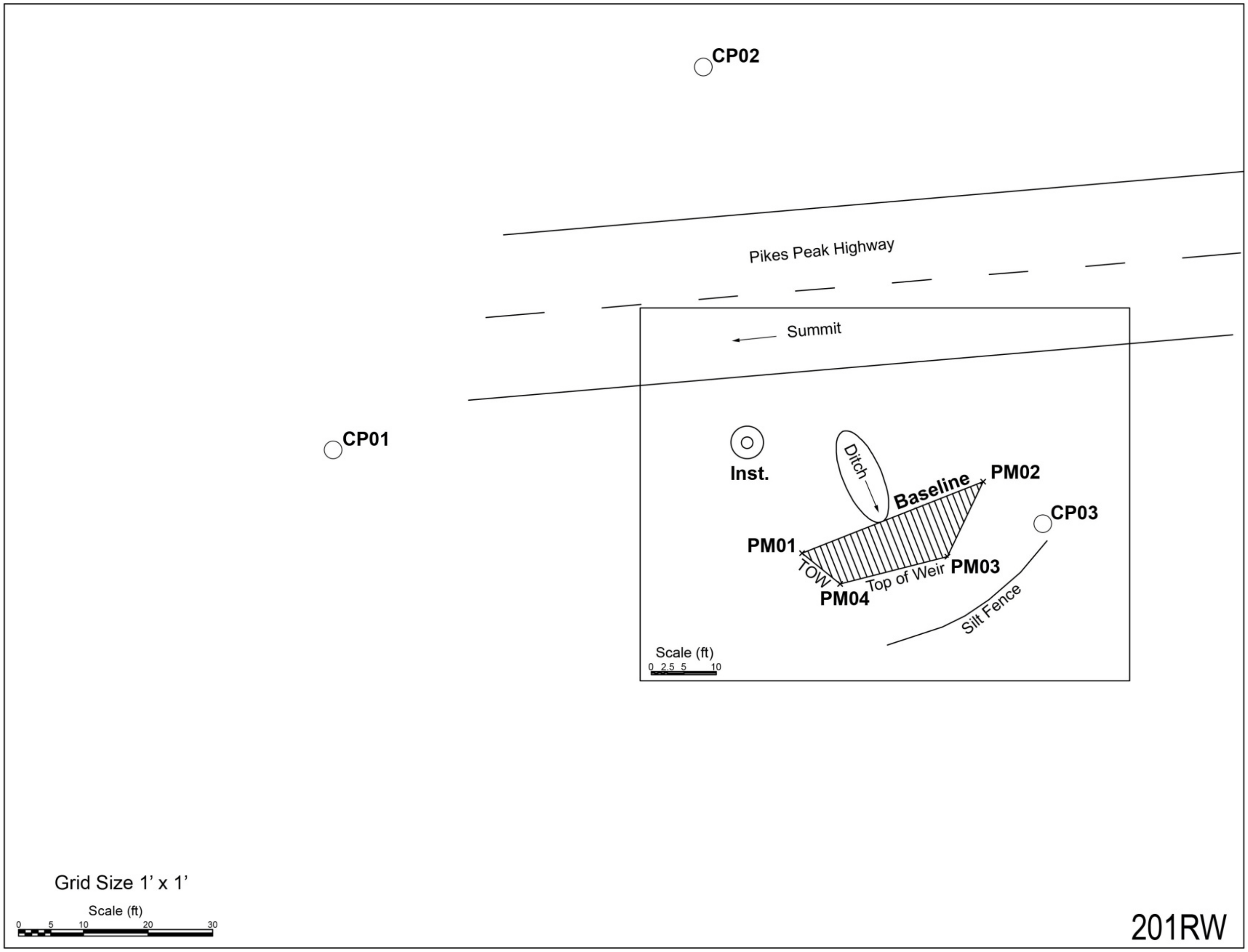

Pikes Peak Highway
Summit
Ditch
PM01
Baseline
PM02
PM03
PM04
PM05
Top of Weir
Silt Fence
Grid Size 2’ x 1’
Scale (ft)
0
2.5
5
10
CP02
179RW

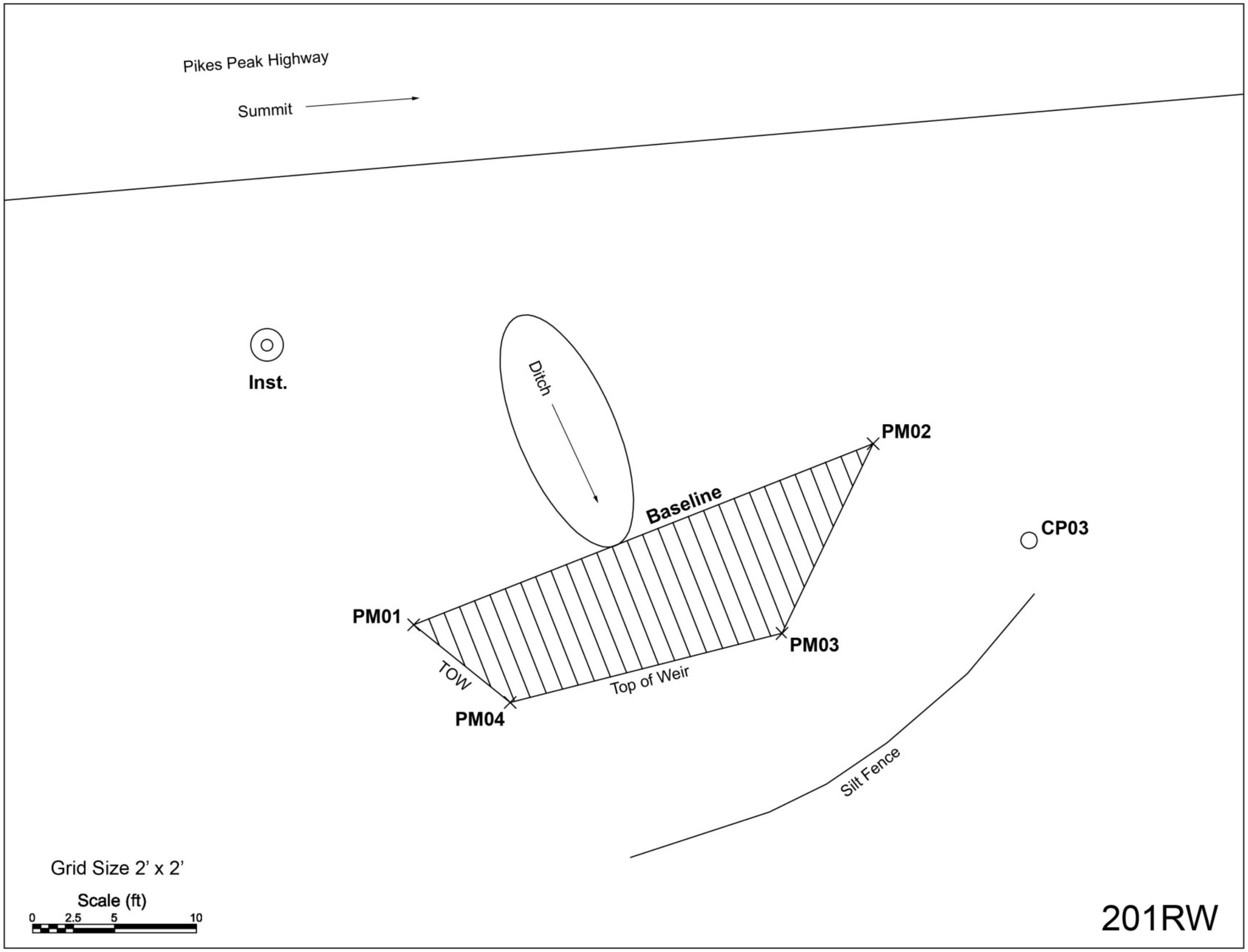

CP02
PM05
Top of Weir
Silt Fence
PM04
Ditch
Top of Weir
Inst.
PM03
PM01
CP01
Baseline
PM02
231CCXSALPIN
Pikes Peak Highway
Summit
Grid Size 1’ x 1’
Scale (ft)
0
2.5
5
10
180RW
CP03



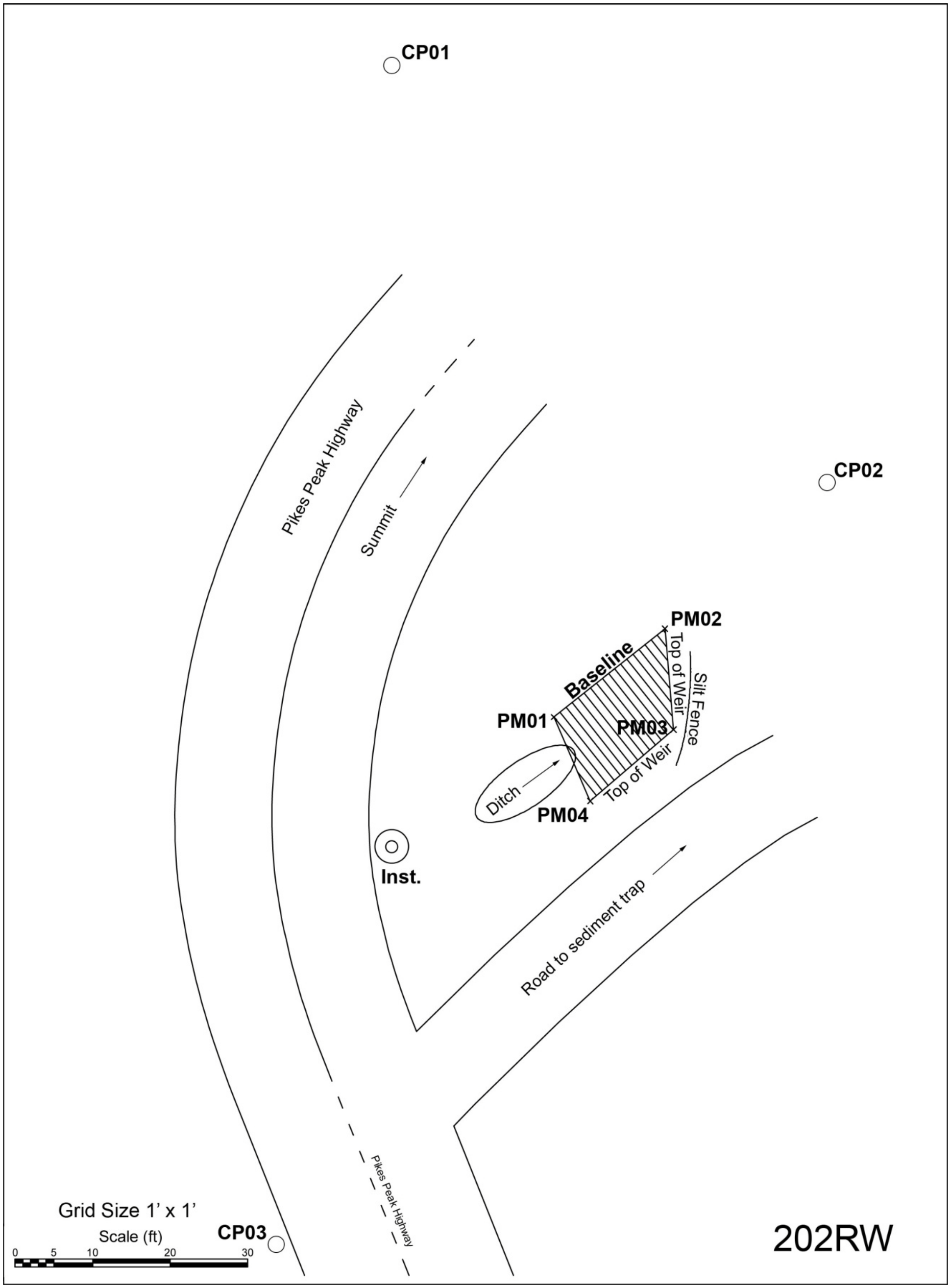
CP01
PM04
PM07
PM05
PM06
Ditch
Silt Fence
Top of Weir
PM03
PM01
Inst.
Top of Weir
CP02
Baseline
PM02
Pikes Peak Highway
Summit
Grid Size 1' x 2'
Scale (ft)
0
2.5
5
10
230CCXSALPIN
181RW

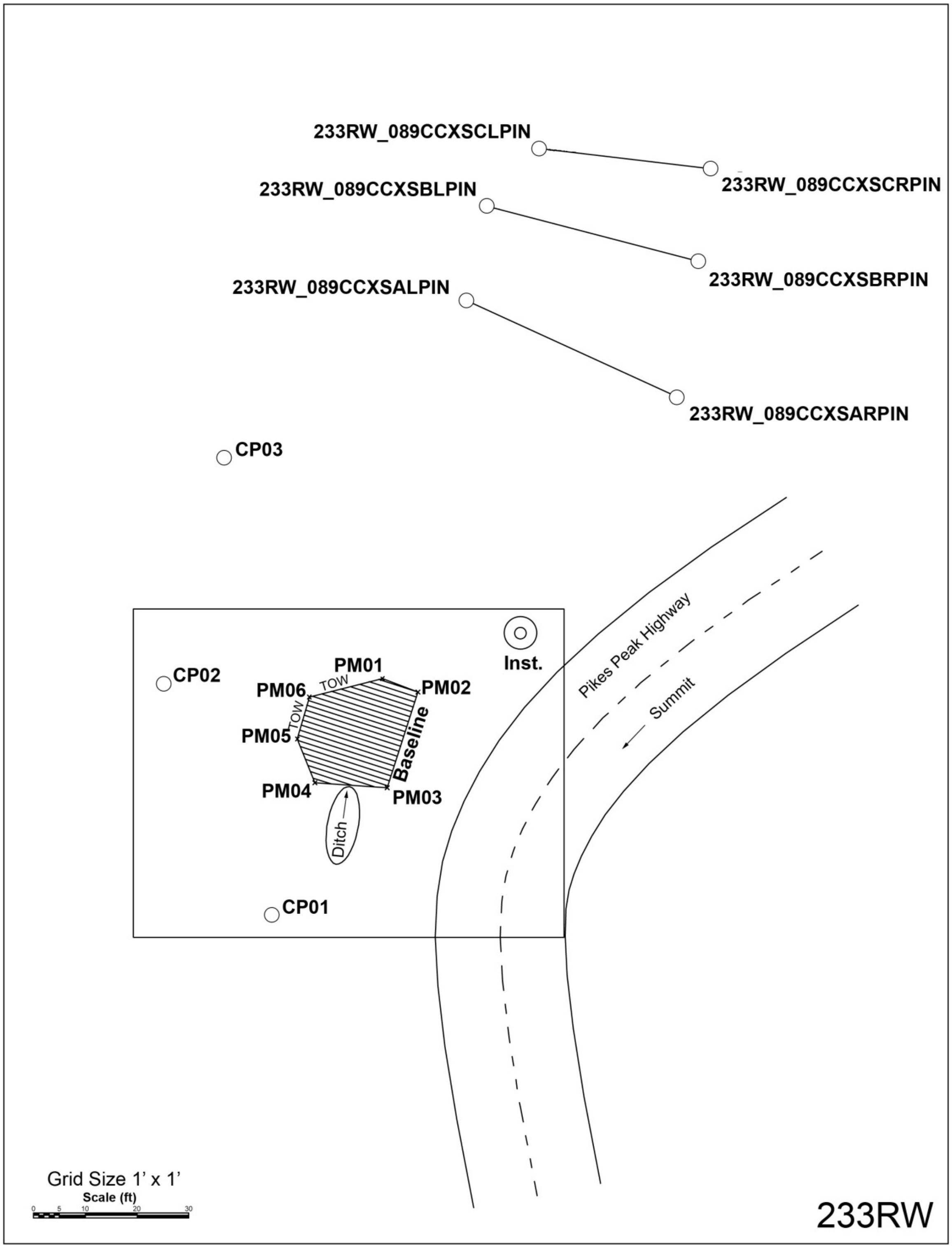

216CCXSALPIN
217CCXSBLPIN
218CCXSALPIN
CP03
Silt Fence
PM03
Top of Weir
PM04
Top of Weir
PM05
Top of Weir
Ditch
PM02
Baseline
CP02
PM01
Inst.
CP01
Pikes Peak Highway
Grid Size 1’ x 1’
Scale (ft)
0
2.5
5
10
Summit
200RW

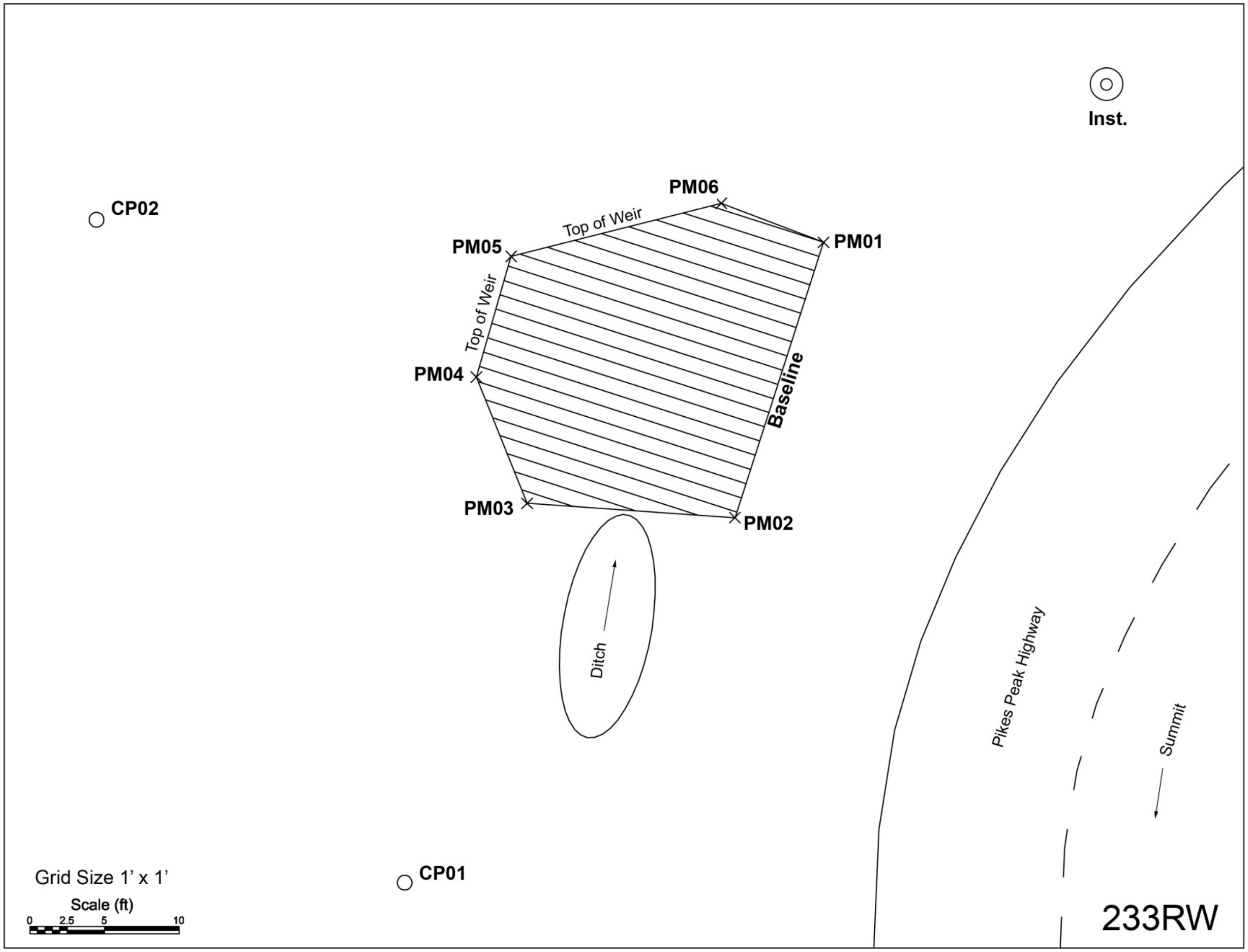

CP02
Pikes Peak Highway
Summit
CP01
Inst.
Ditch
Baseline
PM02
CP03
PM01
TOW
Top of Weir
PM03
PM04
Silt Fence
Scale (ft)
0 2.5 5 10
Grid Size 1' x 1'
Scale (ft)
0 5 10 20 30
201RW

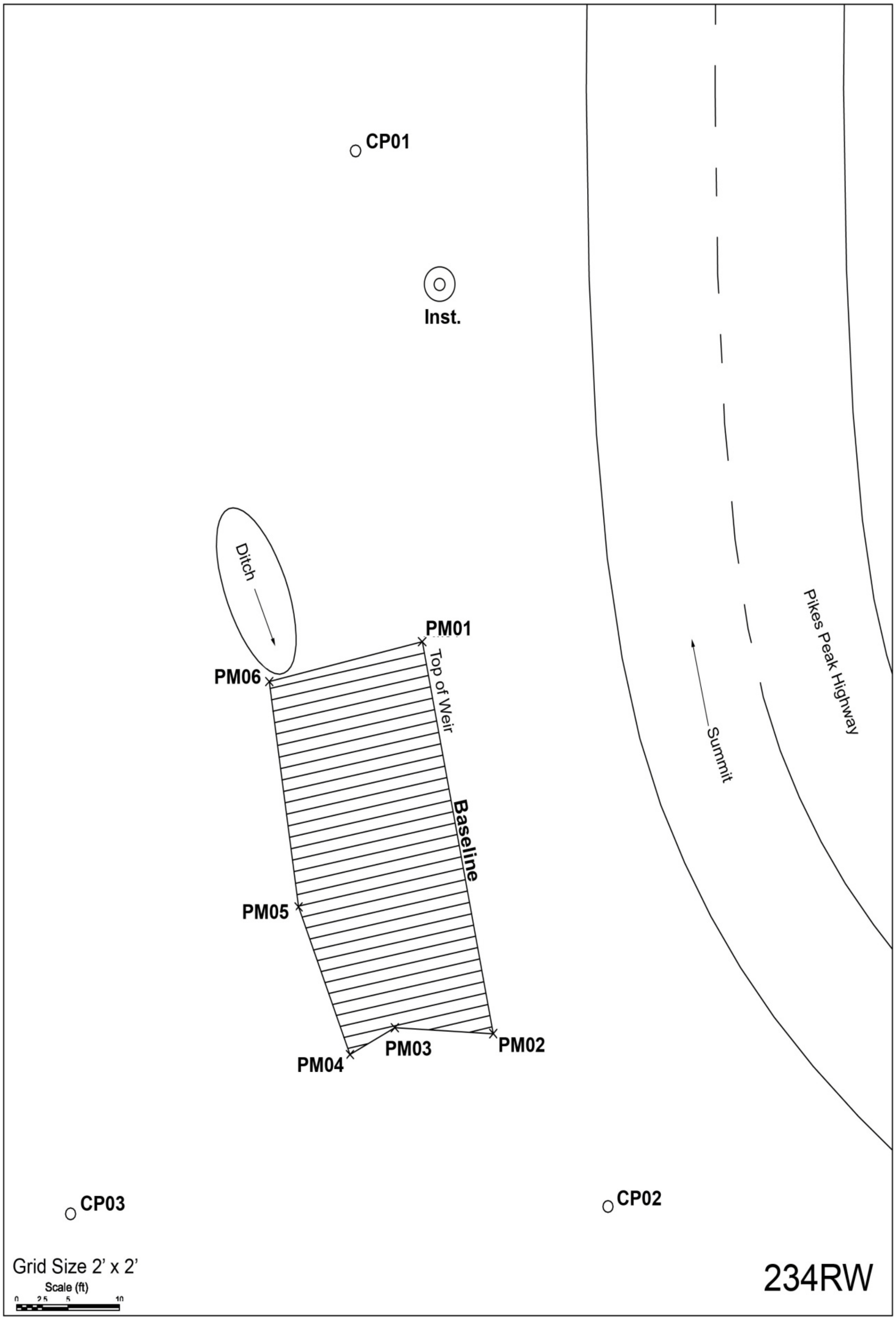


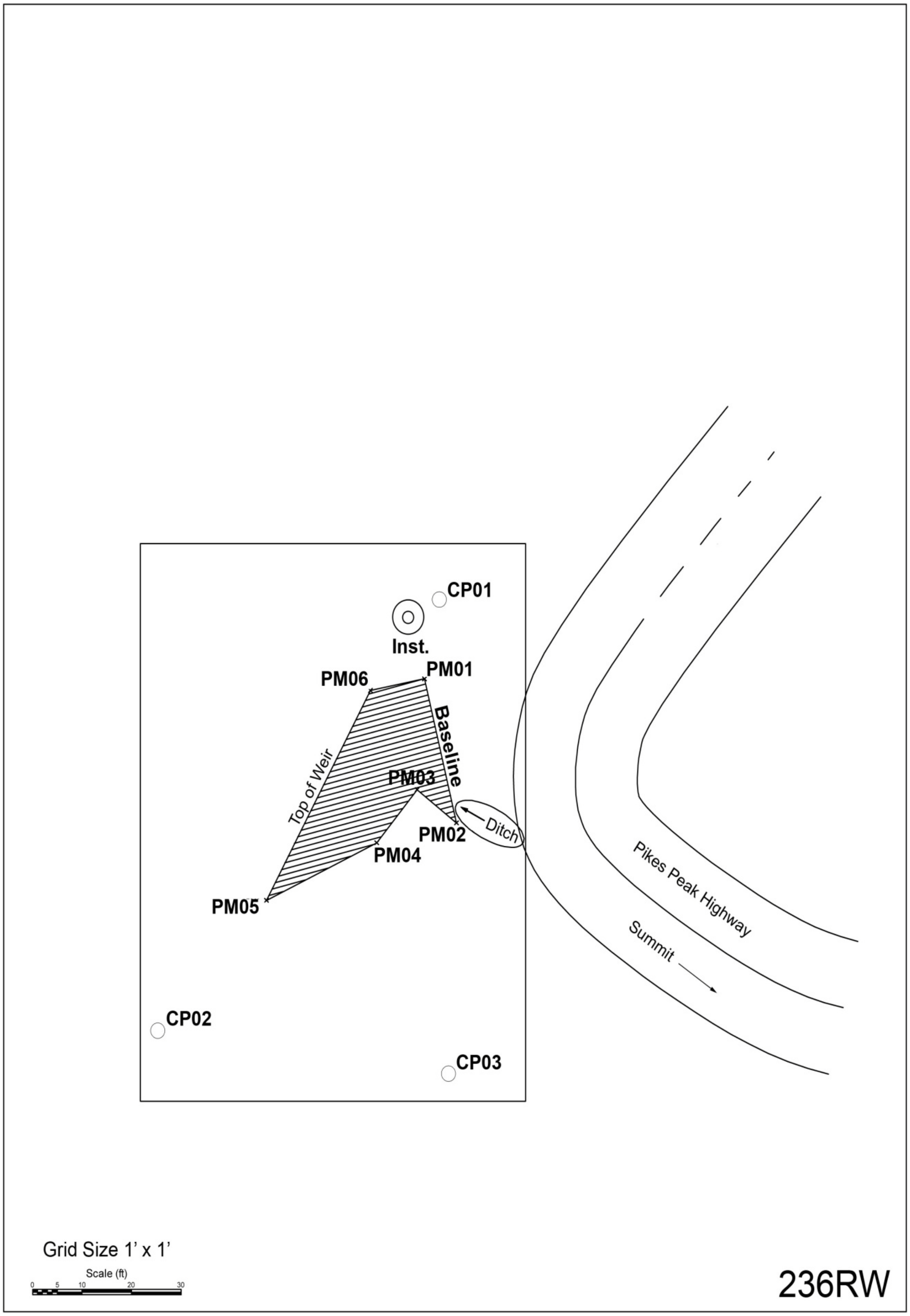
Pikes Peak Highway
Summit
Inst.
Ditch
PM02
Baseline
CP03
PM01
PM03
TOW
Top of Weir
PM04
Silt Fence
Grid Size 2' x 2'
Scale (ft)
0
2.5
5
10
201RW

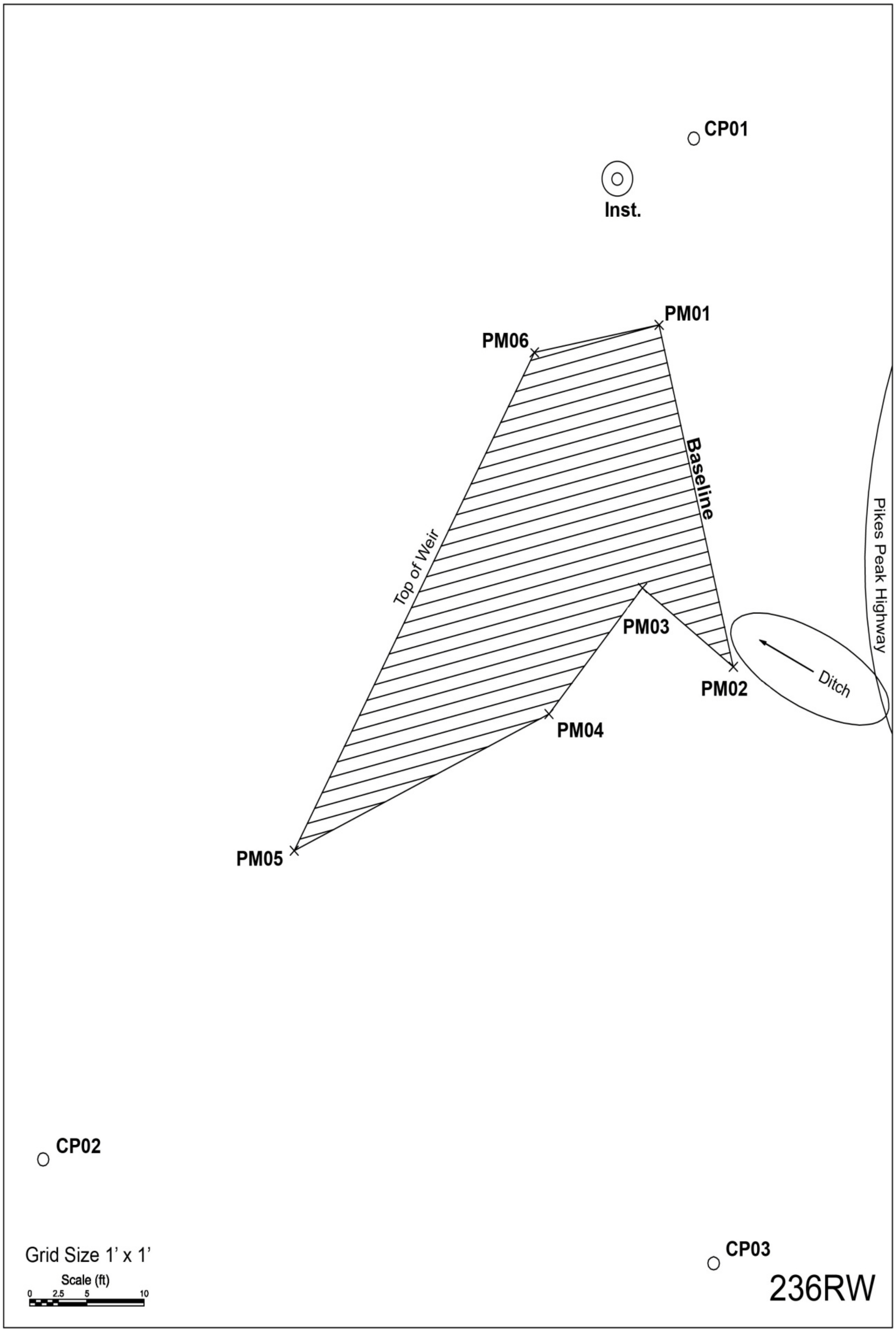

CP01
CP02
Pikes Peak Highway
Summit
PM02
Baseline
Top of Weir
Silt Fence
PM01
PM03
Top of Weir
Ditch
PM04
Inst.
Road to sediment trap
Pikes Peak Highway
Grid Size 1' x 1'
Scale (ft)
0 5 10 20 30
CP03
202RW

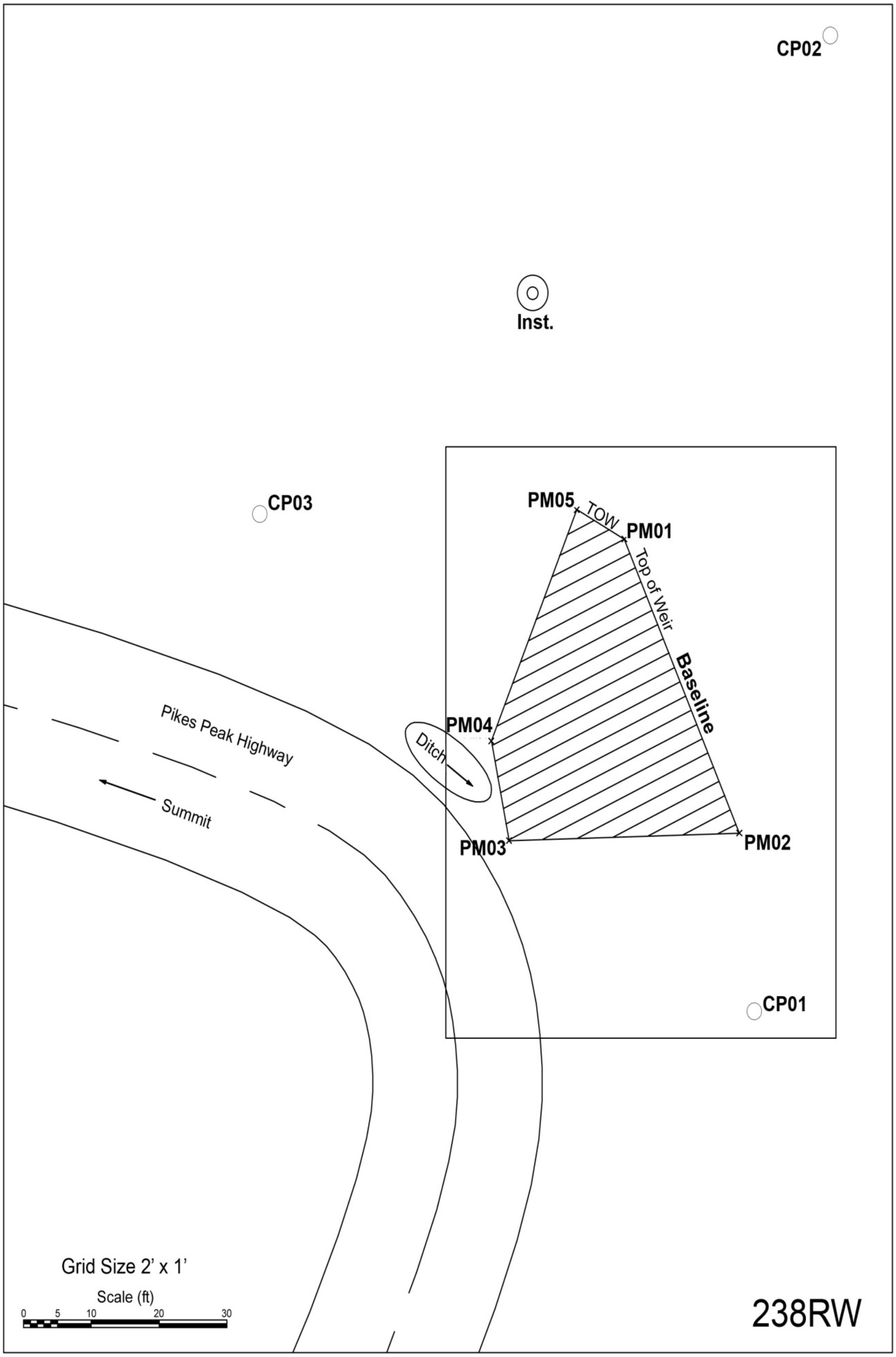

233RW_089CCXSCLPIN
233RW_089CCXSCRPIN
233RW_089CCXSBLPIN
233RW_089CCXSBRPIN
233RW_089CCXSALPIN
233RW_089CCXSARPIN
CP03
Inst.
CP02
PM01
PM06
PM02
TOW
TOW
PM05
Baseline
PM04
PM03
Ditch
CP01
Pikes Peak Highway
Summit
Grid Size 1’ x 1’
Scale (ft)
0
5
10
20
30
233RW

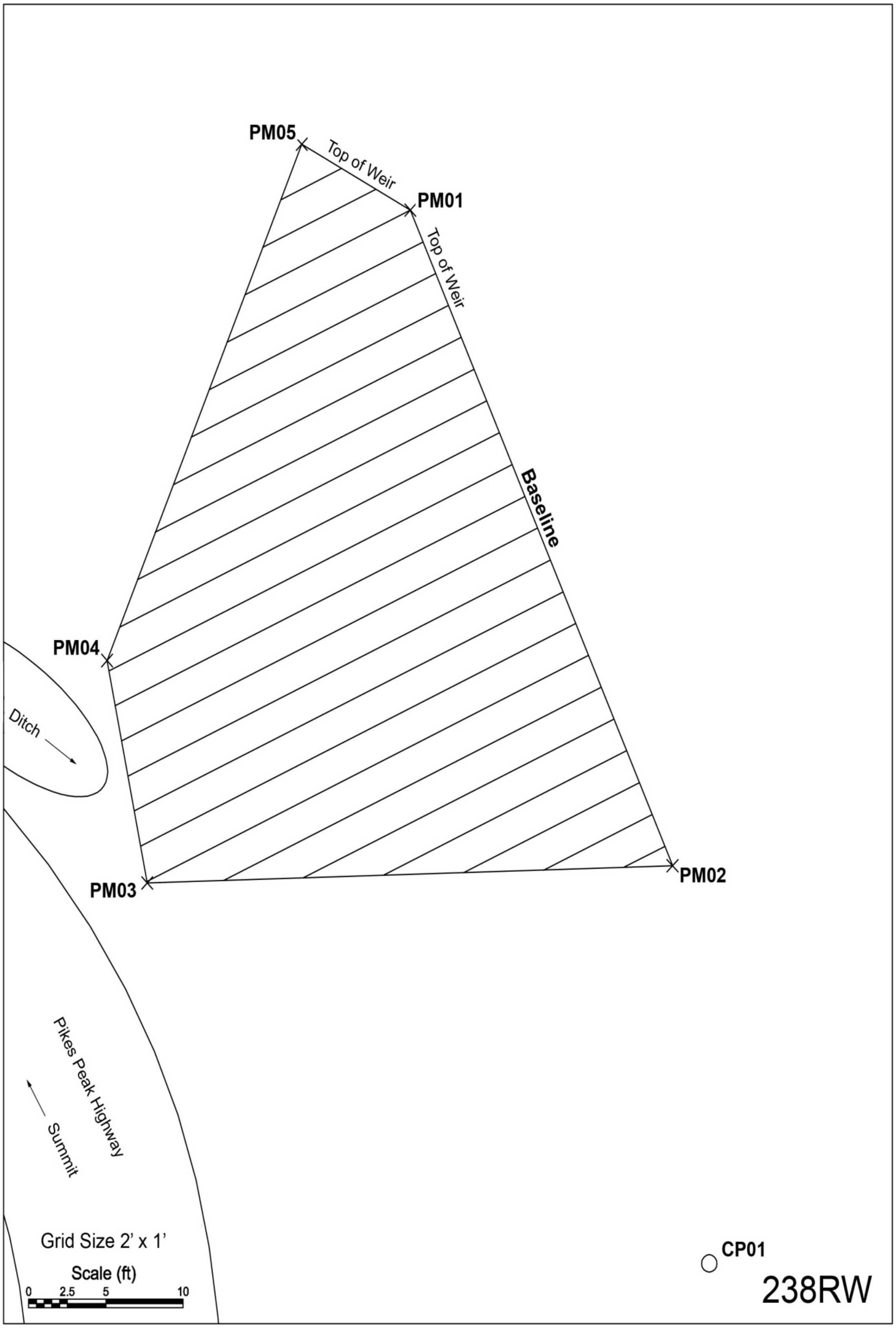

Inst.
CP02
PM06
Top of Weir
PM01
PM05
Top of Weir
PM04
Baseline
PM03
PM02
Ditch
Pikes Peak Highway
Summit
Grid Size 1' x 1'
Scale (ft)
0
2.5
5
10
CP01
233RW

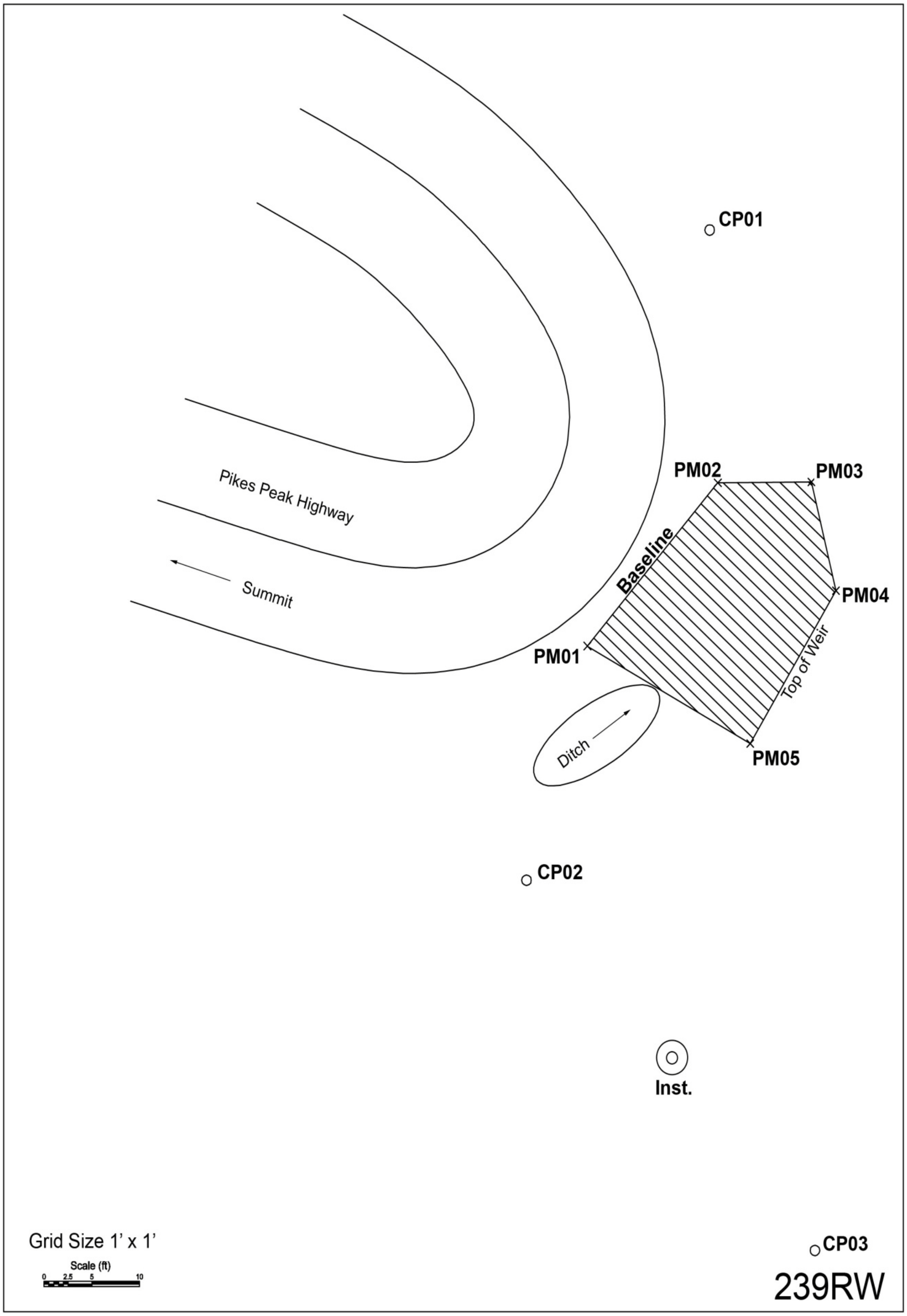

CP01
Inst.
Ditch
PM01
PM06
Top of Weir
Baseline
Summit
Pikes Peak Highway
PM05
PM04
PM03
PM02
CP03
CP02
Grid Size 2' x 2'
Scale (ft)
0
2.5
5
10
234RW

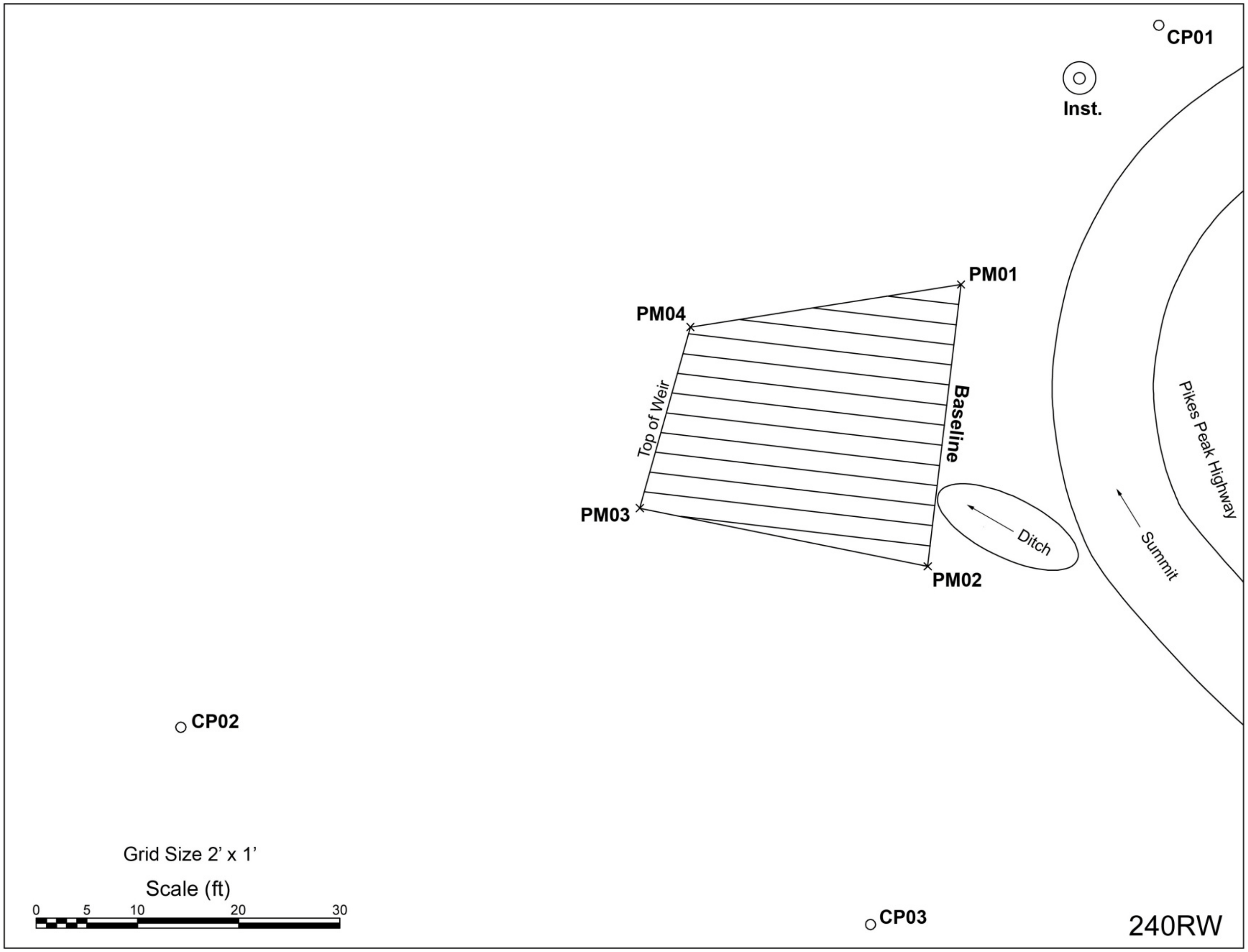

CP01
Inst.
PM06
PM01
Baseline
Top of Weir
PM03
Ditch
PM02
PM04
PM05
Pikes Peak Highway
Summit
CP02
CP03
Grid Size 1' x 1'
Scale (ft)
0
5
10
20
30
236RW

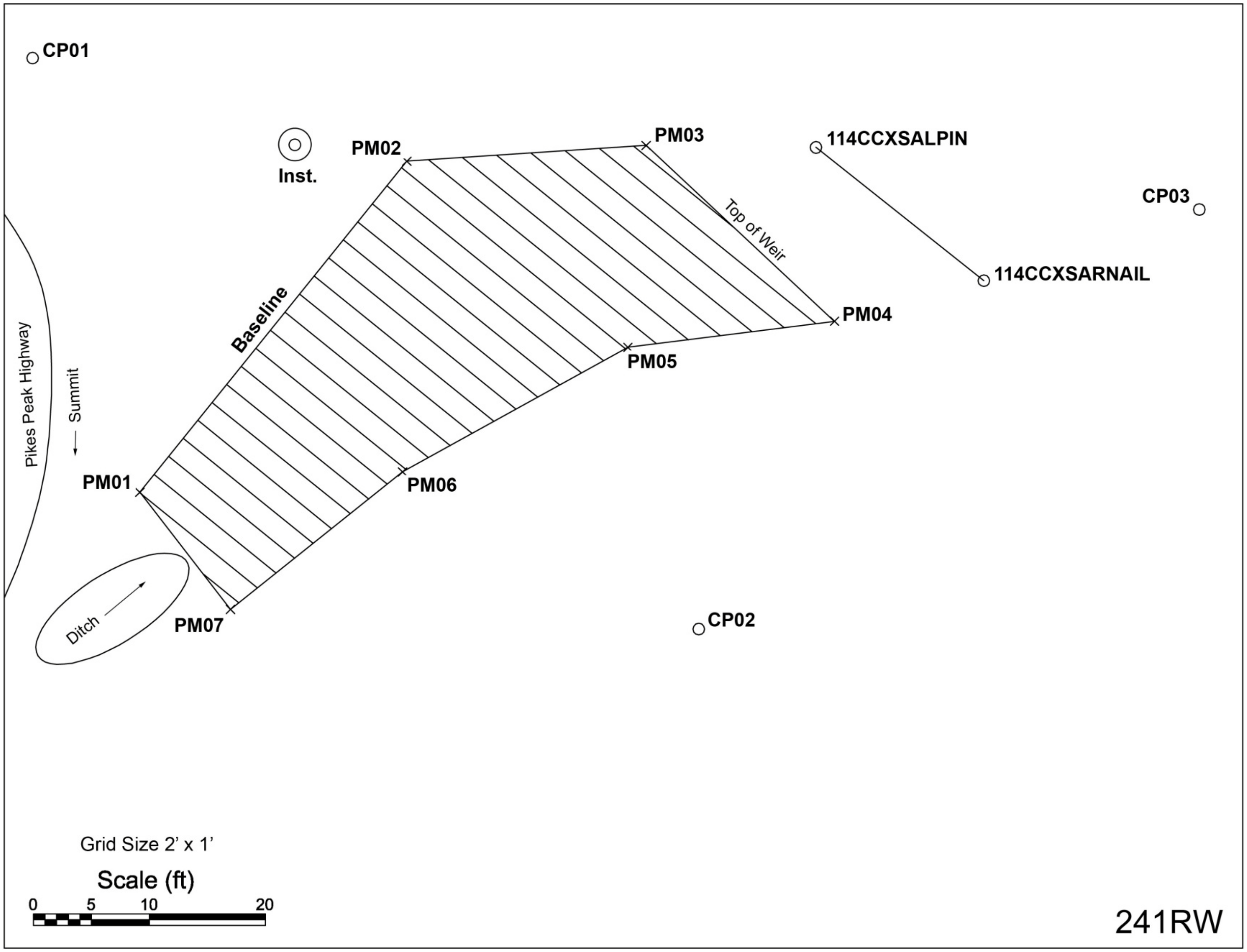

CP01
Inst.
PM01
PM06
Baseline
Top of Weir
Pikes Peak Highway
PM03
Ditch
PM02
PM04
PM05
CP02
Grid Size 1' x 1'
Scale (ft)
0 2.5 5 10
CP03
236RW

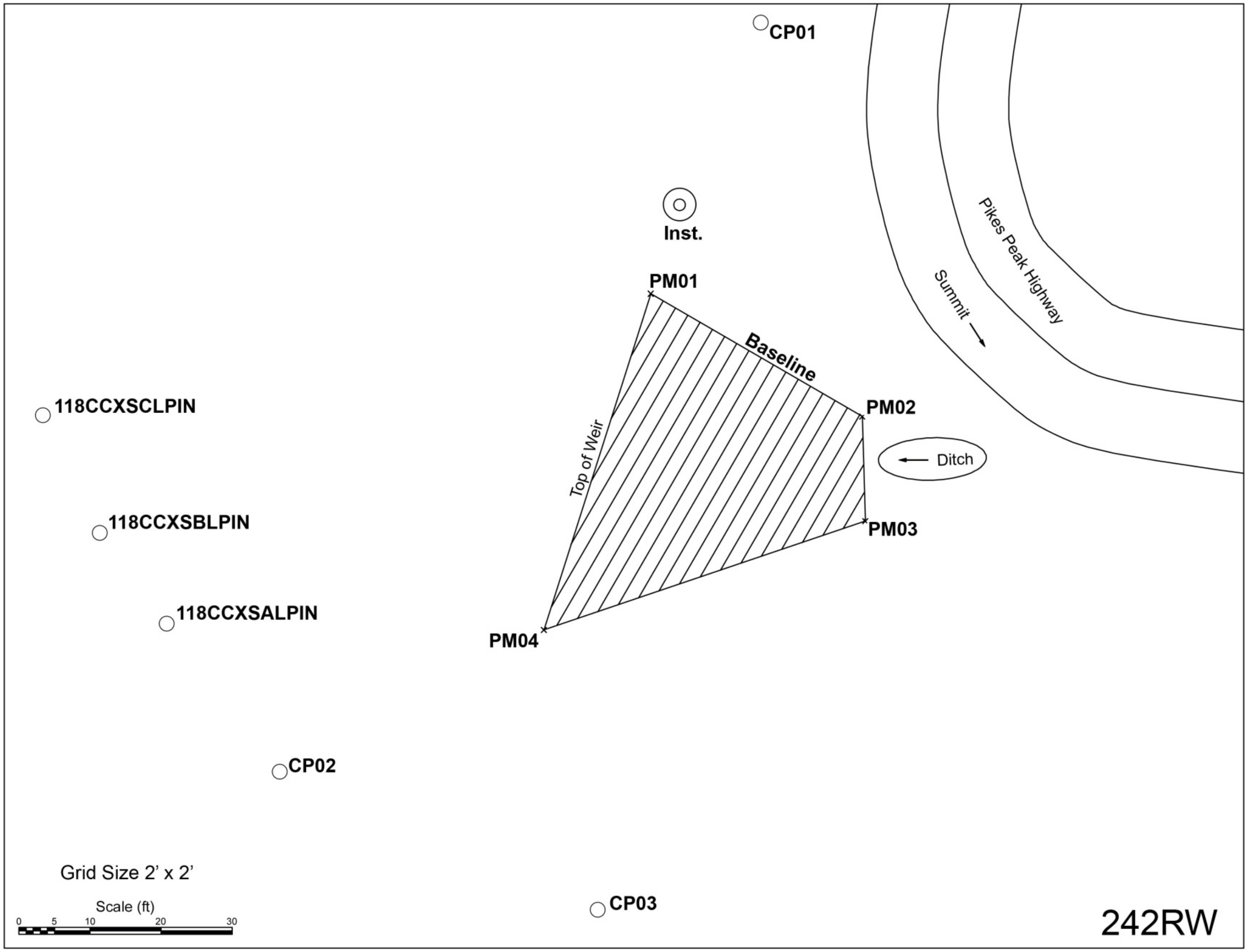

CP02
Inst.
CP03
PM05
TOW
PM01
Top of Weir
Baseline
PM04
Ditch
Pikes Peak Highway
Summit
PM03
PM02
CP01
Grid Size 2' x 1'
Scale (ft)
0 5 10 20 30
238RW

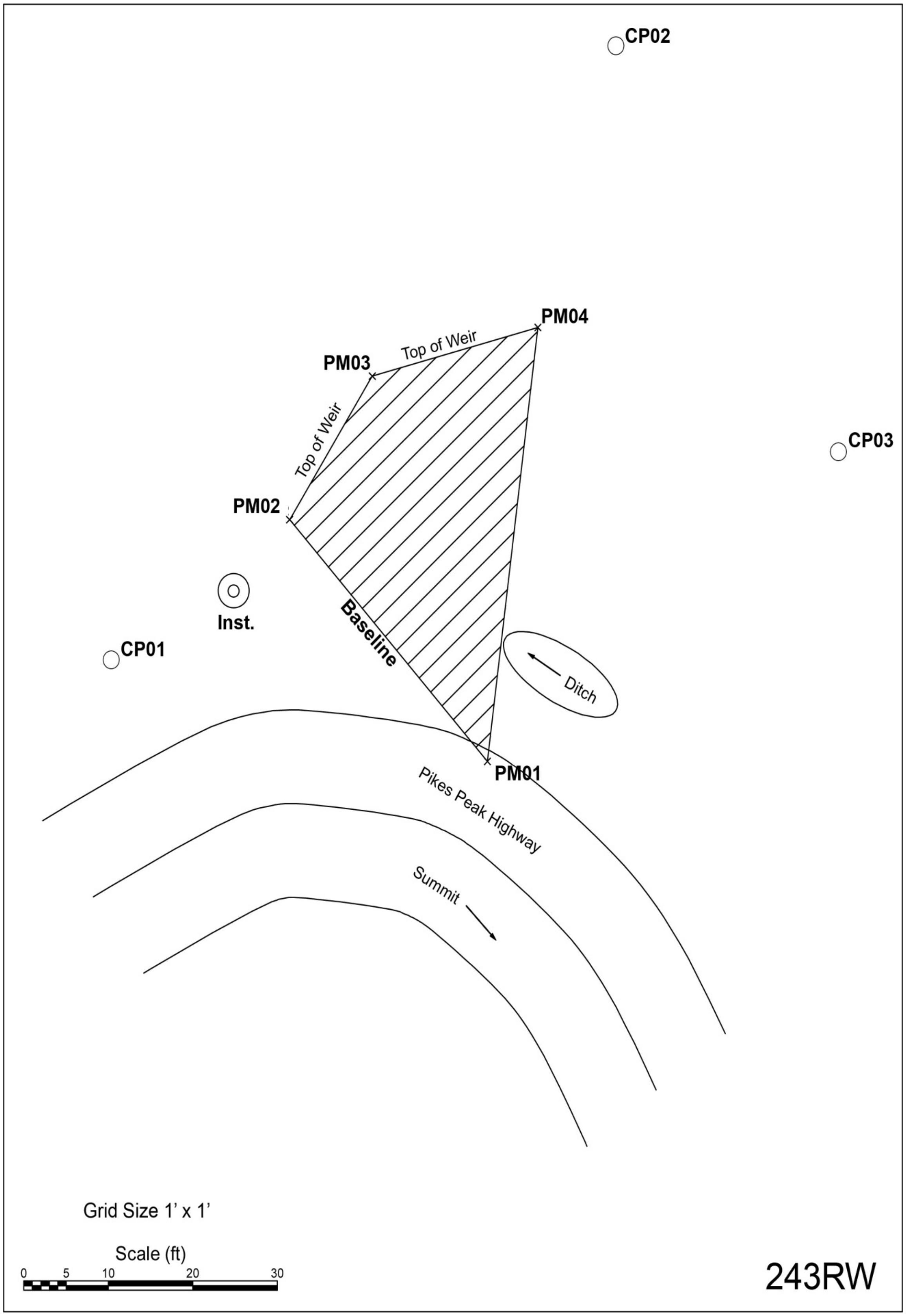

PM05
Top of Weir
PM01
Top of Weir
Baseline
PM04
Ditch
PM03
PM02
Pikes Peak Highway
Summit
Grid Size 2' x 1'
Scale (ft)
0
2.5
5
10
CP01
238RW


CP01
PM02
PM03
Pikes Peak Highway
Baseline
PM04
Summit
PM01
Top of Weir
Ditch
PM05
CP02
Inst.
Grid Size 1' x 1'
Scale (ft)
0
2.5
5
10
CP03
239RW


CP01
Inst.
PM01
PM04
Top of Weir
Baseline
PM03
PM02
Ditch
Summit
Pikes Peak Highway
CP02
Grid Size 2' x 1'
Scale (ft)
0 5 10 20 30
CP03
240RW


CP01
Inst.
PM02
PM03
114CCXSALPIN
CP03
Top of Weir
114CCXSARNAIL
PM04
Baseline
PM05
Pikes Peak Highway
Summit
PM01
PM06
Ditch
PM07
CP02
Grid Size 2' x 1'
Scale (ft)
0
5
10
20
241RW


CP01
Inst.
PM01
Baseline
PM02
Pikes Peak Highway
Summit
Ditch
Top of Weir
PM03
PM04
118CCXSCLPIN
118CCXSBLPIN
118CCXSALPIN
CP02
CP03
Grid Size 2' x 2'
Scale (ft)
0
5
10
20
30
242RW


CP02
CP03
PM04
PM03
Top of Weir
Top of Weir
PM02
Inst.
Baseline
CP01
Ditch
PM01
Pikes Peak Highway
Summit
Grid Size 1' x 1'
Scale (ft)
0
5
10
20
30
243RW

Appendix K

Rock Weir

Cut/Fill Volume Determination Methods

Prepared by Steve Belz
Black Creek Hydrology, LLC

2009

Introduction

The procedures described below were used to determine changes in fill volumes between the 2005/2006 and 2006/2007 sets of survey data points and are specific to the Carlson Software Civil Suite program running inside of AutoCAD 2007. However, other survey software programs likely have similar functions that can be used.

In order to compute changes in fill volumes between two successive surveys of a rock weir basin, the two surveys must be on the same local coordinate grid. This was generally already the case among the data sets analyzed where a basin had been surveyed at least once and subsequent surveys were performed using a resection instrument setup on previously established control points. If the two surveys were not on the same local coordinate system, then one of the sets of survey data was transformed and adjusted both rotationally and vertically based on local control points. Survey data transformation procedures are outside the scope of this write-up but can be done using Trimble Geomatics Office (TGO) or other survey software packages as long as repeat surveys of a particular site use two or more of the same control points.

Some rock weir basins contain riprap that was installed to prevent scour. The local areas covered by the riprap were excluded from the fill volume analysis since the porous character of the riprap makes those areas practically impossible to accurately survey. Generally the riprap areas were delineated in the surveys and can be identified in the survey data point sets. In theory it would be possible to pull out all of the riprap rocks, survey the area and then put the riprap back, but that is not practical. The exclusion of the riprap areas from the survey may introduce some error in the results since some amount of washed in material likely filters into the spaces between the rocks and is not deposited in the surveyed areas.

Procedures

The first step in calculating fill volumes was to examine each data set to ensure all sets for a given rock weir were on the same local coordinate system. Most were but a few had to be transformed. For purposes of this write-up, the data set with the earlier survey date is referred to as the “Before” set and the data set with the later survey date is referred to as the “After” set.

The remainder of the steps performed were as follows:

- Ensure that each data set is in a comma separated values “csv” text file and named with the weir ID and survey date as part of the file name. The .csv files can have one or more lines of header information but must not have any information following the last data point.
- Start AutoCAD, open a blank file and create four layers for the “Before” and “After” data point sets and for the “Before” and “After” data point set inclusion perimeters described below. Use the survey date and weir ID as part of the layer names.

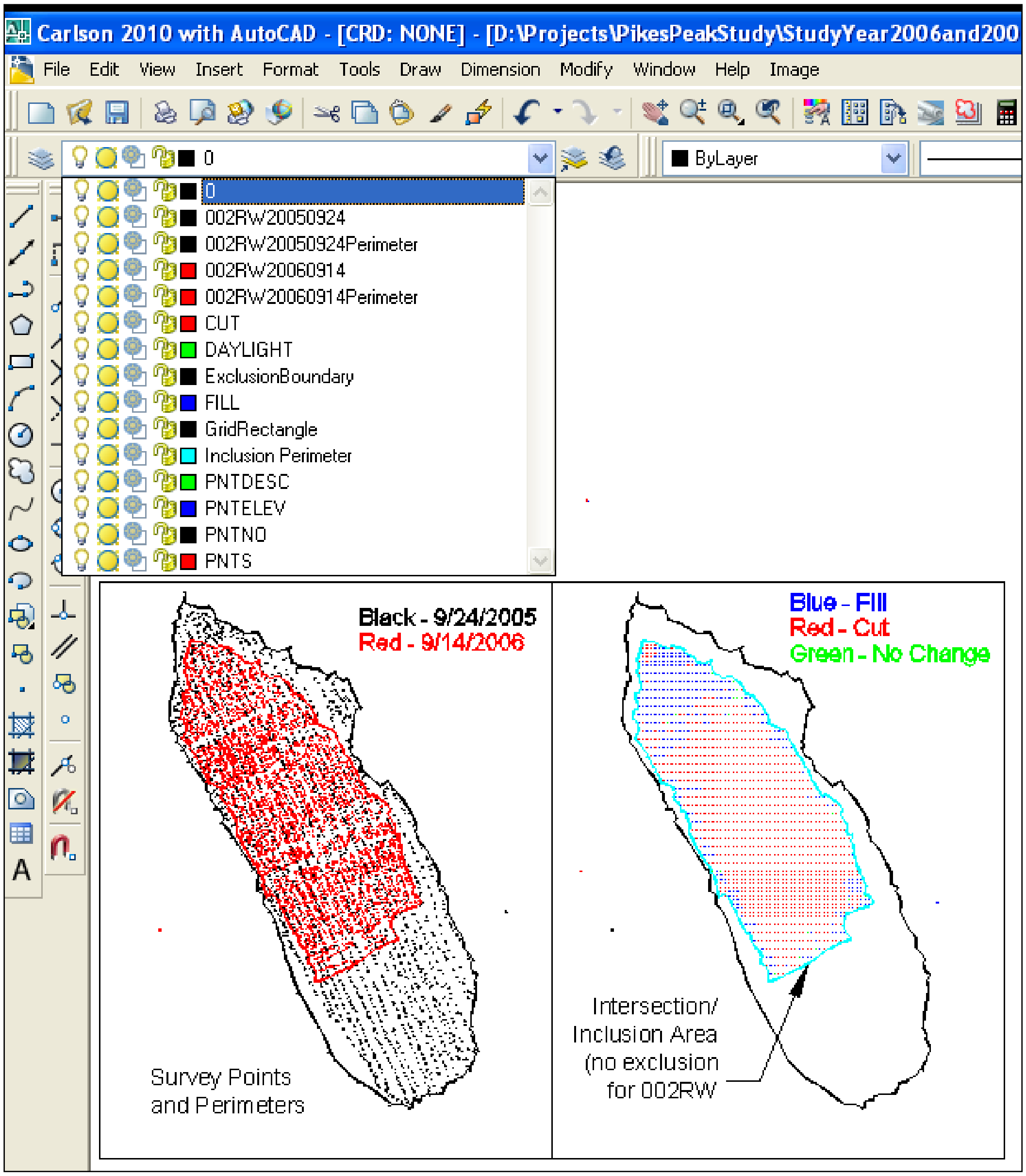
- Using the Carlson Software, import the "Before" data points into AutoCAD and create a coordinate data (.crd) file named with the weir identifier and survey data as part of the file name.
- Draw the points to the screen and use the Carlson "Block Explode" command to explode the points. Copy the points to a layer created for the "Before" points.
- Draw a perimeter polyline around the "Before" points shot within the rock weir basin. This can be done by connecting the points around the perimeter of the data sets in a "dot-to-dot" fashion. The Carlson program has a "Shrink-Wrap Entities" command that quickly performs that task. Assign the perimeter polyline to its appropriate created and named layer.
- Repeat these steps on the "After" data set.
- Create another layer for an "exclusion" boundary and name it appropriately.
- The perimeter polylines drawn around the "Before" and "After" data sets typically do not precisely match but should be generally of the same shape reflecting the shape of the bottom of the rock weir basins. Note: This is an appropriate place to note that it is best to over-survey the fill areas so that there is adequate survey data point coverage beyond the edges of observed impacts. This will ensure the ability to create perimeter polylines that capture all impacts
- Draw a polyline to delineate the riprap fill area if appropriate in order to create an "exclusion" area. Assign this exclusion polyline to the appropriate layer created above.
- Create another layer for an "intersection" boundary and name it appropriately and copy, don't move, the "Before" and "After" perimeter lines the intersection layer.
- Close the "Before" and "After" perimeter line layers but keep the intersection boundary layer open.
- Use the AutoCAD "REGION" and "INTERSECT" commands to create an intersection of the two polylines which is then called the "inclusion" area. In some instances one of the polylines may fall entirely within the other polyline and this step can be omitted by simply using the interior of the two polylines as the inclusion area.
- Use the AutoCAD "EXPLODE" command on the inclusion polyline and then use the "POLYLINE EDIT" command to rejoin those exploded segments. This is done to ensure that the inclusion polyline is converted back to an LWPolyline available for the next few steps.
- Start Carlson's "Surface/Volumes By Grid Surface/Volumes by Layers" Command.
- Select the lower left and upper right "limits of the surface area" to include all of the points within the inclusion area and to include the "Inclusion" and "Exclusion" polylines.
- Set the cell dimensions to be 0.5' for both the X and Y. Smaller cell dimensions can be used if desired.
- Select the layers from the screen by simply clicking on one of the points for the "Before" data set and one for the "After" data set. Use the "Before" data set for the "Existing" and use the "After" data set for the final.

- At the prompt of “Select surface entities on corresponding layers”, draw a window box around all of the points to be used in the calculations.
- Select the “Inclusion” and “Exclusion” polylines at the appropriate prompts.
- In the “Volume Report Options” box, it is not necessary to have any options selected. However, it is useful to select the “Draw Depth/Difference in Each Cell” option so that a layer is created that shows the cut/fill depth in each of the 0.5’x0.5’ grid cells
- The final volume report is shown below. The difference between the fill volume and cut volume (the last two rows of the report) is the net fill or cut in the basin. In the example shown below, the cut is 68.9 cu. ft. while the fill is 11.6 cu. ft. indicating that material was removed from the basin in the time period between the two surveys; perhaps the result of weir basin cleaning.

```
Volume Report                      Sat Feb 20 17:31:41 2010
Comparing Grid: C:/Documents and Settings/Steve/Application
Data/Carlson Software/Carlson2010/R17.0/USER/grid1.grd
      and Grid: C:/Documents and Settings/Steve/Application
Data/Carlson Software/Carlson2010/R17.0/USER/grid2.grd
Grid corner locations: 5029.38, 5007.57 to 5084.88, 5049.07
Grid resolution X:111, Y:83 Grid cell size X:0.50, Y:0.50
Area in Cut:321.5 S.F., 0.01 Acres
Area in Fill:125.0 S.F., 0.00 Acres
Total inclusion area:446.5 S.F., 0.01 Acres
Cut to Fill ratio:5.96
Average Cut Depth:0.21 Average Fill Depth: 0.09
Max Cut Depth:1.00 Max Fill Depth: 0.56
Cut (C.Y.)/Area (acres):249.12
Fill (C.Y.)/Area (acres): 41.79
Cut volume:68.9 C.F., 2.55 C.Y.
Fill volume:11.6 C.F., 0.43 C.Y.
```

- Print the Volume Report to a .pdf file or save it as a text file.
- Save the AutoCAD file with a file name containing the weir ID and the survey dates of the before and after survey data point sets.

Below is an AutoCAD/Carlson Software screen capture showing layers (upper left), points, perimeters (lower left), inclusion boundary and Depth/Difference values (lower right)



Additional Notes

Sometimes to small of an area was captured by the weir surveys such that the intersection of areas cut off significant portions of the larger surveyed area (as shown above). This can be a problem if the fill volume of that cut off area changes. A possible, although somewhat tedious solution, is to add points collected in that cutoff area from an older survey. However, this would need to be done with full knowledge of the site and absolute confidence that the added area neither received or lost material and did reflect the fill conditions of the survey to which its survey points are added.

Appendix L

Rock Weir and Sediment Pond

Site Visit Dates
Sediment Accumulation
and
Sediment Pond Cross Section Graphs

2009

Site Visit Dates of Rock Weir (Sediment Trap) Silt Fences on Pikes Peak, 2009

Site ID	Rock Weir (Sediment Trap) Silt Fence Site Visit Dates 2009																			
002RW	5/11	5/18	5/27	6/3	6/9	6/23	6/29	7/7	7/13	7/21	7/29	8/4	8/13	8/18	8/27	9/4	9/16			
003RW	5/6	5/18	5/27	6/3	6/9	6/15	6/23	6/29	7/7	7/13	7/21	7/29	8/4	8/13	8/18	8/27	9/4	9/16		
006RW	5/11	5/18	5/27	6/3	6/9	6/15	6/23	6/29	7/7	7/13	7/21	7/29	8/4	8/13	8/18	8/27	9/4	9/16		
008RW	5/6	5/13	5/18	5/27	6/3	6/9	6/15		6/23	6/29	7/7	7/13	7/21	7/29	8/4	8/13	8/18	8/27	9/4	9/16
009RA	5/11	5/18	5/27	6/3	6/9	6/15	6/23	6/29	7/7	7/13	7/21	7/29	8/4	8/13	8/18	8/27	9/4	9/16		
152RW †	5/18	5/27	6/3	6/9																
161RW	5/11	5/18	5/27	6/3	6/9	6/15	6/23	6/29	7/7	7/13	7/21	7/29	8/4	8/13	8/18	8/27	9/4	9/16		
162RW ∞	5/11	5/18	5/27	6/3	6/9															
176RW	5/11	5/12	5/18	5/27	6/3	6/9	6/15	6/23	6/29	7/7	7/13	7/21	7/29	8/4	8/13	8/18	8/27	9/4	9/16	
178RW	5/11	5/12	5/18	5/27	6/3	6/9	6/15	6/23	6/29	7/7	7/13	7/21	7/29	8/4	8/13	8/18	8/27	9/4	9/16	
179RW	5/11	5/12	5/18	5/27	6/3	6/9	6/15	6/23	6/29	7/7	7/13	7/21	7/29	8/4	8/13	8/18	8/27	9/4	9/16	
180RW	5/11	5/18	5/27	6/3	6/9	6/15	6/23	6/29	7/6	7/7	7/13	7/21	7/29	8/4	8/13	8/18	8/27	9/4	9/16	
181RW	5/11	5/18	5/27	6/3	6/9	6/15	6/23	6/29	7/6	7/7	7/13	7/21	7/29	8/4	8/6	8/13	8/18	8/27	9/4	9/16
200RW	5/11	5/18	5/19	5/27	6/3	6/9	6/23	6/29	7/7	7/13	7/21	7/29	8/4	8/13	8/18	8/27	9/4	9/16		
201RW	5/11	5/18	5/27	6/3	6/9	6/15	6/23	6/29	7/7	7/13	7/21	7/29	8/4	8/13	8/18	8/27	9/4	9/16		
202RW	5/11	5/18	5/27	6/3	6/9	6/15	6/23	6/29	7/7	7/13	7/21	7/29	7/31	8/4	8/13	8/18	8/27	9/4	9/16	

† Silt fence below 152RW was removed on 6/9/2009 as it contained only eroded berm material from the rock weir and organic material.

∞ Rock Weir 162RW is full of sediment and water has been diverted by a sediment berm constructed by the Highway Dept. The silt fence below 162RW is full of sediment from the breached rock weir, but sediment accumulation will not be measured until the weir is cleaned-out by the Highway Dept.

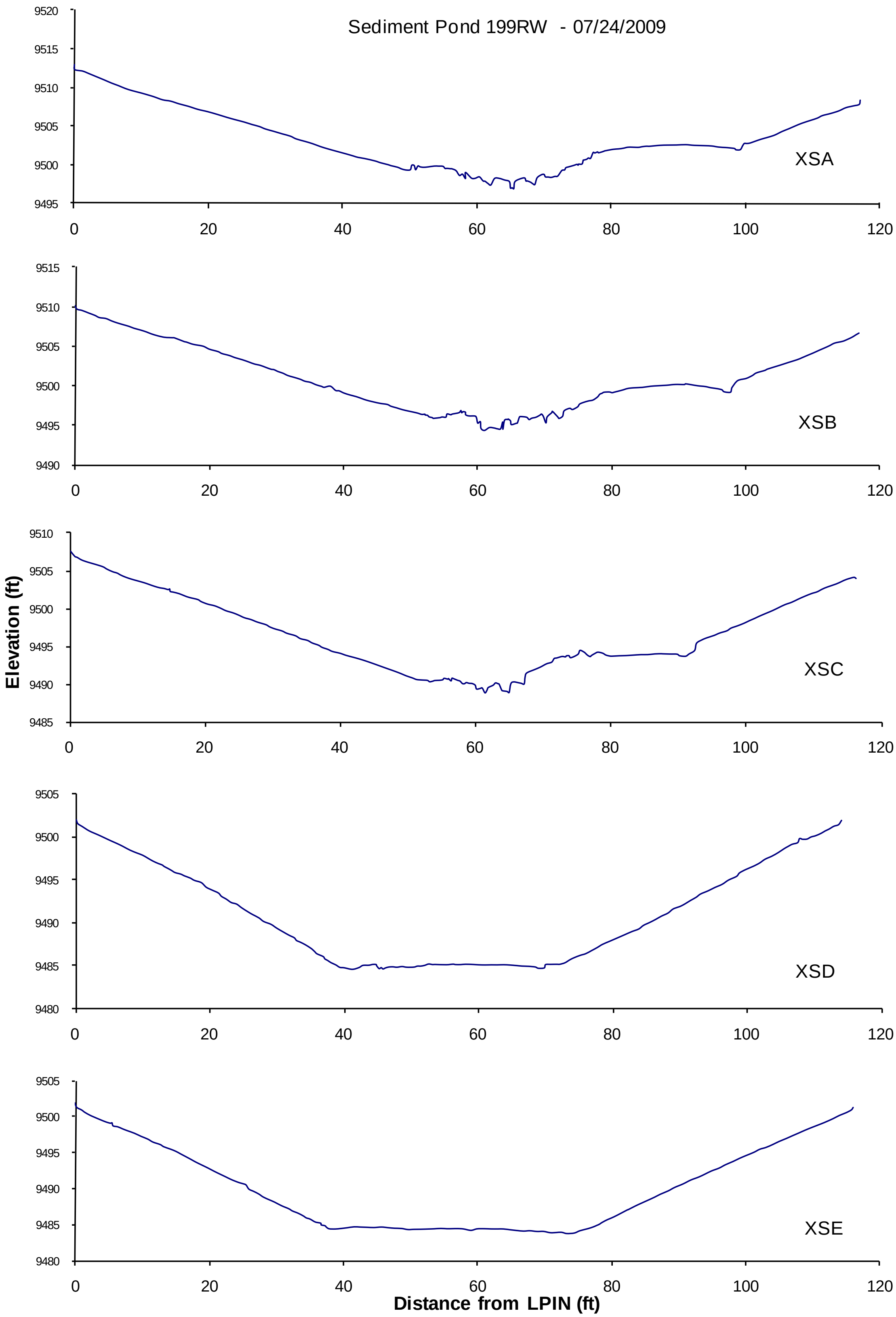
Sediment Accumulation in Rock Weir Silt Fences on Pikes Peak, 2009

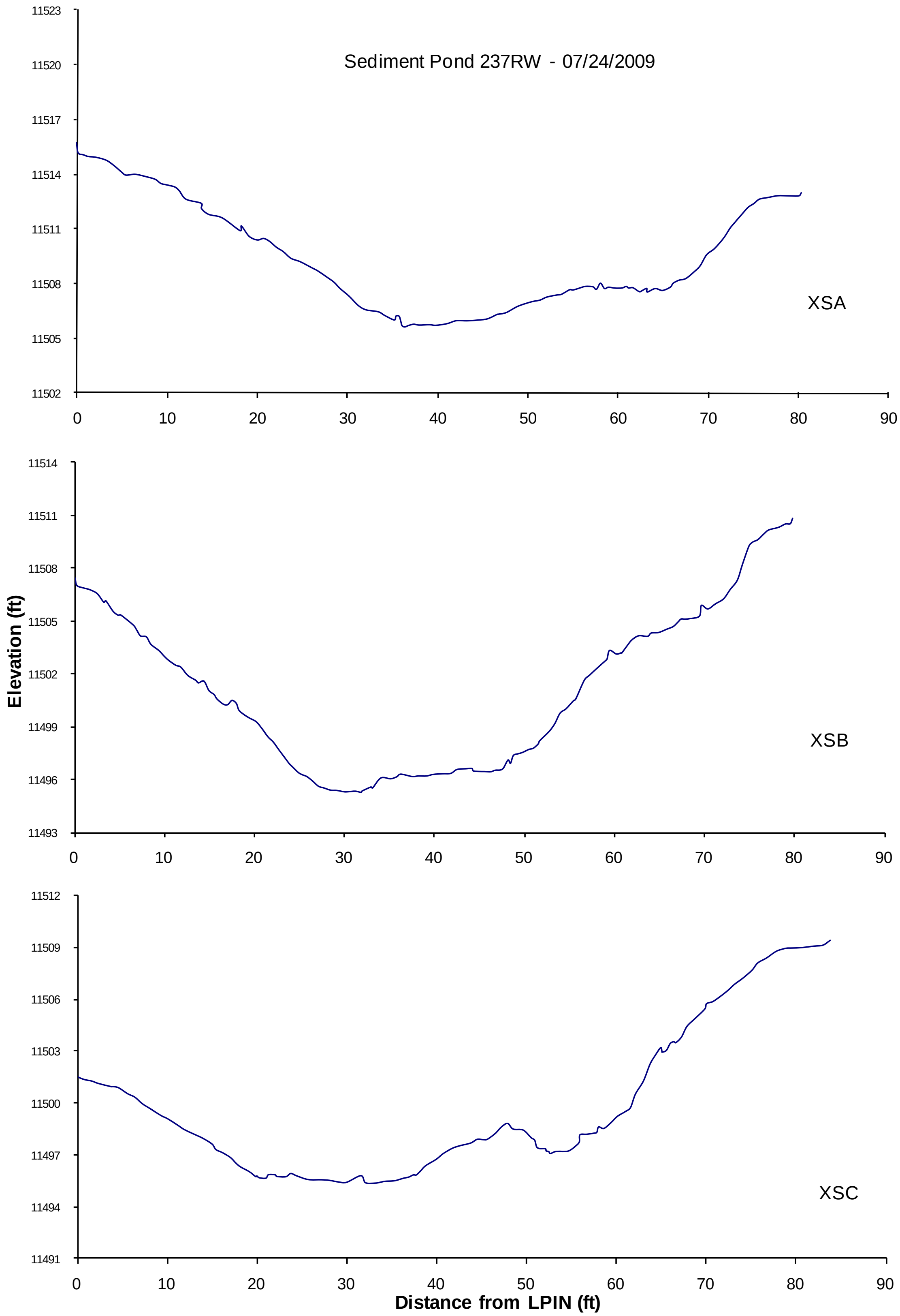
Site ID	Location	Date	Volume (ft^3)	Grab Sample
006RW	Silt Fence	5/6/09	0.03	Yes
176RW	Silt Fence	5/12/09	0.13	Yes
200RW	Silt Fence	5/19/09	0.07	Yes
180RW	Silt Fence	6/9/09	0.13	Yes
161RW	Silt Fence	6/12/09	0.07	Yes
176RW	Silt Fence	7/29/09	0.13	Yes
178RW	Silt Fence	7/29/09	0.07	Yes
181RW	Silt Fence	7/29/09	0.27	Yes
202RW	Silt Fence	7/29/09	0.07	Yes
181RW	Silt Fence	8/6/09	0.07	Yes
180RW	Silt Fence	8/18/09	0.27	Yes
180RW	Silt Fence	8/27/09	0.07	Yes
161RW	Silt Fence	9/4/09	0.07	Yes
181RW	Silt Fence	9/4/09	0.07	Yes

Rock Weir Sediment Accumulation Values on Pikes Peak, 2009

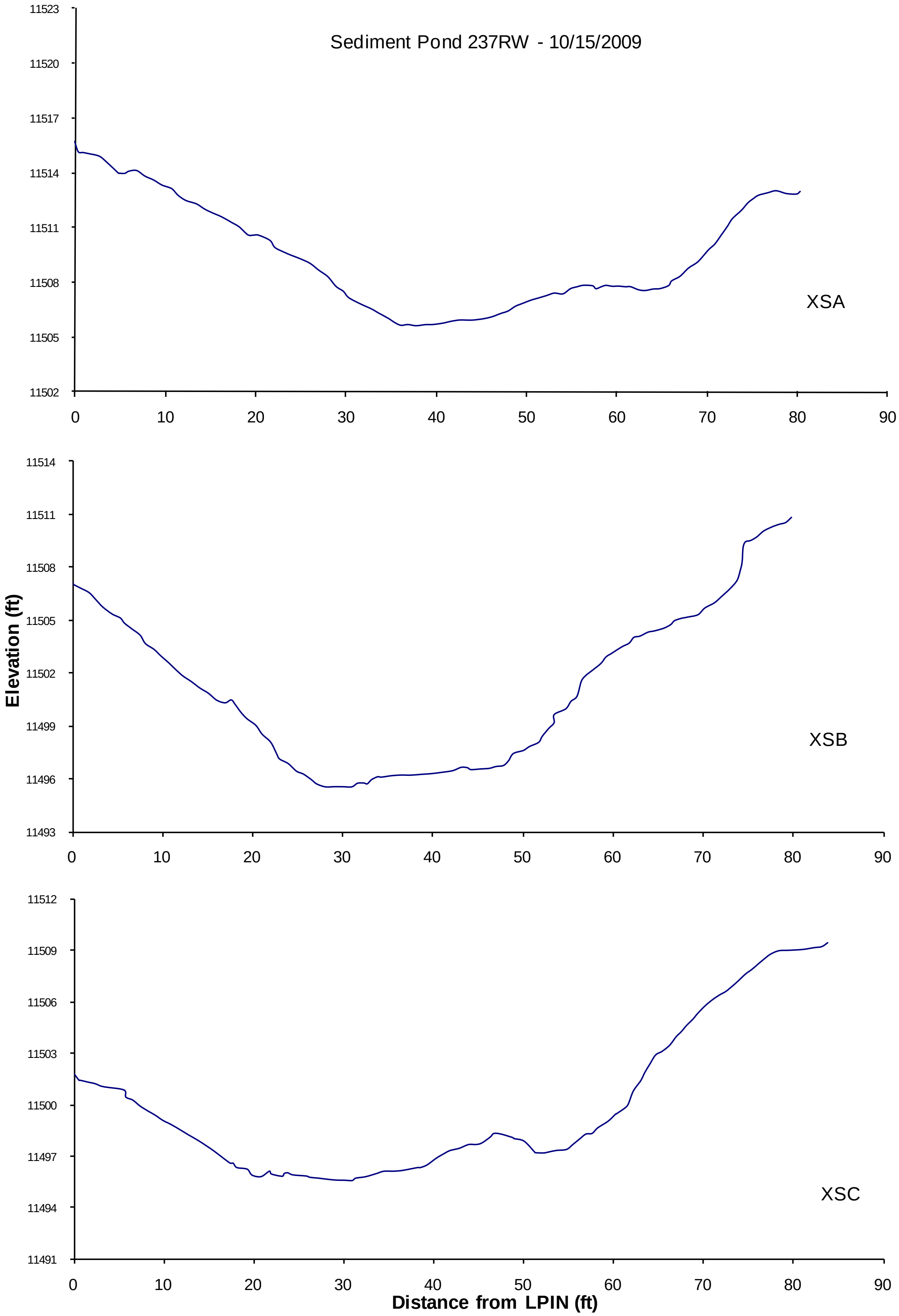
Site ID	Area (sq ft)	Survey1		Survey 2				Survey 3			
		Date	Average Elevation (ft)	Date	Average Elevation (ft)	Elevation Change (ft) †	Volume Change (ft^3) †	Date	Average Elevation (ft)	Elevation Change (ft) †	Volume Change (ft^3) †
002RW	1679	6/15/09	8998.08	9/30/09	8998.13	0.05	83.95				
003RW	521	6/12/09	8991.22	6/12/09	8991.30	0.08	41.68	9/24/09	8991.16	-0.14	-72.94
006RW	798	6/12/09	8997.00	9/24/09	8997.16	0.16	127.68				
008RW	1044	6/17/09	9498.99	10/14/09	9499.09	0.10	104.40				
009RA	905	6/11/09	9695.79	9/24/09	9695.82	0.03	27.15				
152RW	917	6/15/09	9791.82	10/13/09	9791.86	0.04	36.68				
153RW	1568	6/15/09	9452.44	10/14/09	9452.38	-0.06	-94.08				
161RW	263	6/12/09	9504.88	9/25/09	9504.94	0.06	15.78				
176RW	372	6/17/09	10193.91	10/14/09	10193.94	0.03	11.16				
178RW	377	6/17/09	10201.74	10/14/09	10201.65	-0.09	-33.93				
179RW	792	6/17/09	10214.65	10/14/09	10214.64	-0.01	-7.92				
180RW	542	6/17/09	10234.97	10/13/09	10235.33	0.36	195.12				
181RW	1299	6/18/09	10252.68	10/13/09	10253.03	0.35	454.65				
200RW	412	6/15/09	9194.68	10/14/09	9194.70	0.02	8.24				
201RW	183	6/12/09	9588.53	9/25/09	9588.51	-0.02	-3.66				
202RW	179	6/11/09	9690.43	9/30/09	9690.49	0.06	10.74				
233RW	359	6/25/09	11902.04	10/13/09	11902.19	0.15	53.85				
234RW	514	9/18/09	12100.20								
236RW	630	9/2/09	12457.75								
238RW	933	9/11/09	12198.66								
239RW	381	8/21/09	12799.02								
240RW	634	8/12/09	12897.07								
241RW	1015	8/19/09	12551.79								
242RW	1170	7/24/09	12900.89								
243RW	743	8/5/09	12897.12								

† Negative values imply a decrease in estimate of sediment accumulation between two surveys


Sediment Pond 199RW - 07/24/2009
XSA
XSB
XSC
XSD
XSE
Elevation (ft)
Distance from LPIN (ft)
9520
9515
9510
9505
9500
9495
9490
9485
9480
0
20
40
60
80
100
120



Sediment Pond 237RW - 07/24/2009
XSA
XSB
XSC
Elevation (ft)
Distance from LPIN (ft)


Sediment Pond 237RW - 10/15/2009
XSA
XSB
XSC
Elevation (ft)
Distance from LPIN (ft)
11523
11520
11517
11514
11511
11508
11505
11502
11499
11496
11493
11512
11509
11506
11503
11500
11497
11494
11491
0
10
20
30
40
50
60
70
80
90

Appendix M

Rock Weir and Sediment Pond

Particle Size Distribution and Graphs
and
Suspended Sediment Data

2009

Summary of Rock Weir and Silt Fence Particle Size Distribution from Sieve Analysis of Grab Samples on Pikes Peak, 2008 and 2009

			Particle Size Distribution–Grab Samples 2008–2009					
Site Name	**ID**	**Date**	**D15**	**D35**	**D50**	**D84**	**D95**	**D100**
Pikes Peak Highway–Rock Weir	161RW Rock Weir	9/22/2008	0.056	0.822	1.662	5.116	8.573	12.0
Pikes Peak Highway–Rock Weir	161RW Silt Fence	9/22/2008	0.086	0.944	1.875	7.557	19.732	31.0
Pikes Peak Highway–Rock Weir	202RW Silt Fence	5/19/2008	0.297	1.008	1.903	6.856	13.542	19.0
Pikes Peak Highway–Rock Weir	239RW Rock Weir	9/5/2008	0.112	0.900	1.704	8.865	33.078	35.0
Pikes Peak Highway–Rock Weir	240RW Rock Weir	7/14/2008	0.064	0.835	1.564	4.950	8.588	15.0
Pikes Peak Highway–Rock Weir	008RW Rock Weir	10/14/2009	0.068	0.730	1.294	4.138	8.920	17.0
Pikes Peak Highway–Rock Weir	161RW Silt Fence	6/12/2009	0.422	1.462	3.035	32.608	37.526	40.0
Pikes Peak Highway–Rock Weir	161RW Rock Weir	6/12/2009	0.200	1.122	1.890	5.053	7.869	15.0
Pikes Peak Highway–Rock Weir	237RW Rock Weir	7/24/2009	0.634	1.760	2.990	9.905	34.252	38.0
Pikes Peak Highway–Rock Weir	241RW Rock Weir	8/19/2009	0.063	0.813	1.607	5.496	10.458	21.0
Pikes Peak Highway–Rock Weir	243RW Rock Weir	8/5/2009	0.022	0.213	0.761	5.350	14.363	20.0

Sieve Analysis Worksheet

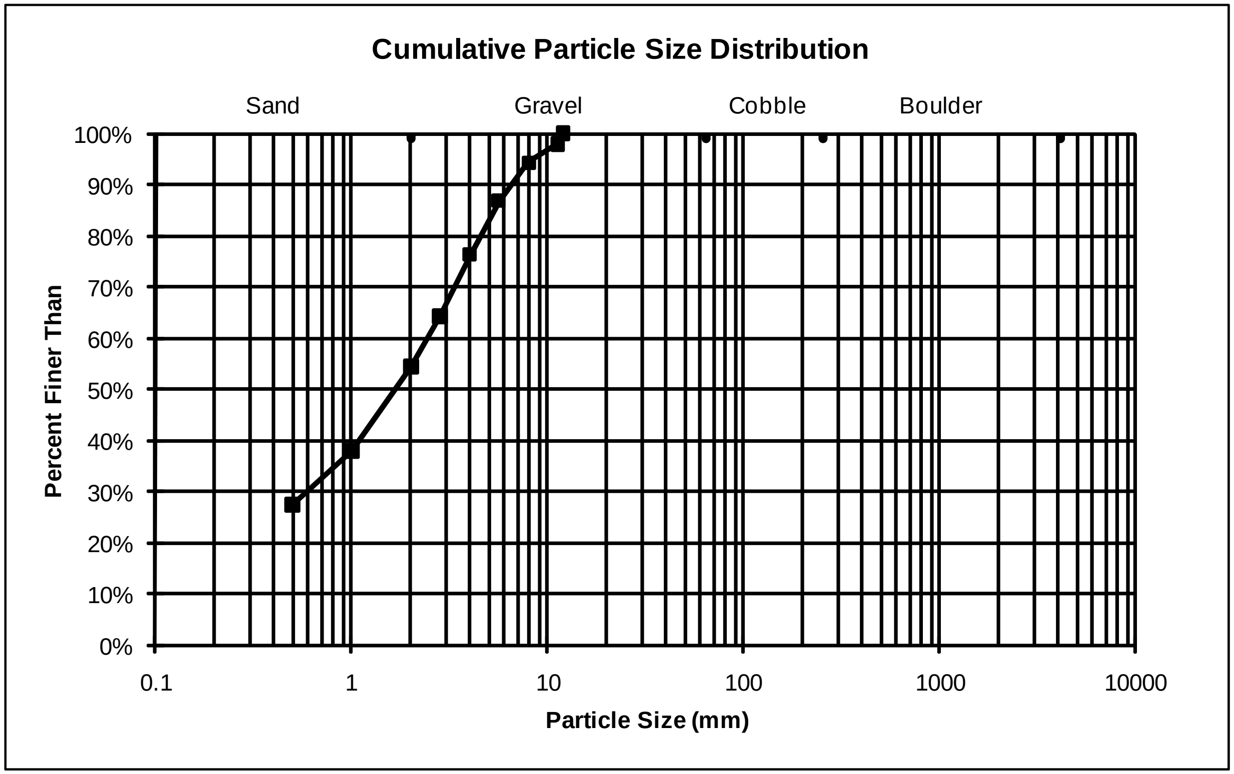
Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	162.60	27.4%	
0.5	62.90	10.6%	27.4%
1.0	97.20	16.4%	38.0%
2.0	58.80	9.9%	54.4%
2.8	71.10	12.0%	64.3%
4.0	62.80	10.6%	76.3%
5.6	43.90	7.4%	86.8%
8.0	22.00	3.7%	94.2%
11.2	12.20	2.1%	97.9%
12.0	*		100.0%
22.4			-
32.0			
45.0			
64.0			
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	593.50		

*Measured value of the largest particle in the sample and not a sieve weight

COMMENTS: Grab Sample of 2008 Sediment Accumulation

SITE NAME: Pike's Peak Highway - Rock Weir
ID NUMBER: 161RW Rock Weir
DATE: 9/22/2008
CREW: Derengowski/VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	0.056	0.822	1.662	5.116	8.573	12.0



Sieve Analysis Worksheet

Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	185.50	23.5%	
0.5	98.80	12.5%	23.5%
1.0	121.40	15.4%	36.0%
2.0	65.80	8.3%	51.4%
2.8	83.80	10.6%	59.8%
4.0	59.40	7.5%	70.4%
5.6	56.90	7.2%	77.9%
8.0	32.00	4.1%	85.2%
11.2	22.80	2.9%	89.2%
16.0	36.70	4.7%	92.1%
22.4	25.60	3.2%	96.8%
31.0	*		100.0%
45.0			-
64.0			
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	788.70		

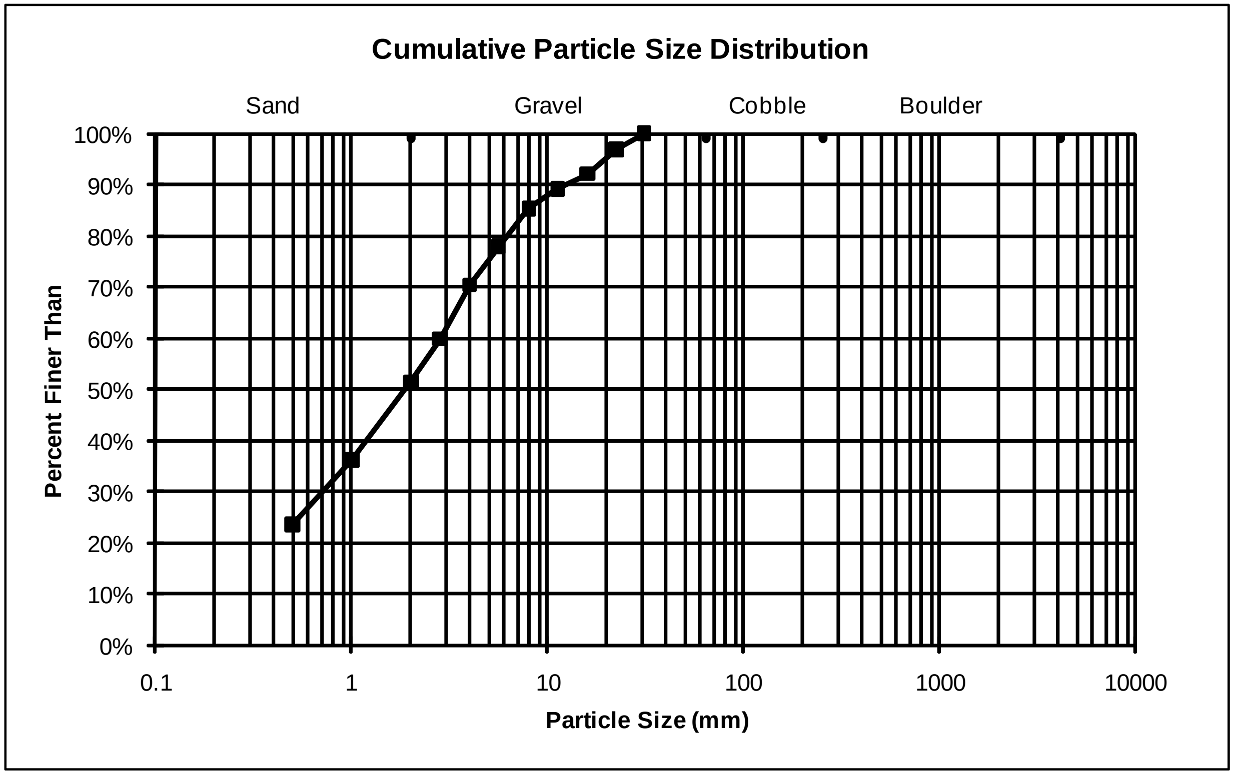
*Measured value of the largest particle in the sample and not a sieve weight

COMMENTS: Grab Sample of 2008 Sediment Accumulation

SITE NAME: Pike's Peak Highway - Rock Weir
ID NUMBER: 161RW Silt Fence
DATE: 9/22/2008
CREW: Derengowski/VonLoh

Particle Size Distribution (mm)

D15	D35	D50	D84	D95	Lpart
0.086	0.944	1.875	7.557	19.732	31.0



Sieve Analysis Worksheet

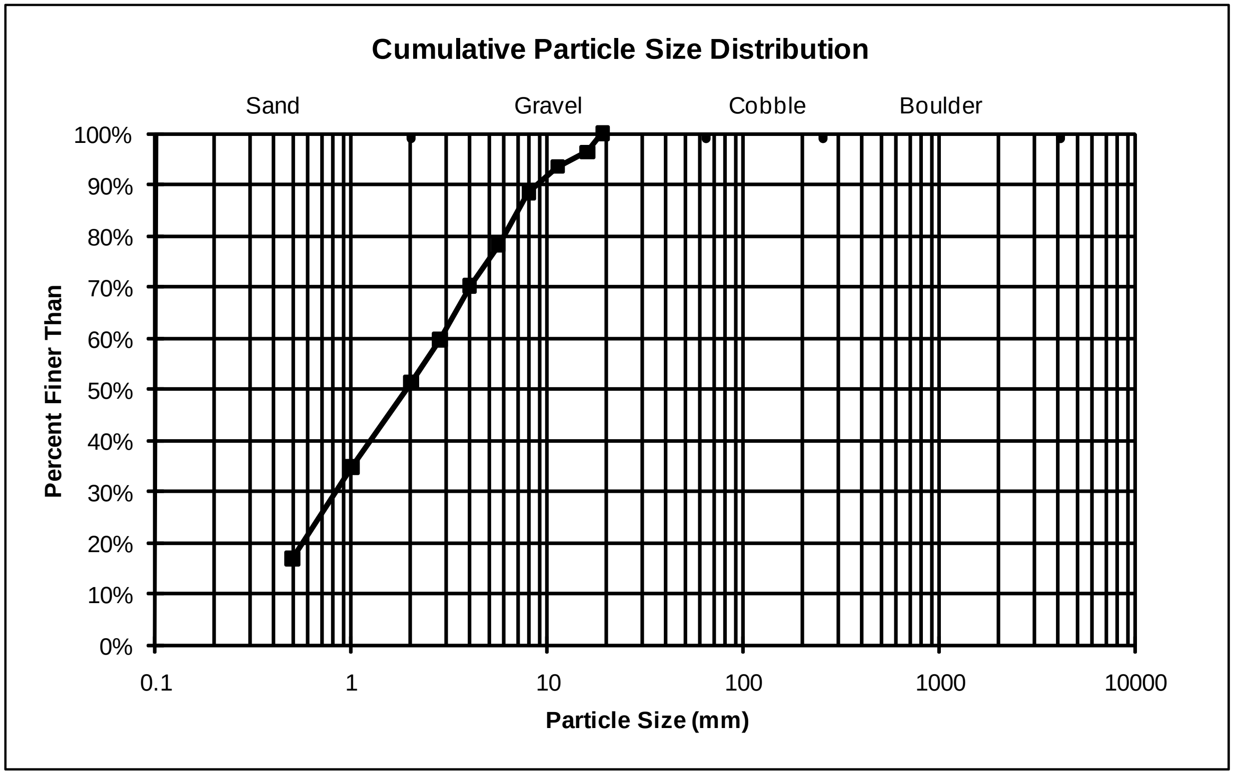
Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	99.00	16.8%	
0.5	106.00	18.0%	16.8%
1.0	96.40	16.4%	34.8%
2.0	50.50	8.6%	51.2%
2.8	61.50	10.4%	59.7%
4.0	47.10	8.0%	70.2%
5.6	60.40	10.3%	78.2%
8.0	29.60	5.0%	88.4%
11.2	17.00	2.9%	93.5%
16.0	21.50	3.7%	96.3%
19.0	*		100.0%
32.0			-
45.0			
64.0			
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	589.00		

*Measured value of the largest particle in the sample and not a sieve weight

COMMENTS: Grab Sample of 2008 Sediment Accumulation

SITE NAME: Pike's Peak Highway - Rock Weir
ID NUMBER: 202RW Silt Fence
DATE: 5/19/2008
CREW: Derengowski/VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	0.297	1.008	1.903	6.856	13.542	19.0



Sieve Analysis Worksheet

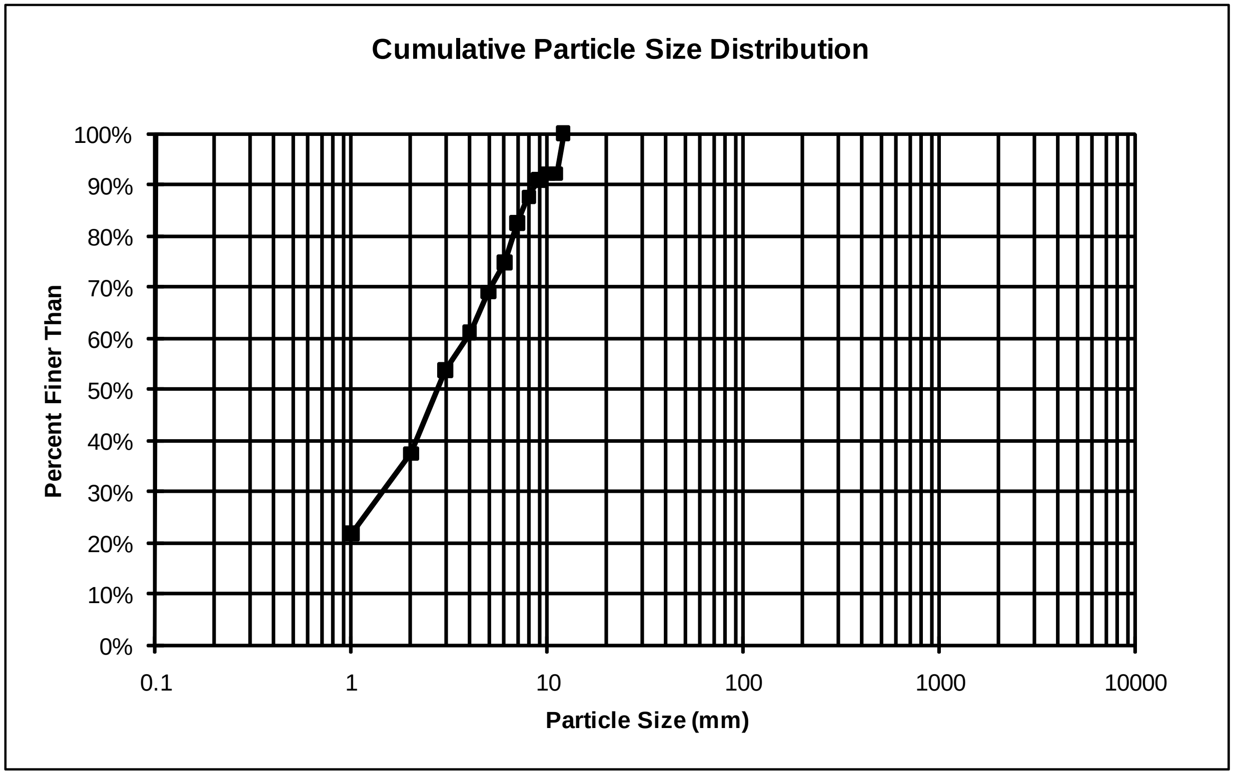
Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	165.10	21.7%	
0.5	119.60	15.7%	21.7%
1.0	124.90	16.4%	37.4%
2.0	55.00	7.2%	53.8%
2.8	60.70	8.0%	61.0%
4.0	44.60	5.9%	69.0%
5.6	57.80	7.6%	74.8%
8.0	39.20	5.1%	82.4%
11.2	24.60	3.2%	87.6%
16.0	9.60	1.3%	90.8%
22.4	0.00	0.0%	92.1%
32.0	60.40	7.9%	92.1%
35.0	*		100.0%
64.0			-
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	761.50		

*Measured value of the largest particle in the sample and not a sieve weight

COMMENTS: Grab Sample of 2008 Sediment Accumulation

SITE NAME: Pike's Peak Highway - Rock Weir
ID NUMBER: 239RW Rock Weir
DATE: 9/5/2008
CREW: Derengowski/VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	0.112	0.900	1.704	8.865	33.078	35.0



Sieve Analysis Worksheet

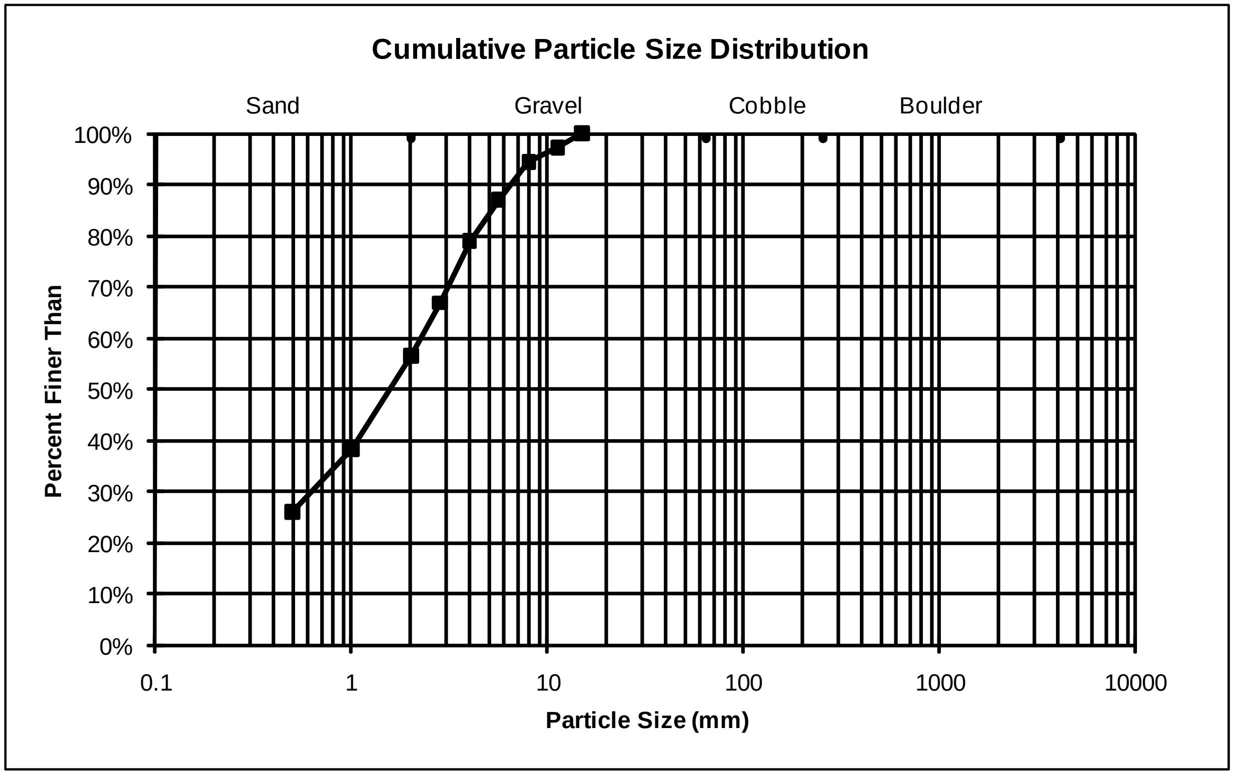
Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	159.60	26.1%	
0.5	73.90	12.1%	26.1%
1.0	112.60	18.4%	38.1%
2.0	62.90	10.3%	56.5%
2.8	74.30	12.1%	66.8%
4.0	49.00	8.0%	78.9%
5.6	45.80	7.5%	86.9%
8.0	17.00	2.8%	94.4%
11.2	17.20	2.8%	97.2%
15.0	*		100.0%
22.4			-
32.0			
45.0			
64.0			
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	612.30		

*Measured value of the largest particle in the sample and not a sieve weight

COMMENTS: Grab Sample of 2008 Sediment Accumulation

SITE NAME: Pike's Peak Highway - Rock Weir
ID NUMBER: 240RW Rock Weir
DATE: 7/14/2008
CREW: Derengowski/VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	0.064	0.835	1.564	4.950	8.588	15.0



Sieve Analysis Worksheet

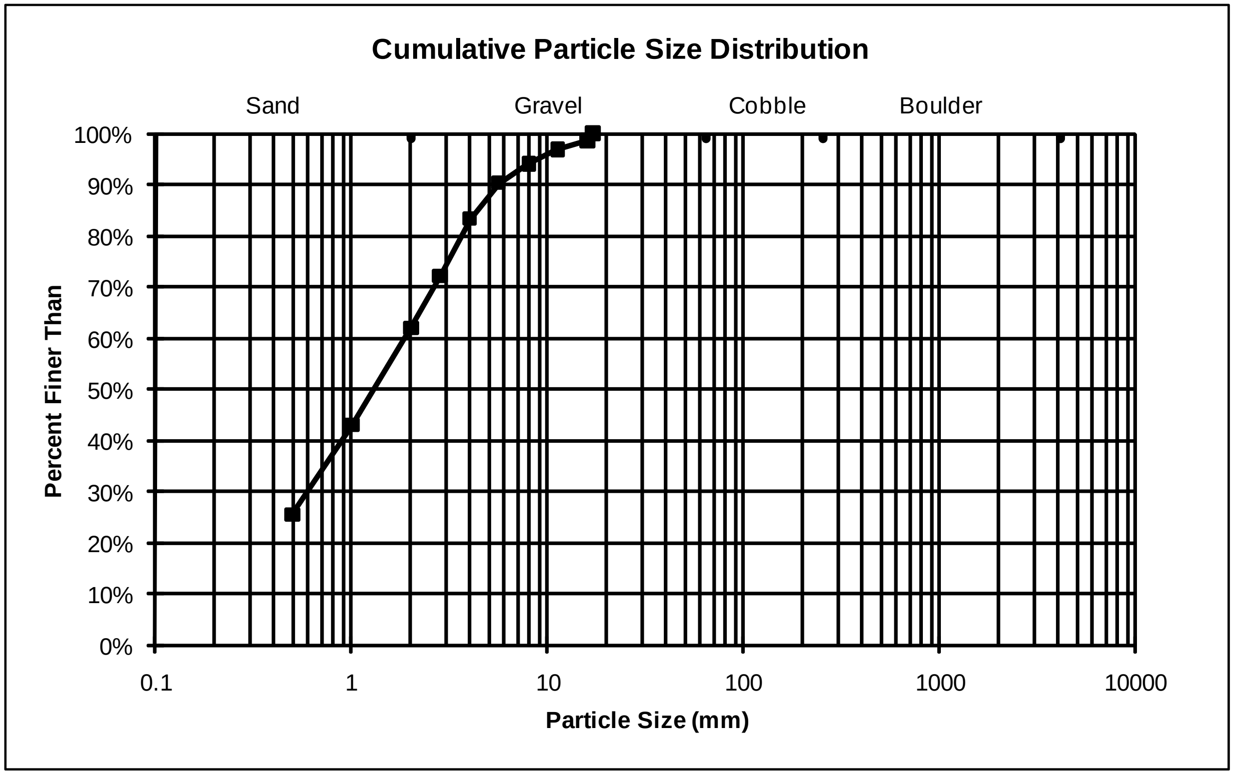
COMMENTS: Grab Sample of 2009 Sediment Accumulation

Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	224.20	25.5%	
0.5	153.60	17.5%	25.5%
1.0	167.40	19.0%	42.9%
2.0	89.20	10.1%	62.0%
2.8	98.60	11.2%	72.1%
4.0	61.60	7.0%	83.3%
5.6	33.60	3.8%	90.3%
8.0	24.10	2.7%	94.1%
11.2	14.40	1.6%	96.9%
16.0	13.30	1.5%	98.5%
17.0	*		100.0%
32.0			-
45.0			
64.0			
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	880.00		

*Measured value of the largest particle in the sample and not a sieve weight

SITE NAME: Pike's Peak Highway - Rock Weir
ID NUMBER: 008RW Rock Weir
DATE: 10/14/2009
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	0.068	0.730	1.294	4.138	8.920	17.0



Sieve Analysis Worksheet

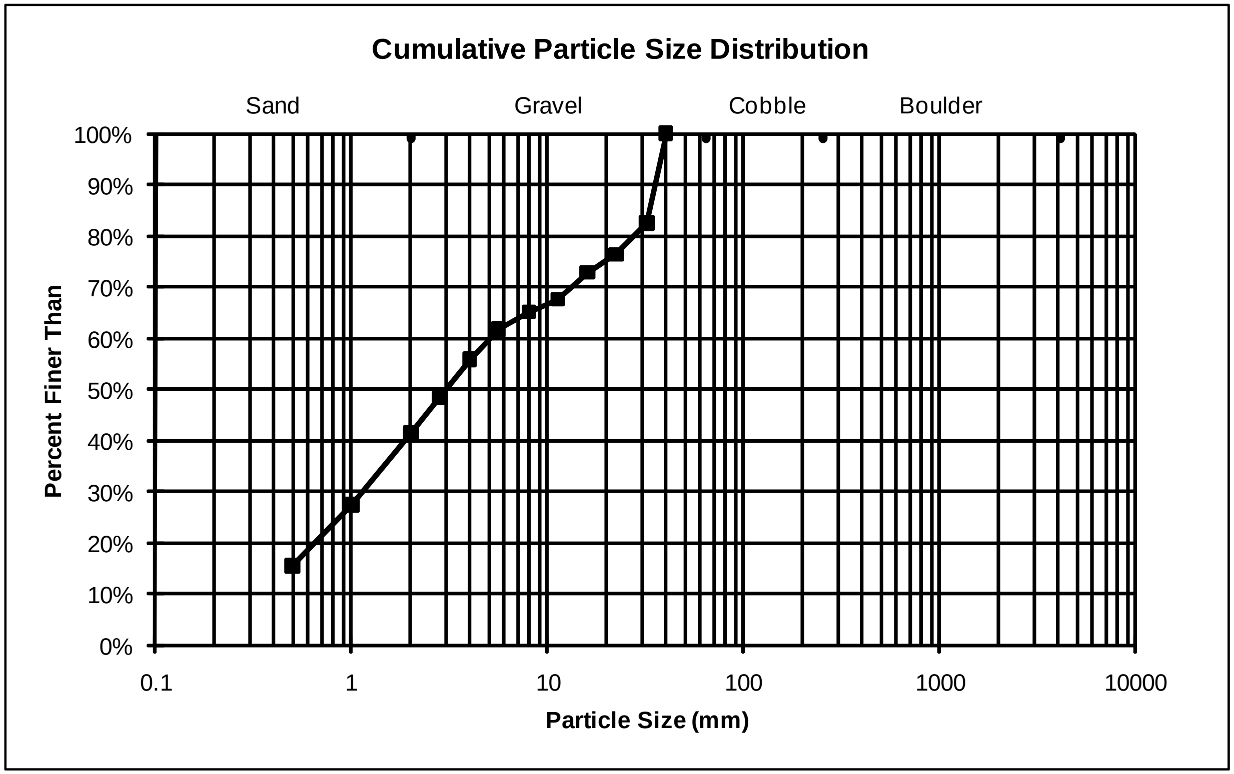
Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	100.80	15.5%	
0.5	76.60	11.8%	15.5%
1.0	90.40	13.9%	27.4%
2.0	45.40	7.0%	41.3%
2.8	48.70	7.5%	48.3%
4.0	38.40	5.9%	55.8%
5.6	21.70	3.3%	61.7%
8.0	15.90	2.5%	65.1%
11.2	34.00	5.2%	67.5%
16.0	23.10	3.6%	72.8%
22.4	40.10	6.2%	76.3%
32.0	113.30	17.5%	82.5%
40.0	*		100.0%
64.0			-
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	648.40		

*Measured value of the largest particle in the sample and not a sieve weight

COMMENTS: Grab Sample of 2009 Sediment Accumulation

SITE NAME: Pike's Peak Highway - Rock Weir
ID NUMBER: 161RW Silt Fence
DATE: 6/12/2009
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	0.422	1.462	3.035	32.608	37.526	40.0



Sieve Analysis Worksheet

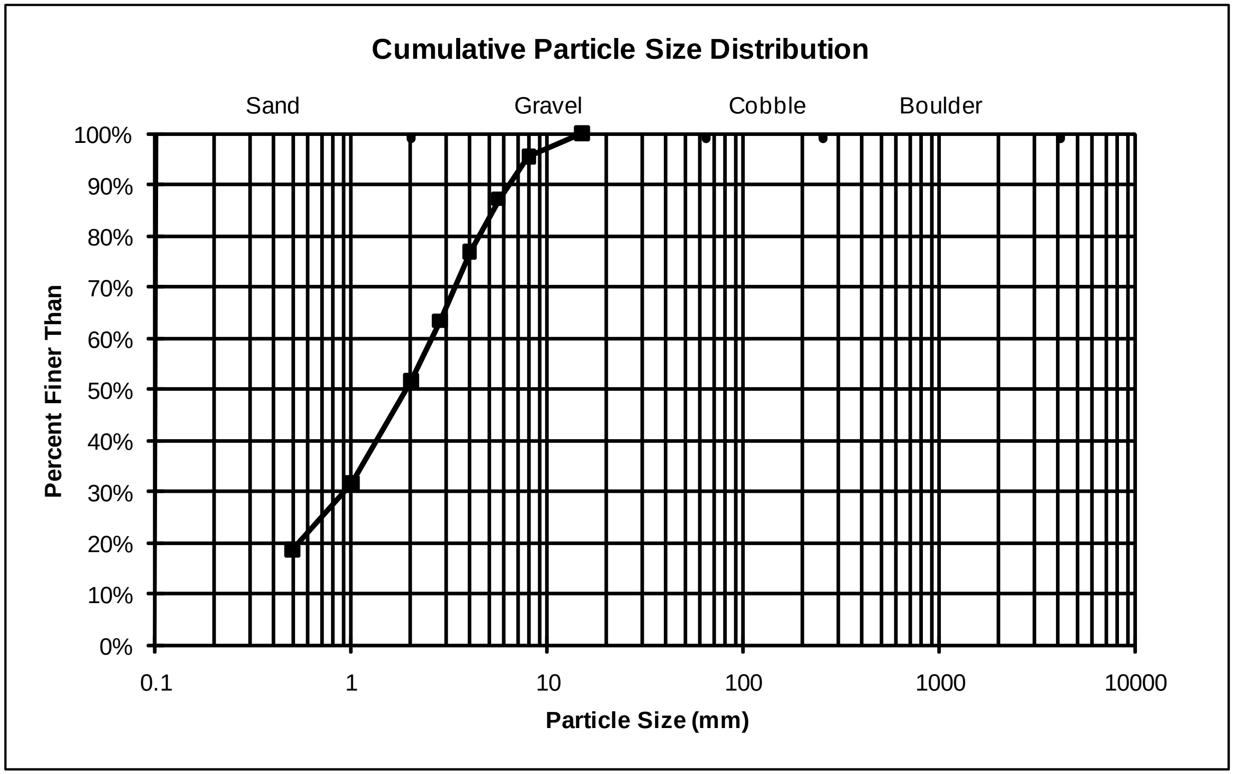
Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	120.60	18.5%	
0.5	86.00	13.2%	18.5%
1.0	130.00	19.9%	31.7%
2.0	76.10	11.7%	51.6%
2.8	88.30	13.5%	63.3%
4.0	67.10	10.3%	76.9%
5.6	53.70	8.2%	87.1%
8.0	30.10	4.6%	95.4%
15.0	*		100.0%
16.0			-
22.4			
32.0			
45.0			
64.0			
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	651.90		

*Measured value of the largest particle in the sample and not a sieve weight

COMMENTS: Grab Sample of 2009 Sediment Accumulation

SITE NAME: Pike's Peak Highway - Rock Weir
ID NUMBER: 161RW Rock Weir
DATE: 6/12/2009
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	0.200	1.122	1.890	5.053	7.869	15.0



Sieve Analysis Worksheet

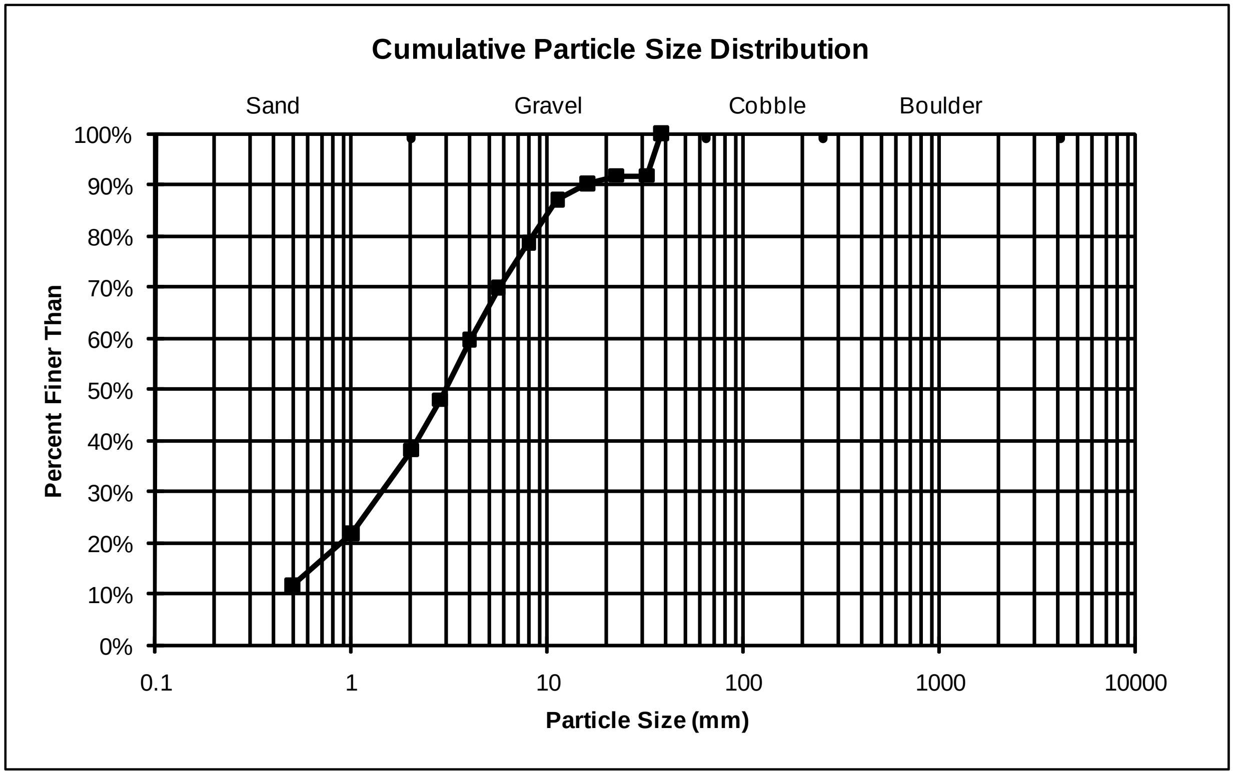
Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	113.20	11.5%	
0.5	100.10	10.2%	11.5%
1.0	160.60	16.3%	21.7%
2.0	96.70	9.8%	38.0%
2.8	115.10	11.7%	47.8%
4.0	100.70	10.2%	59.5%
5.6	87.00	8.8%	69.8%
8.0	83.20	8.5%	78.6%
11.2	29.80	3.0%	87.1%
16.0	15.80	1.6%	90.1%
22.4	0.00	0.0%	91.7%
32.0	81.40	8.3%	91.7%
38.0	*		100.0%
64.0			-
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	983.60		

*Measured value of the largest particle in the sample and not a sieve weight

COMMENTS: Grab Sample of 2009 Sediment Accumulation

SITE NAME: Pike's Peak Highway - Rock Weir
ID NUMBER: 237RW Rock Weir
DATE: 7/24/2009
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	0.634	1.760	2.990	9.905	34.252	38.0



Sieve Analysis Worksheet

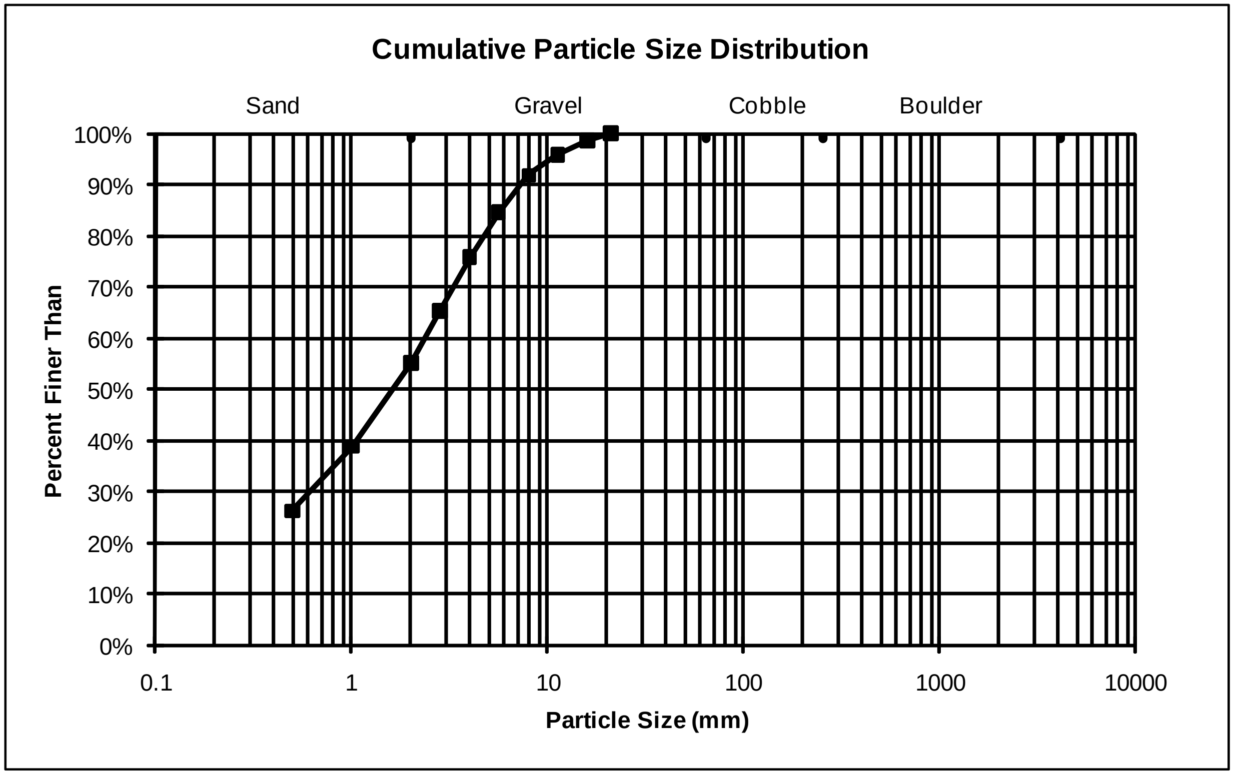
Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	162.70	26.2%	
0.5	78.40	12.6%	26.2%
1.0	102.00	16.4%	38.8%
2.0	62.20	10.0%	55.2%
2.8	66.00	10.6%	65.2%
4.0	54.10	8.7%	75.8%
5.6	45.50	7.3%	84.5%
8.0	25.00	4.0%	91.8%
11.2	16.60	2.7%	95.8%
16.0	9.40	1.5%	98.5%
21.0	*		100.0%
32.0			-
45.0			
64.0			
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	621.90		

*Measured value of the largest particle in the sample and not a sieve weight

COMMENTS: Grab Sample of 2009 Sediment Accumulation

SITE NAME: Pike's Peak Highway - Rock Weir
ID NUMBER: 241RW Rock Weir
DATE: 8/19/2009
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	0.063	0.813	1.607	5.496	10.458	21.0



Sieve Analysis Worksheet

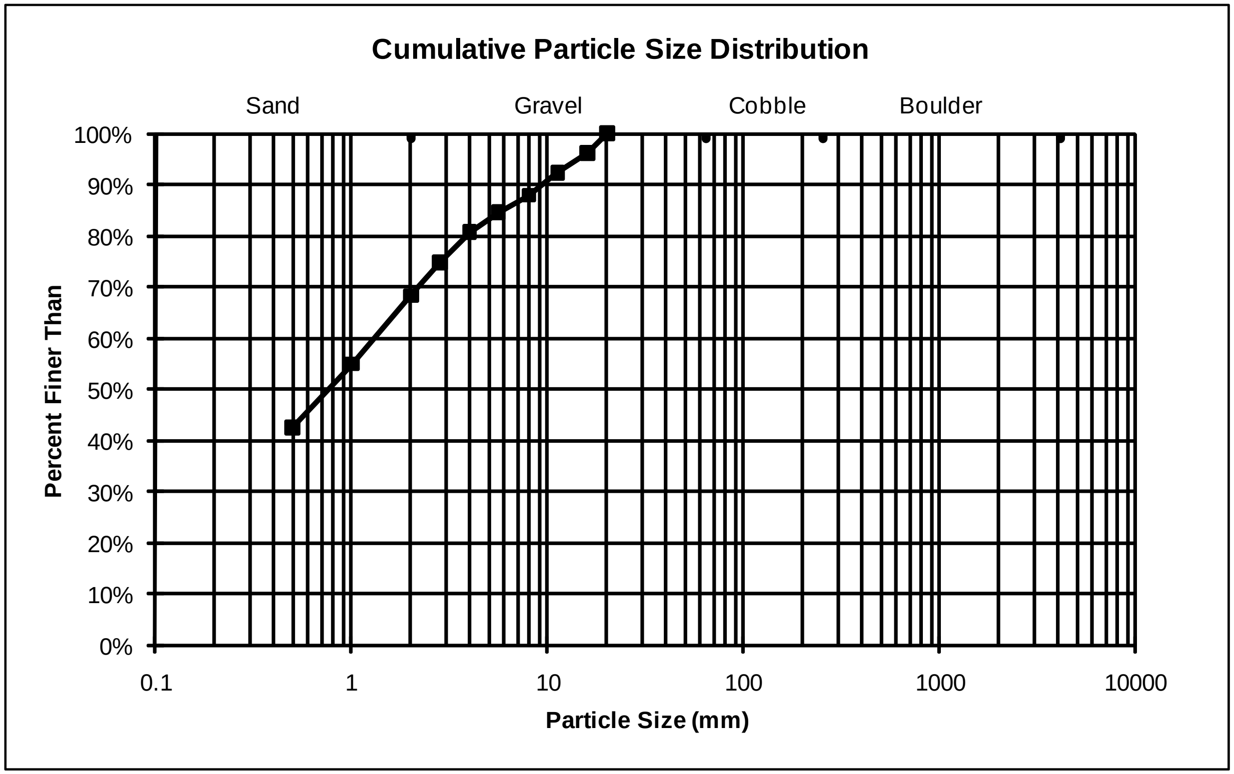
Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	293.70	42.5%	
0.5	85.80	12.4%	42.5%
1.0	92.40	13.4%	54.9%
2.0	45.40	6.6%	68.3%
2.8	40.40	5.8%	74.8%
4.0	26.70	3.9%	80.7%
5.6	23.00	3.3%	84.5%
8.0	31.30	4.5%	87.9%
11.2	26.00	3.8%	92.4%
16.0	26.70	3.9%	96.1%
20.0	*		100.0%
32.0			-
45.0			
64.0			
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	691.40		

*Measured value of the largest particle in the sample and not a sieve weight

COMMENTS: Grab Sample of 2009 Sediment Accumulation

SITE NAME: Pike's Peak Highway - Rock Weir
ID NUMBER: 243RW Rock Weir
DATE: 8/5/2009
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	0.022	**0.213**	**0.761**	**5.350**	**14.363**	**20.0**



Summary of Sediment Pond 199RW Suspended Sediment Analysis of Grab Samples on Pikes Peak, 2009

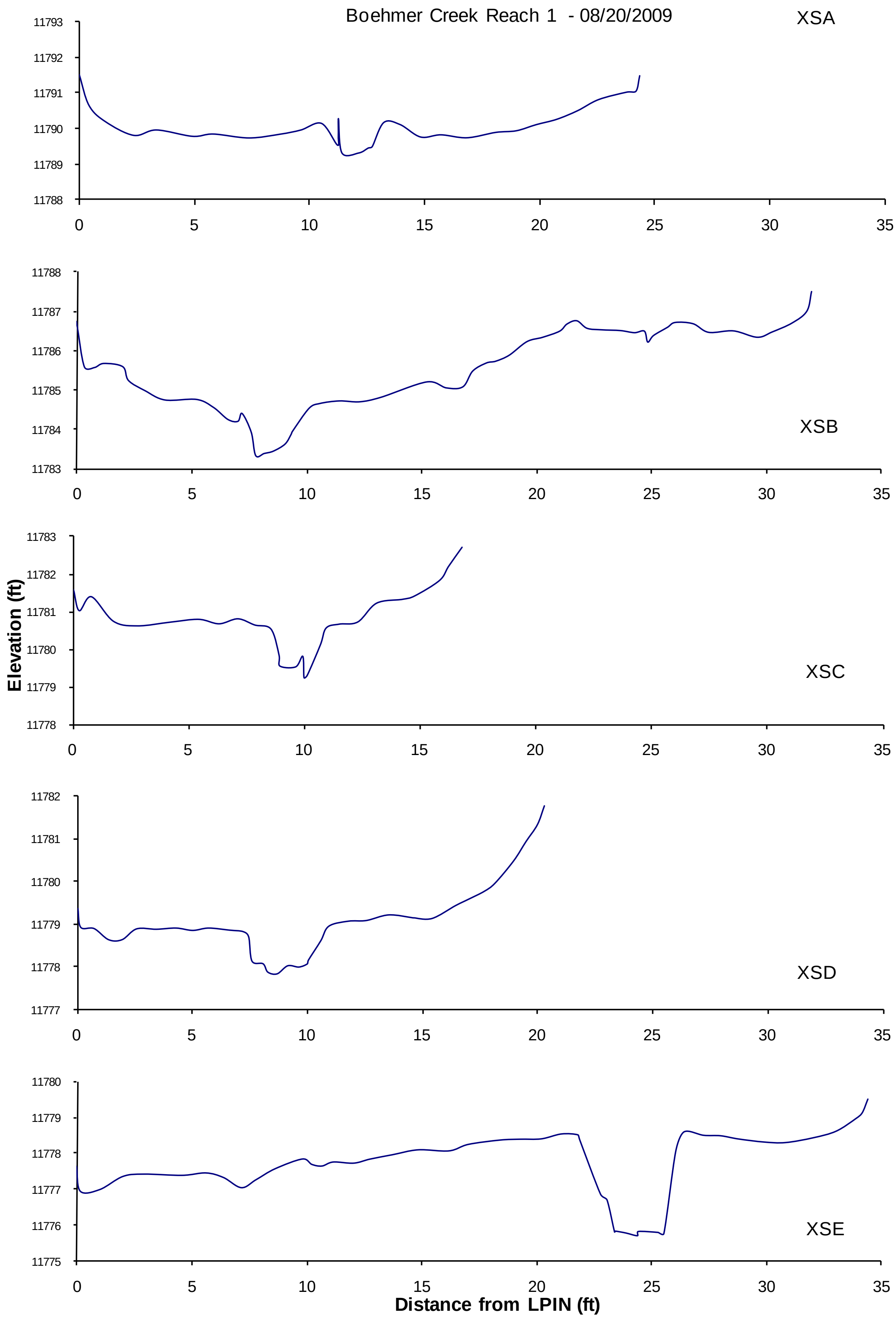
Site ID	Date	Tin + Filter Initial (g)	Tin +Filter Final (g)	Bottle Initial (g)	Bottle Final (g)	Weight Sample (g)	Weight Solids (g)	Solids (mg/l)
199RW 1A Entrance Culvert	05/26/09	1.4208	1.4219	978.7	106.9	871.8	0.0011	1.3
199RW 1B Entrance Culvert	05/26/09	1.4079	1.4133	1114.1	91.6	1022.5	0.0054	5.3
199RW 2A Above Sed Pond	05/26/09	1.4180	1.4222	1108.1	107.8	1000.3	0.0042	4.2
199RW 2B Above Sed Pond	05/26/09	1.4185	1.4283	1095.1	108.1	987.0	0.0098	9.9
199RW 3A Exit Culvert	05/26/09	1.3715	1.3751	1130.8	107.7	1023.1	0.0036	3.5
199RW 3B Exit Culvert	05/26/09	1.3574	1.3597	1101.9	108.7	993.2	0.0023	2.3
199RW 1A Entrance Culvert	07/25/09	1.4329	2.1332	1142.0	107.5	1034.5	0.7003	676.9
199RW 1B Entrance Culvert	07/25/09	1.4118	2.1491	1107.2	106.9	1000.3	0.7373	737.1
199RW 2A Above Sed Pond	07/25/09	1.4091	2.0076	1065.9	107.8	958.1	0.5985	624.7
199RW 2B Above Sed Pond	07/25/09	1.4102	1.8981	963.0	107.0	856.0	0.4879	570.0
199RW 3A Exit Culvert	07/25/09	1.4096	1.6691	1054.5	93.1	961.4	0.2595	269.9
199RW 3B Exit Culvert	07/25/09	1.4356	1.6782	992.8	94.3	898.5	0.2426	270.0
199RW 1A Entrance Culvert	07/29/09	1.4169	1.8414	1096.2	106.7	989.5	0.4245	429.0
199RW 1B Entrance Culvert	07/29/09	1.4348	1.9542	1102.8	102.1	1000.7	0.5194	519.0
199RW 2A Above Sed Pond	07/29/09	1.3972	1.6094	1071.3	102.0	969.3	0.2122	218.9
199RW 2B Above Sed Pond	07/29/09	1.4118	1.6061	1076.3	102.3	974.0	0.1943	199.5
199RW 3A Exit Culvert	07/29/09	1.3648	1.3654	1088.2	102.4	985.8	0.0006	0.6
199RW 3B Exit Culvert	07/29/09	1.3680	1.3683	1050.4	102.7	947.7	0.0003	0.3
199RW 1A Entrance Culvert	07/31/09	1.4435	2.4038	1142.0	106.2	1035.8	0.9603	927.1
199RW 1B Entrance Culvert	07/31/09	1.5322	2.5867	1101.9	102.1	999.8	1.0545	1054.7
199RW 2A Above Sed Pond	07/31/09	1.4196	2.0515	1127.8	102.7	1025.1	0.6319	616.4
199RW 2B Above Sed Pond	07/31/09	1.4219	2.1685	1119.3	102.2	1017.1	0.7466	734.0
199RW 3A Exit Culvert	07/31/09	1.5374	1.6813	1126.6	102.3	1024.3	0.1439	140.5
199RW 3B Exit Culvert	07/31/09	1.4005	1.5452	1131.4	105.9	1025.5	0.1447	141.1
199RW 1A Entrance Culvert	09/16/09	1.4039	1.6282	1084.3	91.7	992.6	0.2243	226.0
199RW 1B Entrance Culvert	09/16/09	1.3928	1.7014	1135.5	92.8	1042.7	0.3086	296.0
199RW 2A Above Sed Pond	09/16/09	1.4256	1.5174	1108.4	109.4	999.0	0.0918	91.9
199RW 2B Above Sed Pond	09/16/09	1.3536	1.4648	1139.7	92.0	1047.7	0.1112	106.1
199RW 3A Exit Culvert	09/16/09	1.3554	1.3577	1104.4	108.2	996.2	0.0023	2.3
199RW 3B Exit Culvert	09/16/09	1.4040	1.4067	1108.8	107.8	1001.0	0.0027	2.7

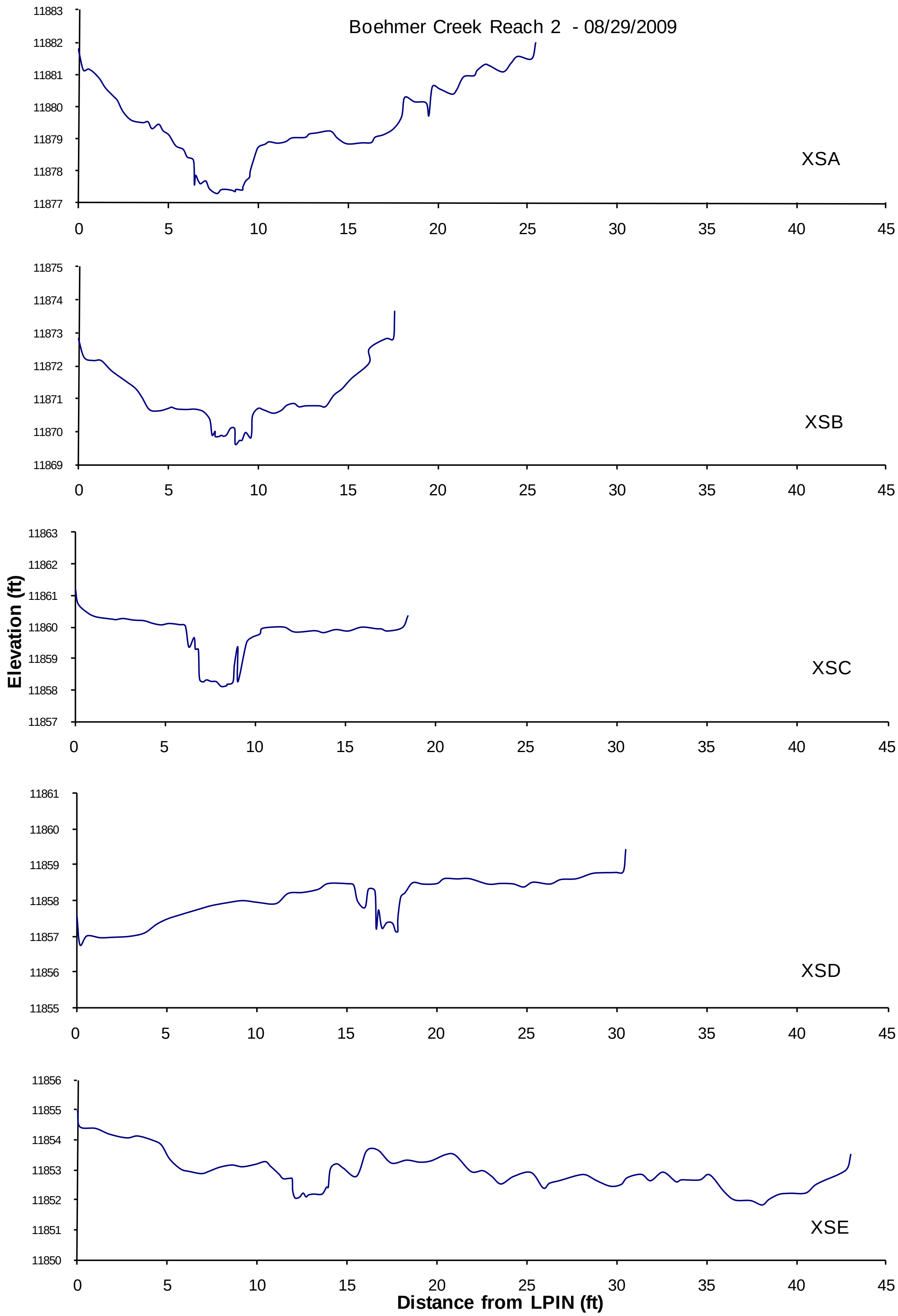
Appendix N

Stream Channel

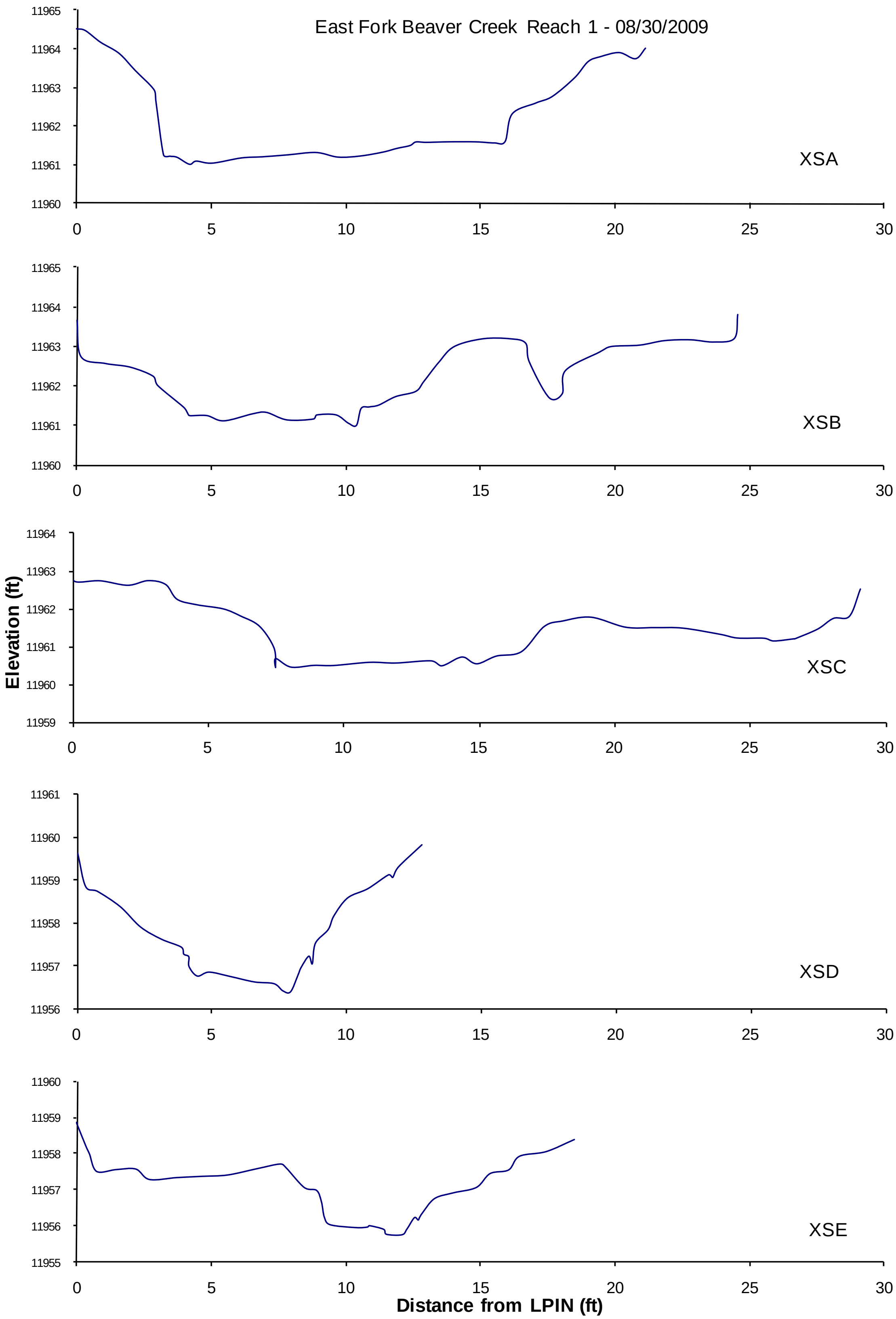
Cross Section Graphs

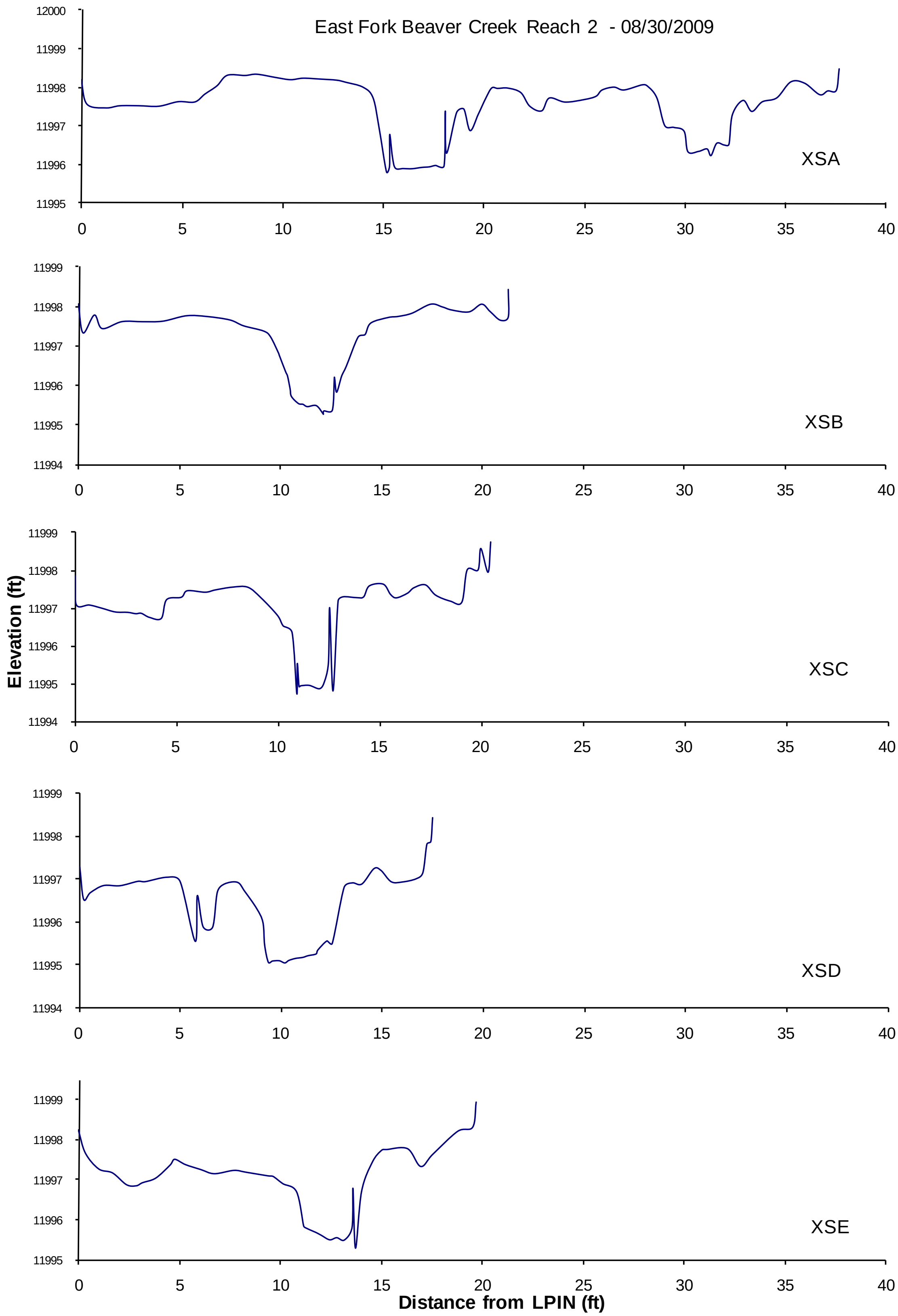
2009

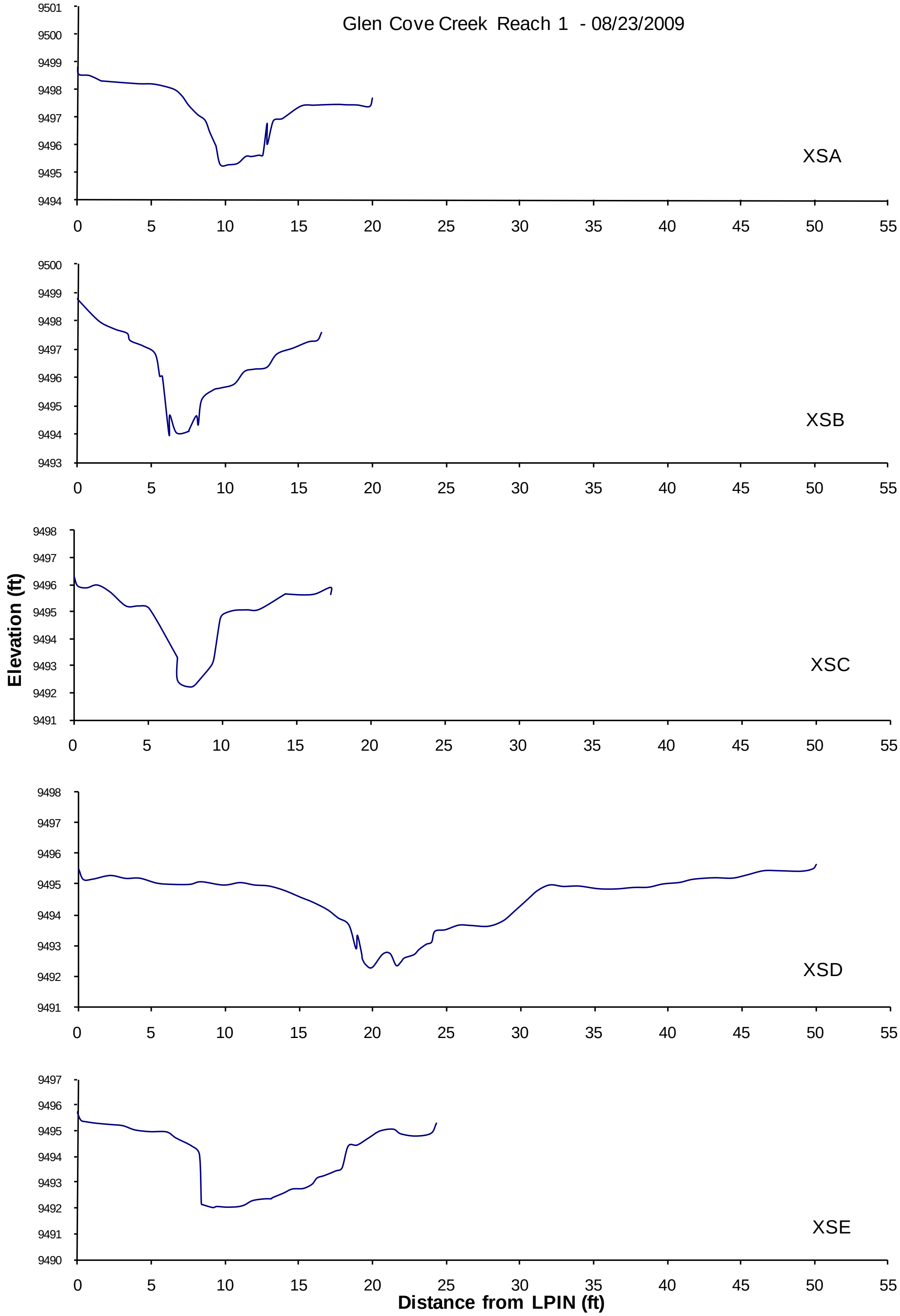

Boehmer Creek Reach 1 - 08/20/2009
XSA
XSB
XSC
XSD
XSE
Elevation (ft)
Distance from LPIN (ft)

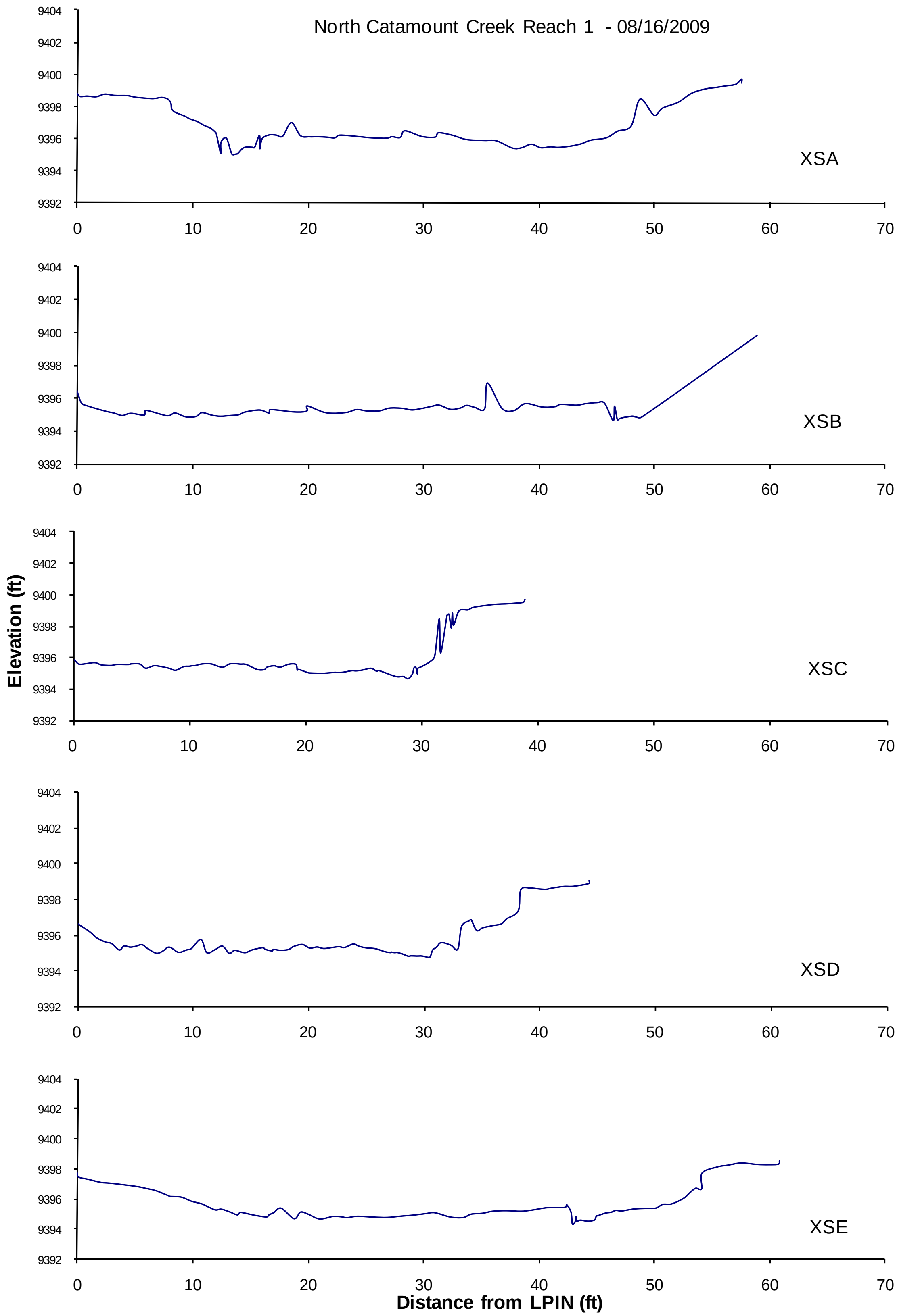


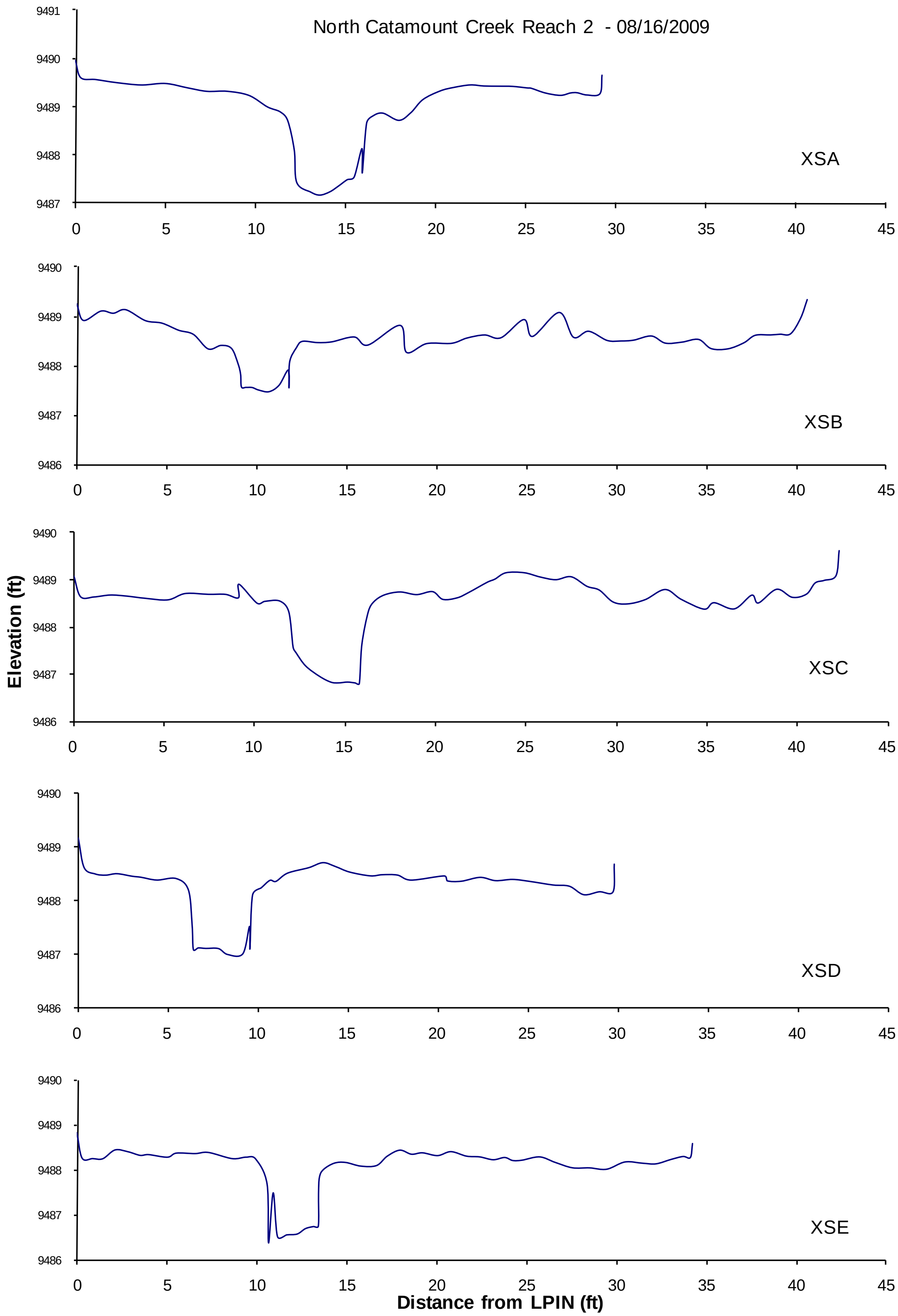
Boehmer Creek Reach 2 - 08/29/2009
XSA
XSB
XSC
XSD
XSE
Elevation (ft)
Distance from LPIN (ft)

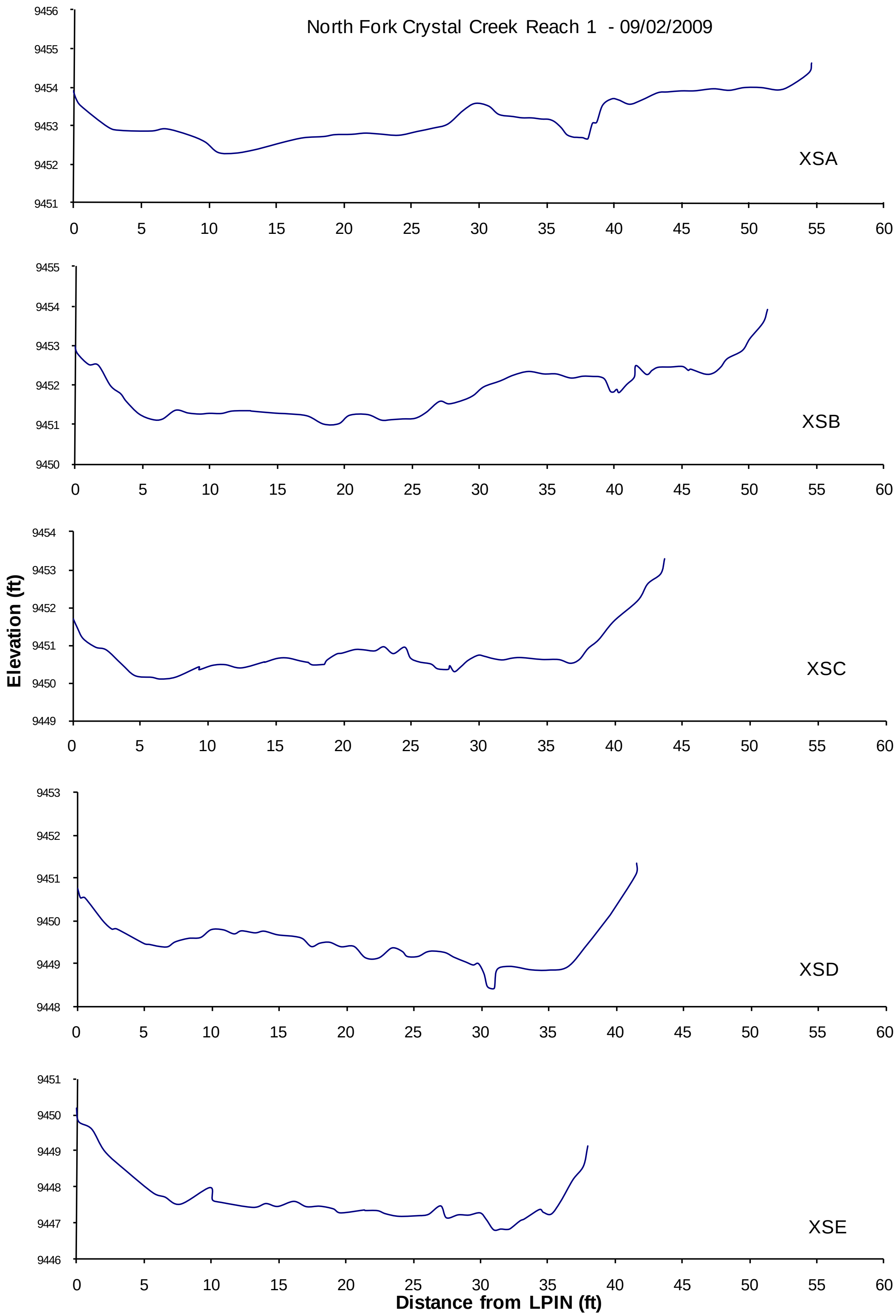

East Fork Beaver Creek Reach 1 - 08/30/2009
XSA
XSB
XSC
XSD
XSE
Elevation (ft)
Distance from LPIN (ft)

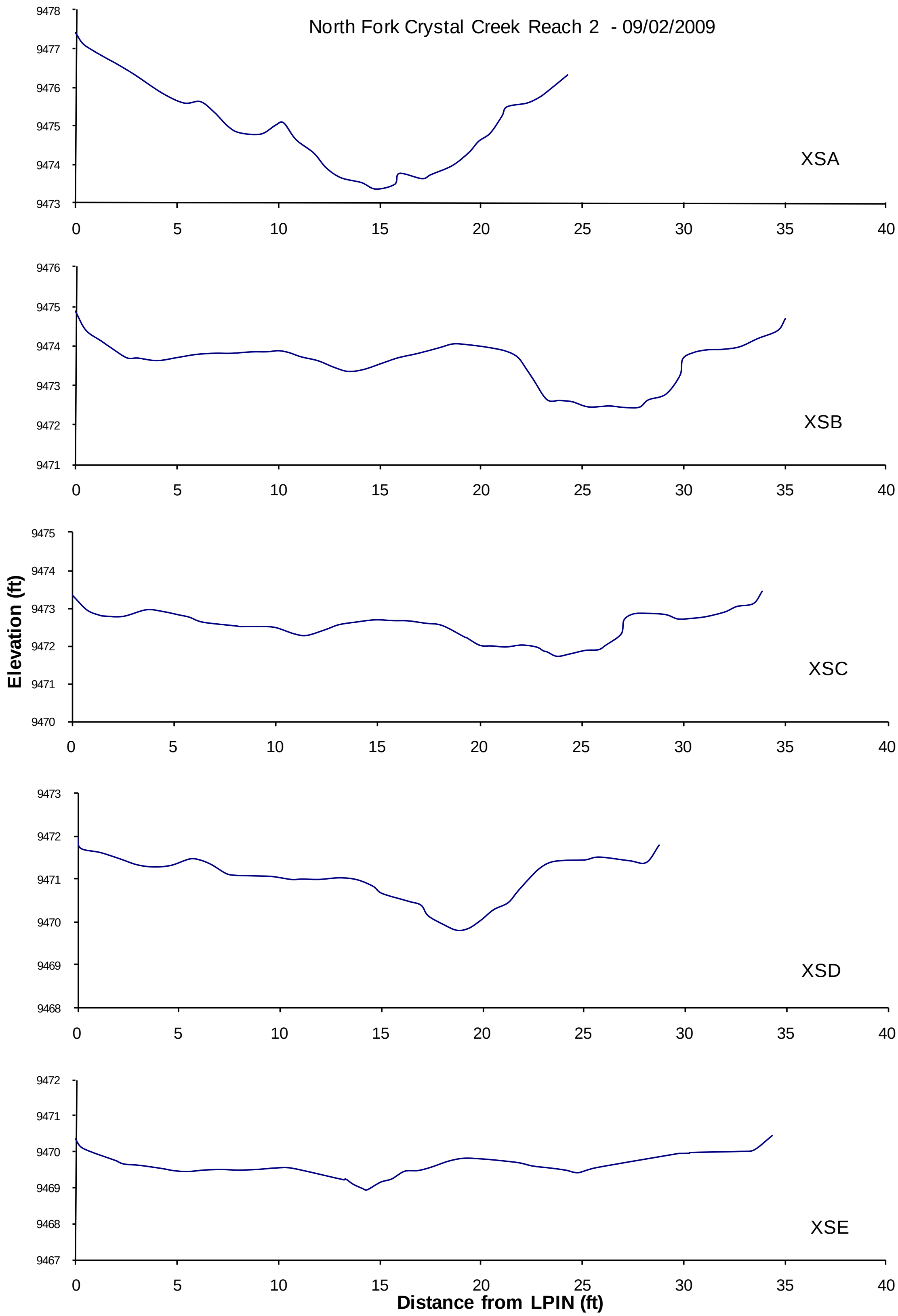

East Fork Beaver Creek Reach 2 - 08/30/2009
Elevation (ft)
Distance from LPIN (ft)
XSA
XSB
XSC
XSD
XSE
12000
11999
11998
11997
11996
11995
11994
0
5
10
15
20
25
30
35
40

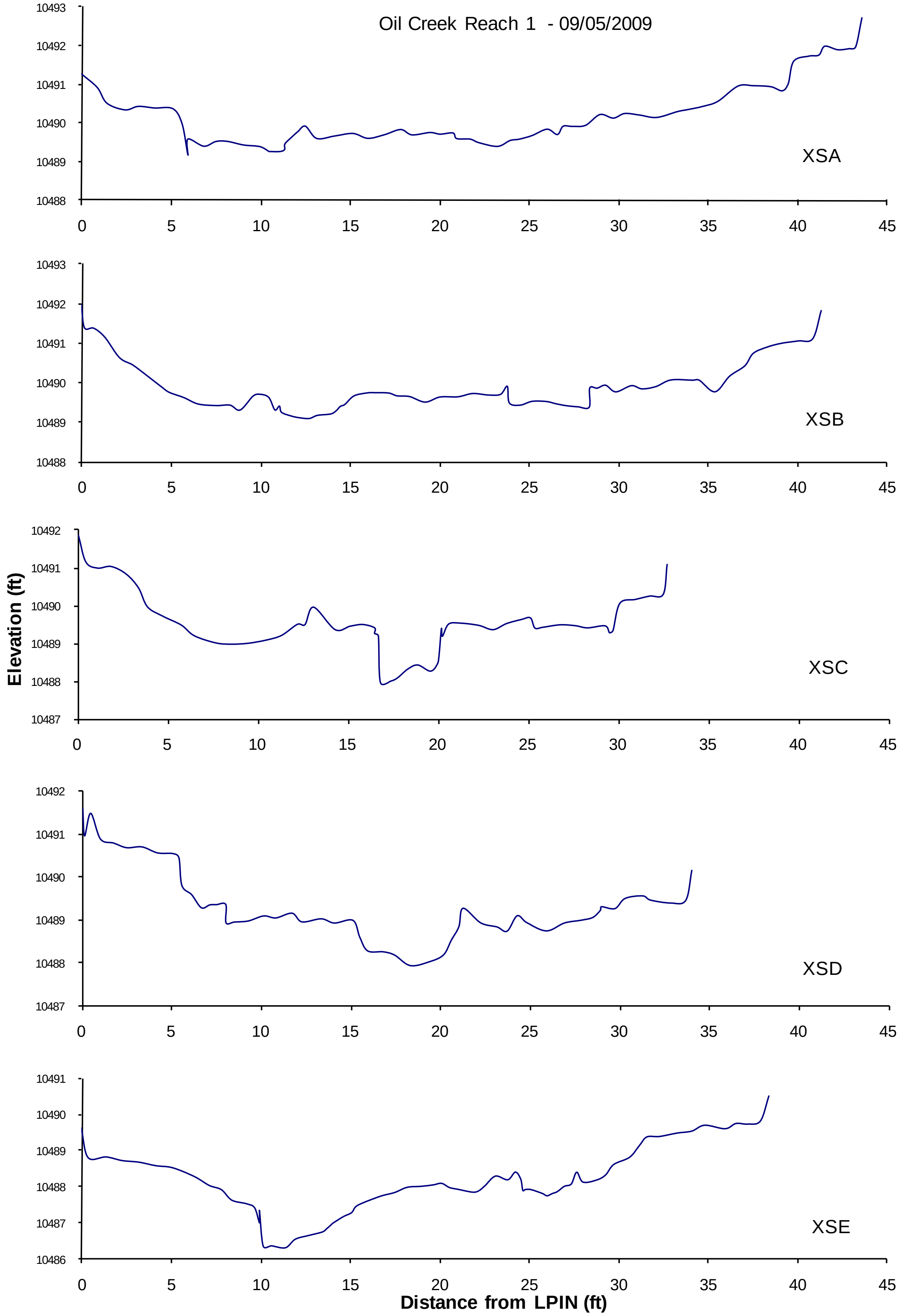

Glen Cove Creek Reach 1 - 08/23/2009
XSA
XSB
XSC
XSD
XSE
Elevation (ft)
Distance from LPIN (ft)


North Catamount Creek Reach 1 - 08/16/2009
XSA
XSB
XSC
XSD
XSE
Elevation (ft)
Distance from LPIN (ft)
9392
9394
9396
9398
9400
9402
9404
0
10
20
30
40
50
60
70

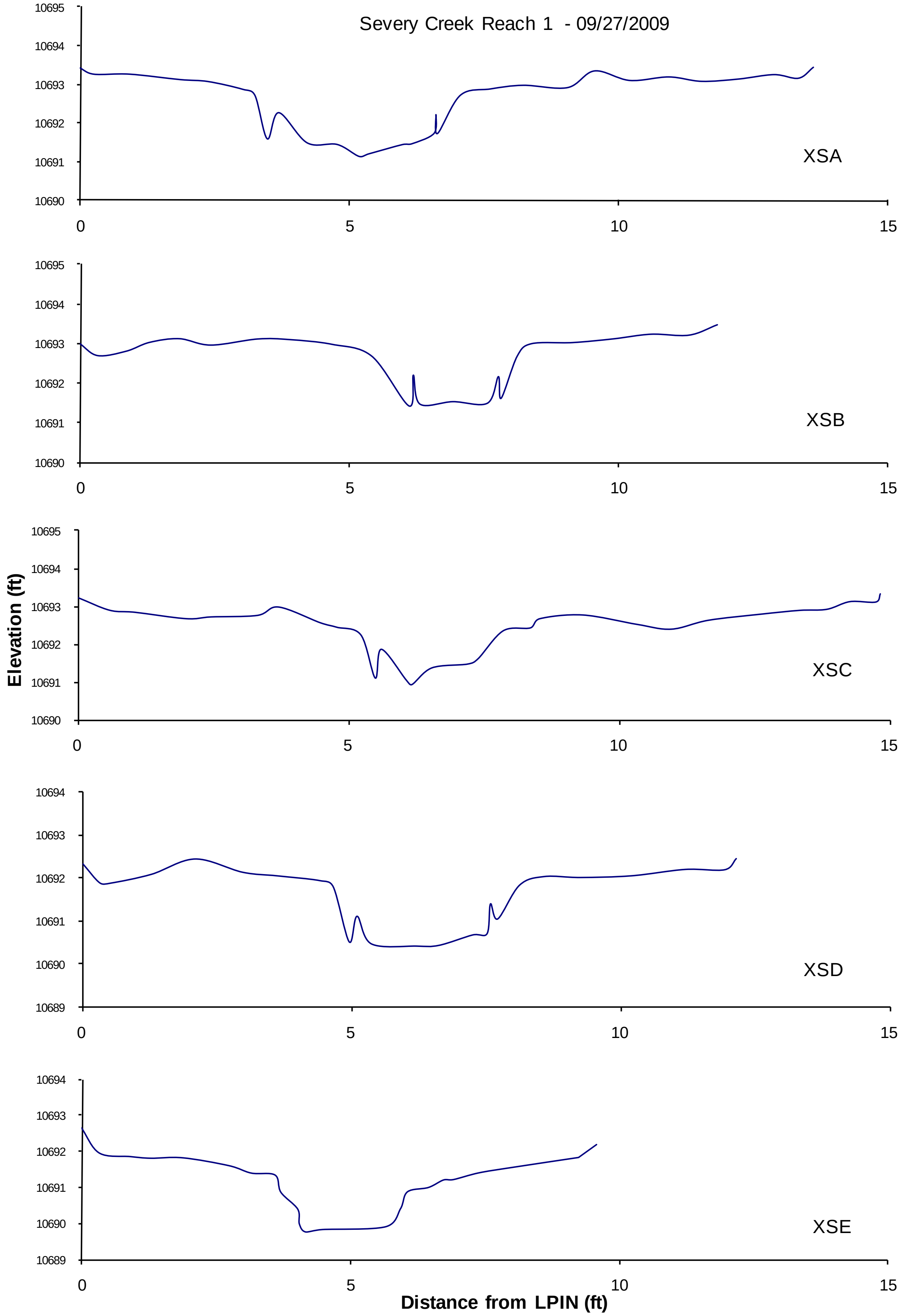

North Catamount Creek Reach 2 - 08/16/2009
XSA
XSB
XSC
XSD
XSE
Elevation (ft)
Distance from LPIN (ft)
9491
9490
9489
9488
9487
9486
0
5
10
15
20
25
30
35
40
45

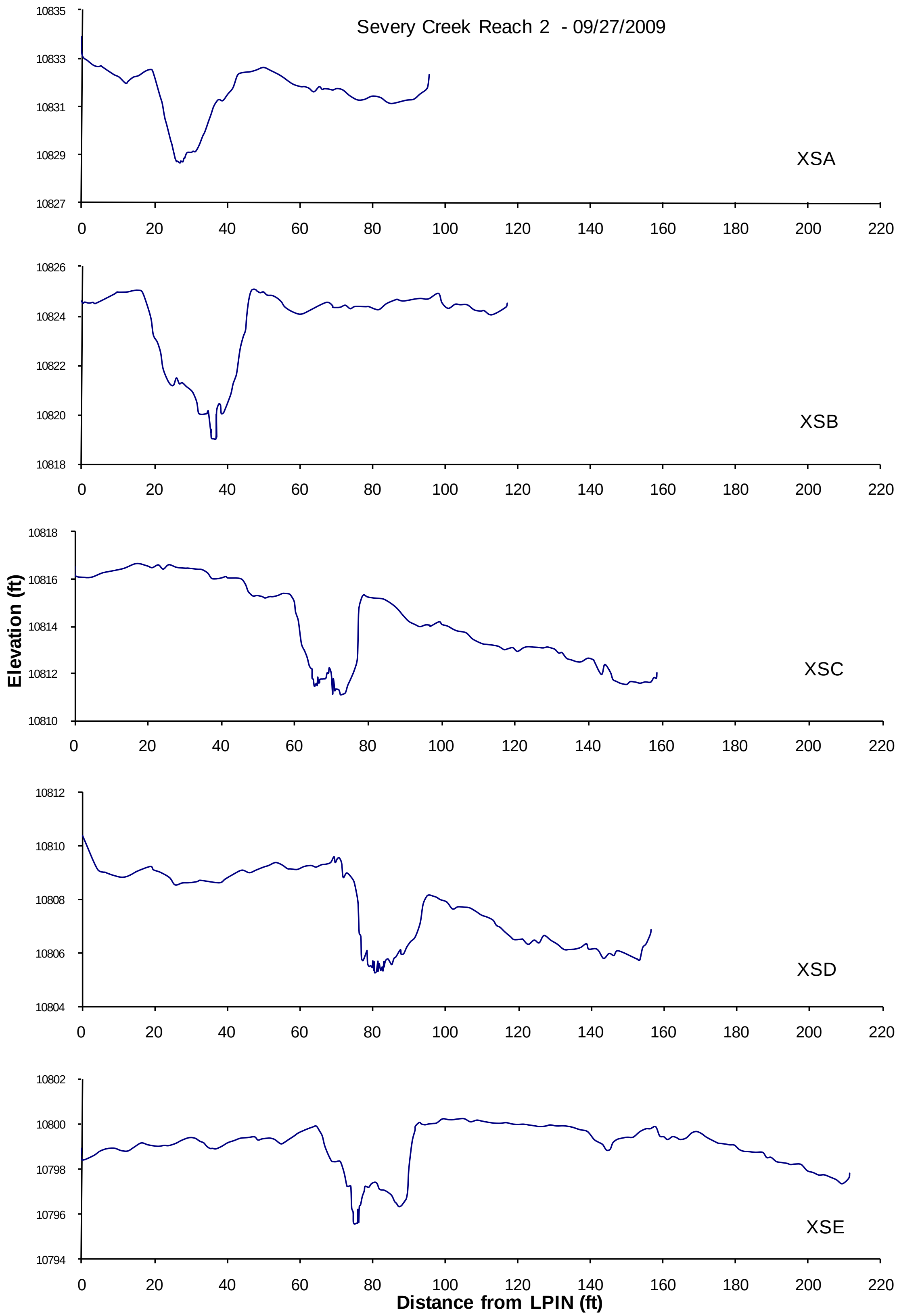

North Fork Crystal Creek Reach 1 - 09/02/2009
XSA
XSB
XSC
XSD
XSE
Elevation (ft)
Distance from LPIN (ft)

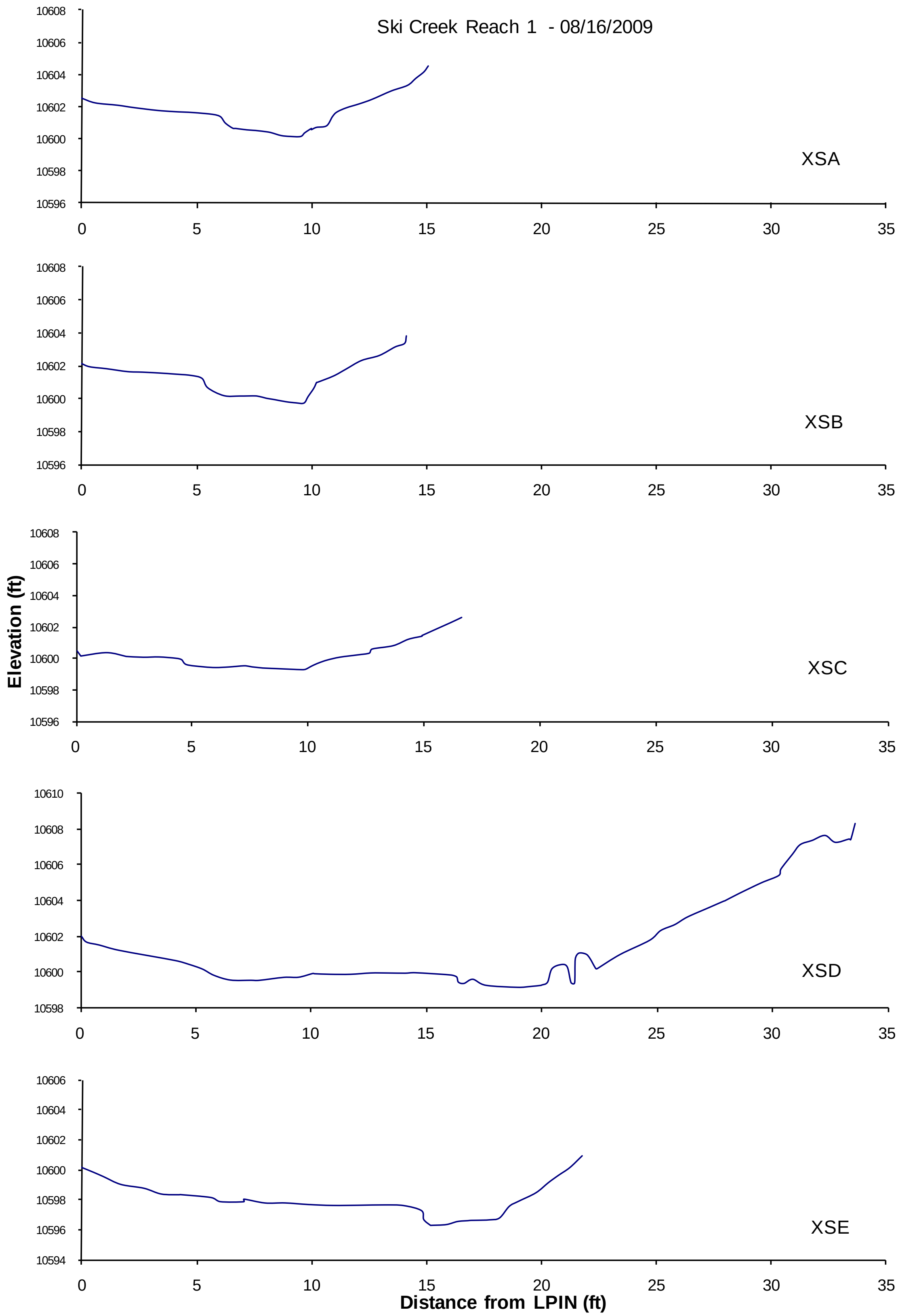

North Fork Crystal Creek Reach 2 - 09/02/2009
XSA
XSB
XSC
XSD
XSE
Elevation (ft)
Distance from LPIN (ft)

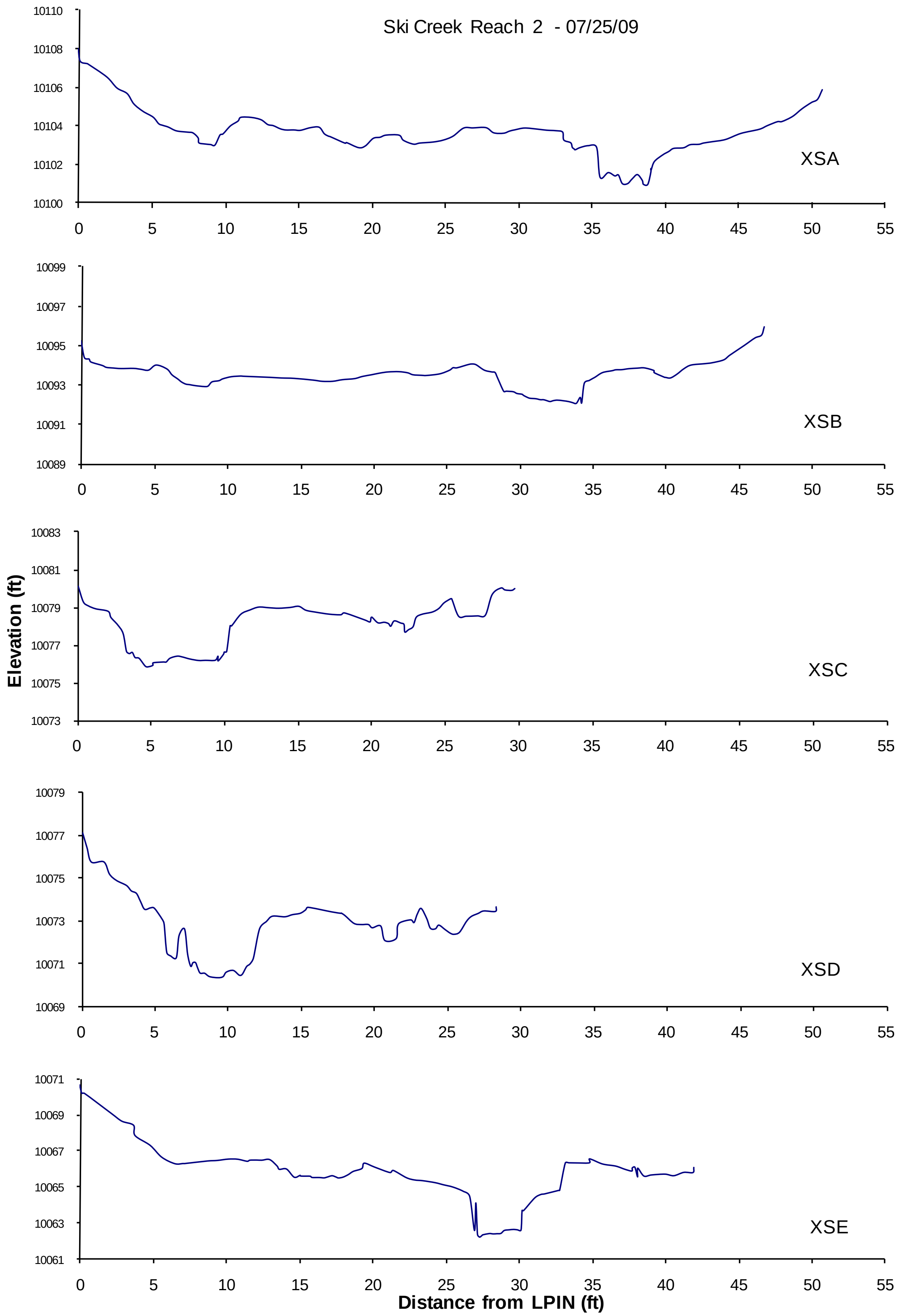


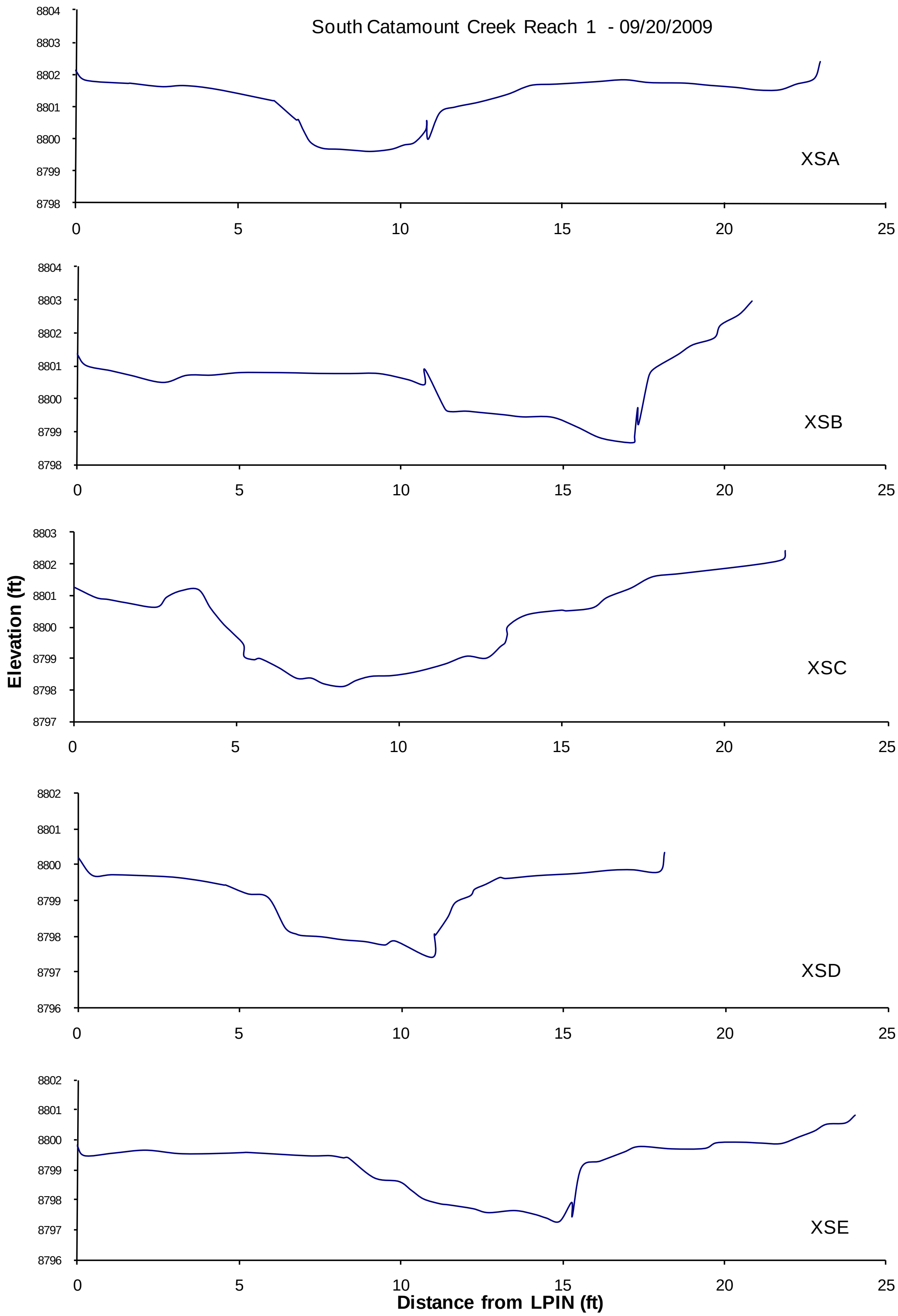
Oil Creek Reach 1 - 09/05/2009
XSA
XSB
XSC
XSD
XSE
Elevation (ft)
Distance from LPIN (ft)


Severy Creek Reach 1 - 09/27/2009
Elevation (ft)
10695
10694
10693
10692
10691
10690
10689
0
5
10
15
XSA
XSB
XSC
XSD
XSE
Distance from LPIN (ft)

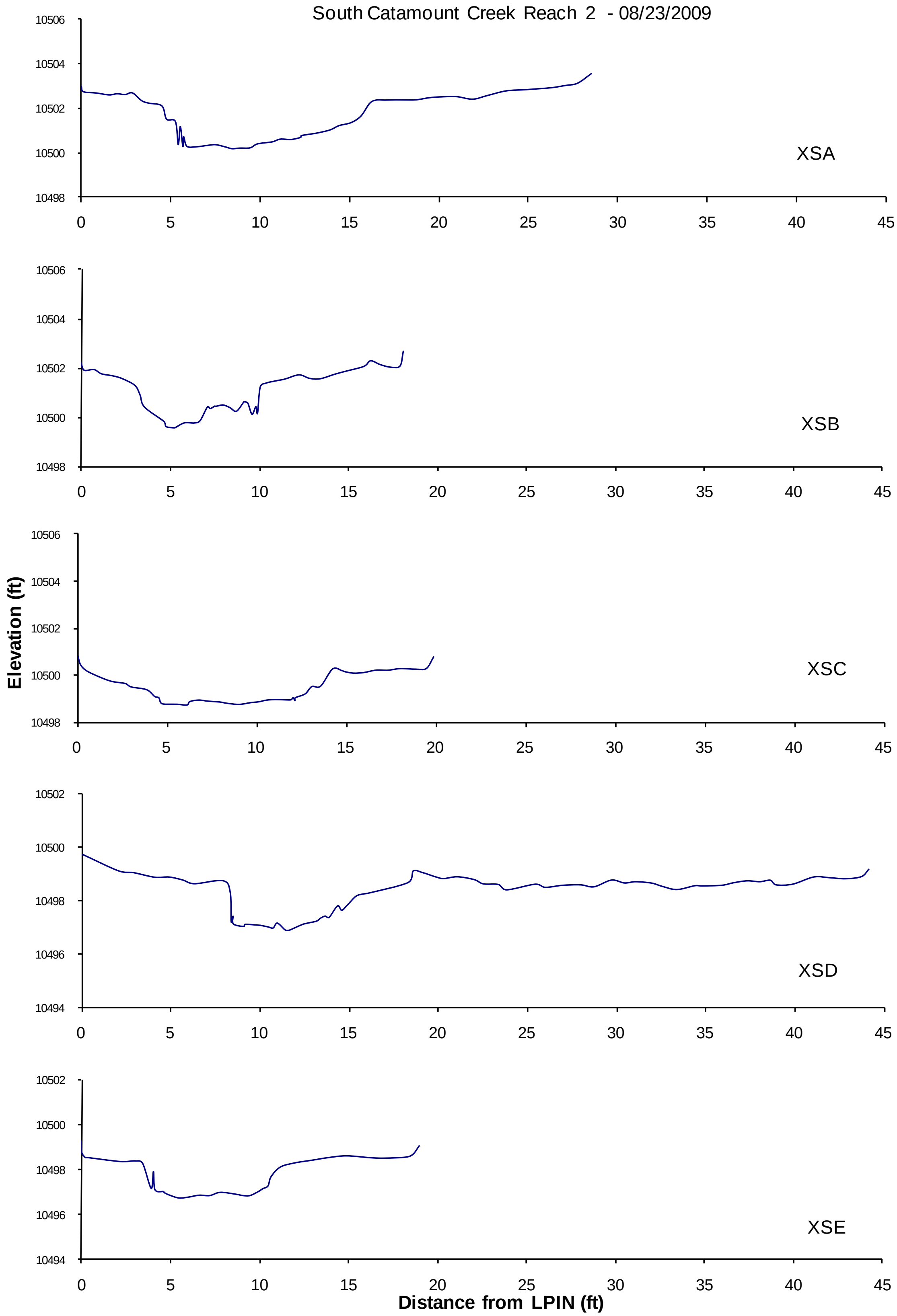

Severy Creek Reach 2 - 09/27/2009
XSA
XSB
XSC
XSD
XSE
Elevation (ft)
Distance from LPIN (ft)

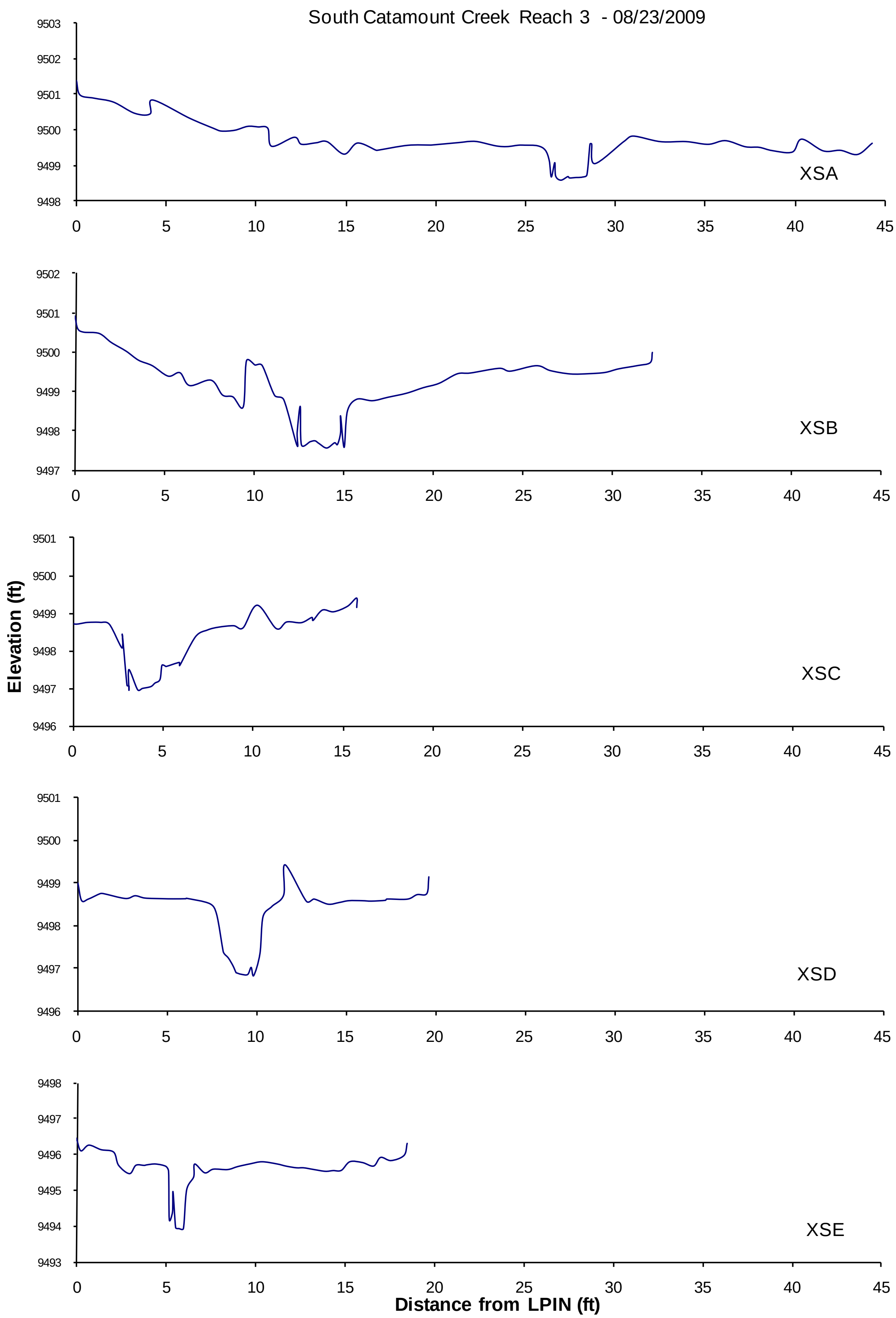

Ski Creek Reach 1 - 08/16/2009
XSA
XSB
XSC
XSD
XSE
Elevation (ft)
Distance from LPIN (ft)


Ski Creek Reach 2 - 07/25/09
XSA
XSB
XSC
XSD
XSE
Elevation (ft)
Distance from LPIN (ft)

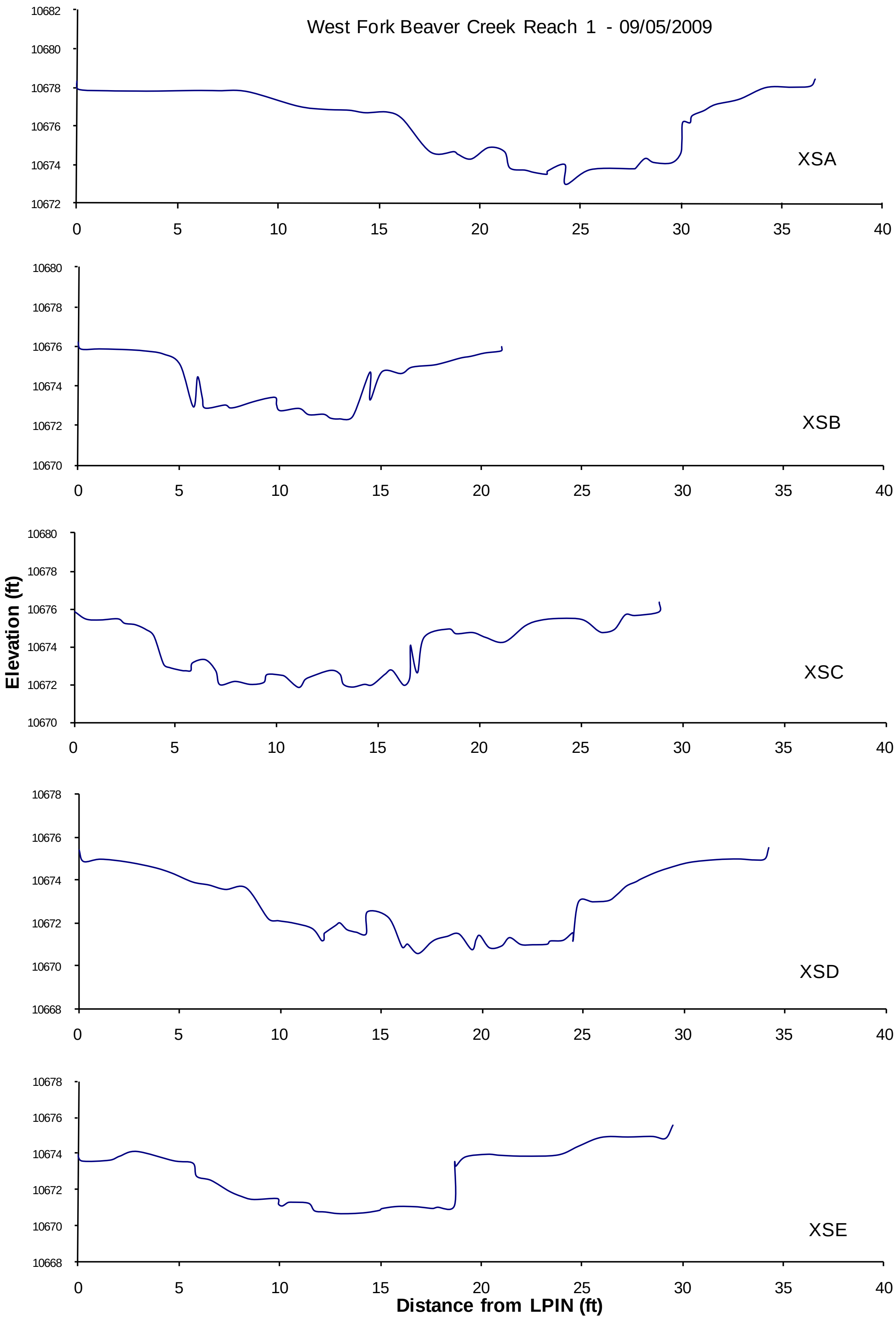


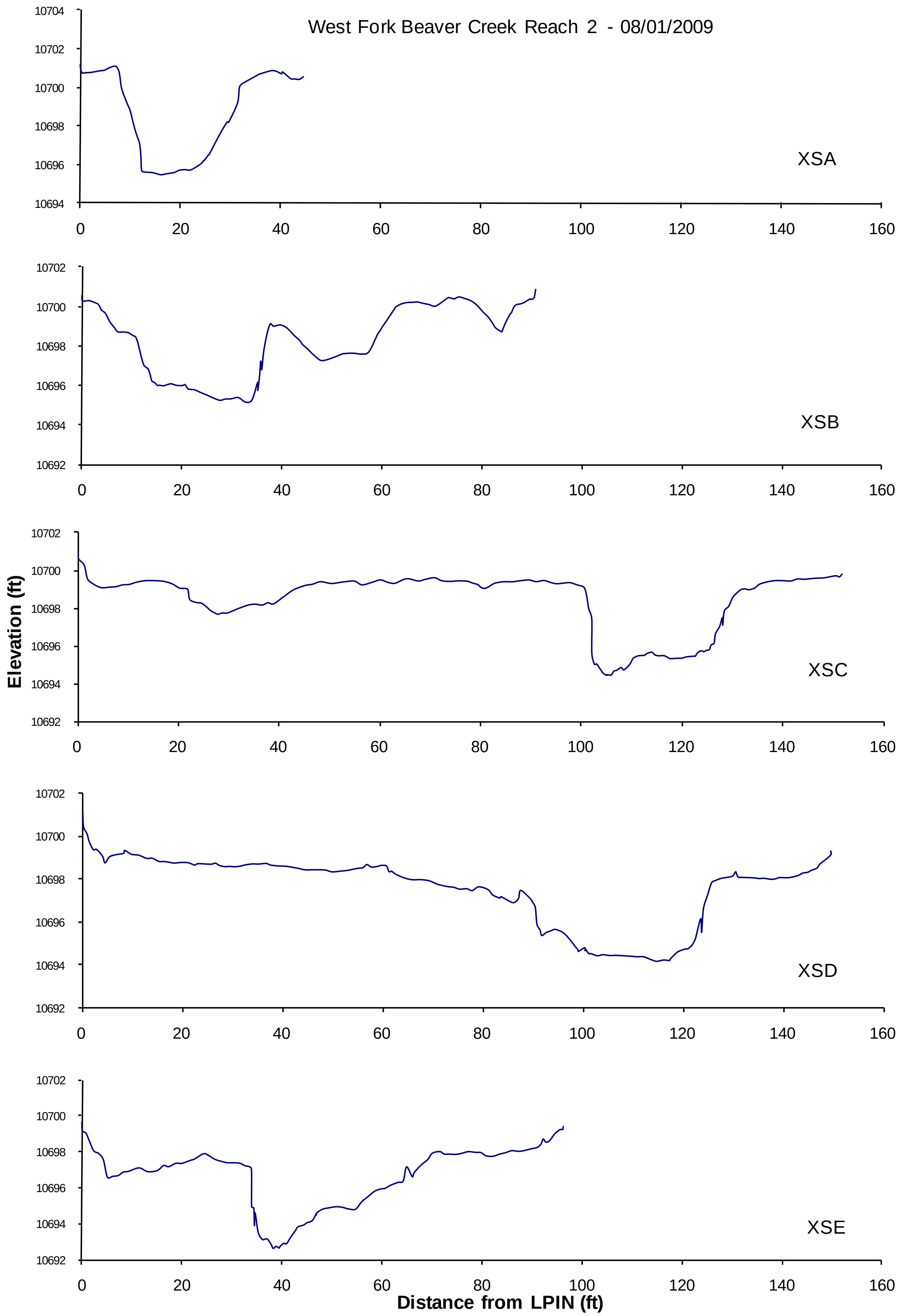
South Catamount Creek Reach 1 - 09/20/2009
XSA
XSB
XSC
XSD
XSE
Elevation (ft)
Distance from LPIN (ft)


South Catamount Creek Reach 2 - 08/23/2009
Elevation (ft)
10506
10504
10502
10500
10498
10496
10494
0
5
10
15
20
25
30
35
40
45
XSA
XSB
XSC
XSD
XSE
Distance from LPIN (ft)



South Catamount Creek Reach 3 - 08/23/2009
Elevation (ft)
Distance from LPIN (ft)
XSA
XSB
XSC
XSD
XSE
9503
9502
9501
9500
9499
9498
9497
9496
9495
9494
9493
0
5
10
15
20
25
30
35
40
45


West Fork Beaver Creek Reach 1 - 09/05/2009
XSA
XSB
XSC
XSD
XSE
Elevation (ft)
Distance from LPIN (ft)


West Fork Beaver Creek Reach 2 - 08/01/2009
XSA
XSB
XSC
XSD
XSE
Elevation (ft)
Distance from LPIN (ft)
10704
10702
10700
10698
10696
10694
10692
0
20
40
60
80
100
120
140
160

Appendix O

Stream Pebble Count

Particle Size Distribution and Graphs

2009

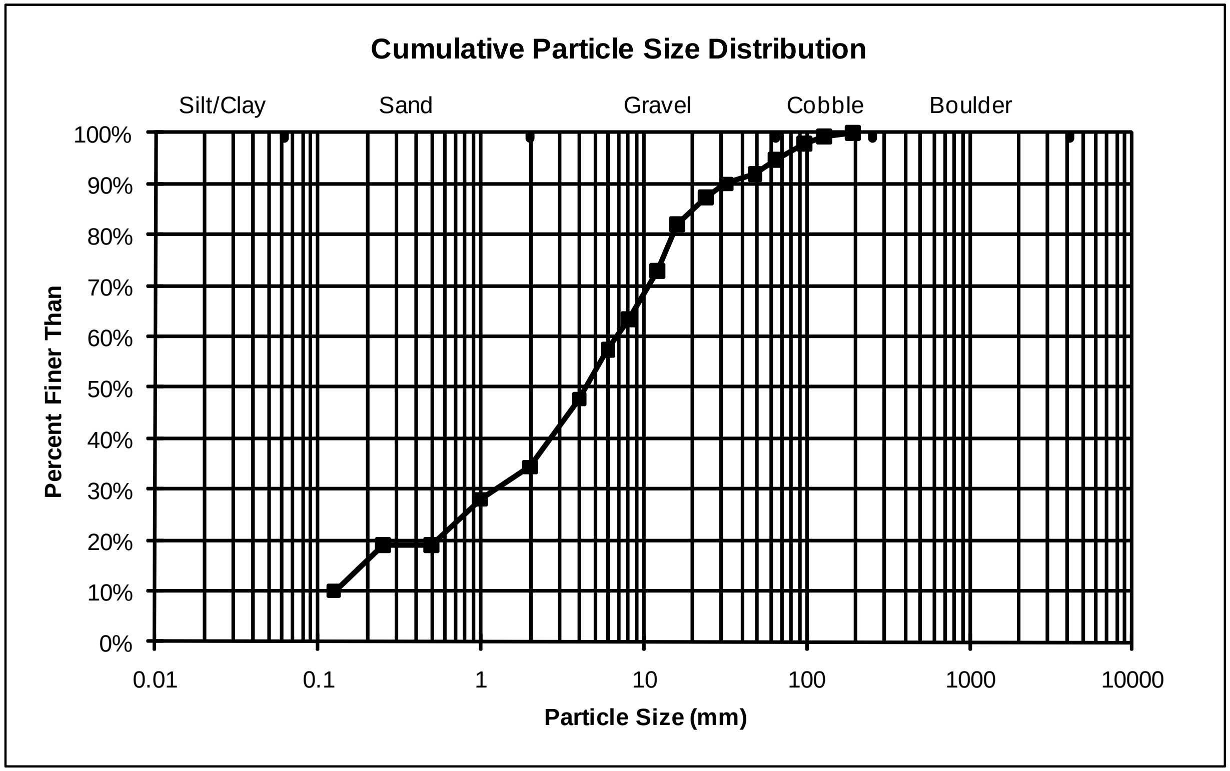
Pebble Count Worksheet

COMMENTS: ERO Reach

Particle Size (mm)	# in Size Class	% of Total	% Finer Than
<0.062	30	10.0%	
0.062 - 0.125	0	0.0%	10%
0.125 - 0.25	27	9.0%	19%
0.25 - .5	0	0.0%	19%
0.5 - 1.0	27	9.0%	28%
1 - 2	19	6.3%	34%
2 - 4	40	13.3%	48%
4 - 6	29	9.7%	57%
6 - 8	18	6.0%	63%
8 - 12	29	9.7%	73%
12 - 16	27	9.0%	82%
16 - 24	16	5.3%	87%
24 - 32	8	2.7%	90%
32 - 48	6	2.0%	92%
48 - 64	8	2.7%	95%
64 - 96	10	3.3%	98%
96 - 128	4	1.3%	99%
128 - 192	2	0.7%	100%
192 - 256			
256 - 384			
384 - 512			
512 - 1024			
1024 - 2048			
2048 - 4096			
Total	300.00		

STREAM NAME: Pike's Peak Highway - Boehmer Creek Reach 1
ID NUMBER: BHMR1
DATE: 8/30/2009
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	0.184	**2.071**	**4.411**	**18.627**	**66.648**	**175.0**



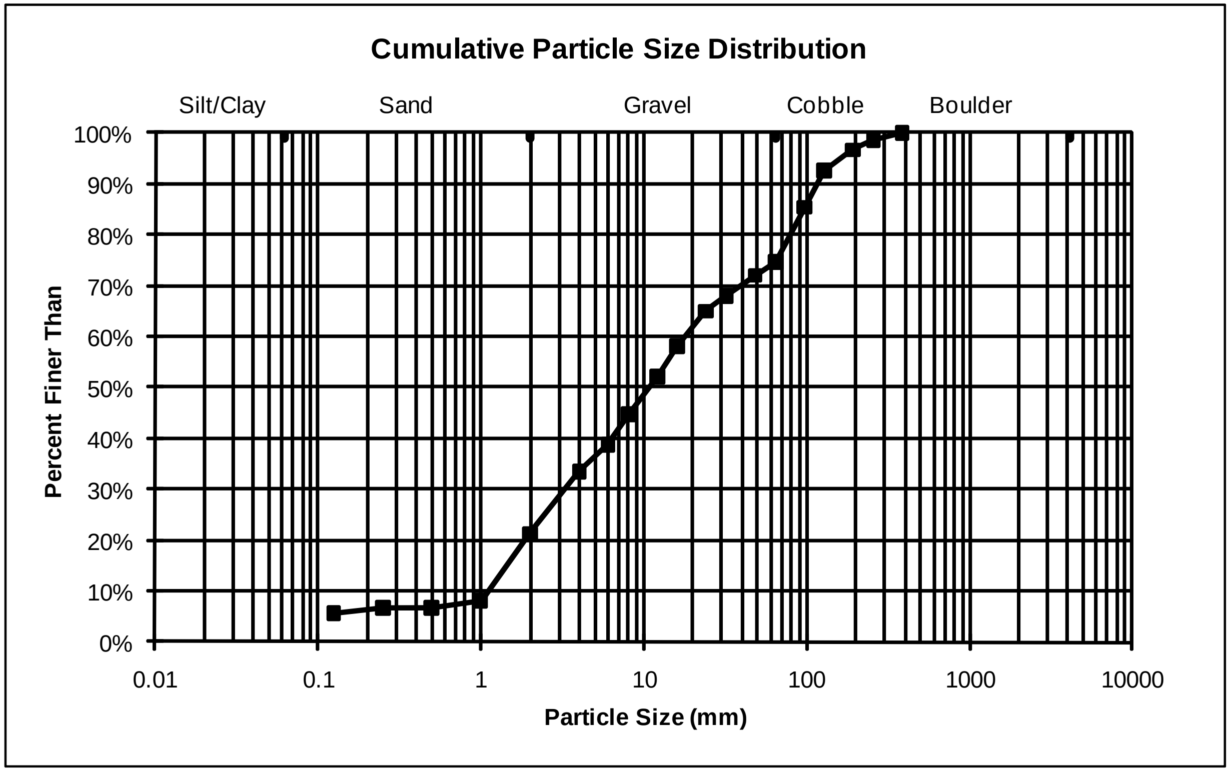
Pebble Count Worksheet

Particle Size (mm)	# in Size Class	% of Total	% Finer Than
<0.062	17	5.7%	
0.062 - 0.125	0	0.0%	6%
0.125 - 0.25	3	1.0%	7%
0.25 - .5	0	0.0%	7%
0.5 - 1.0	4	1.3%	8%
1 - 2	40	13.3%	21%
2 - 4	36	12.0%	33%
4 - 6	16	5.3%	39%
6 - 8	18	6.0%	45%
8 - 12	22	7.3%	52%
12 - 16	18	6.0%	58%
16 - 24	21	7.0%	65%
24 - 32	9	3.0%	68%
32 - 48	12	4.0%	72%
48 - 64	8	2.7%	75%
64 - 96	32	10.7%	85%
96 - 128	22	7.3%	93%
128 - 192	12	4.0%	97%
192 - 256	6	2.0%	99%
256 - 384	4	1.3%	100%
384 - 512			
512 - 1024			
1024 - 2048			
2048- 4096			
Total	300.00		

COMMENTS: Second reach 500 ft upstream of ERO Reach

STREAM NAME: Pike's Peak Highway - Boehmer Creek Reach 2
ID NUMBER: BHMR2
DATE: 8/29/2009
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	1.439	4.540	10.744	91.256	162.155	350.0



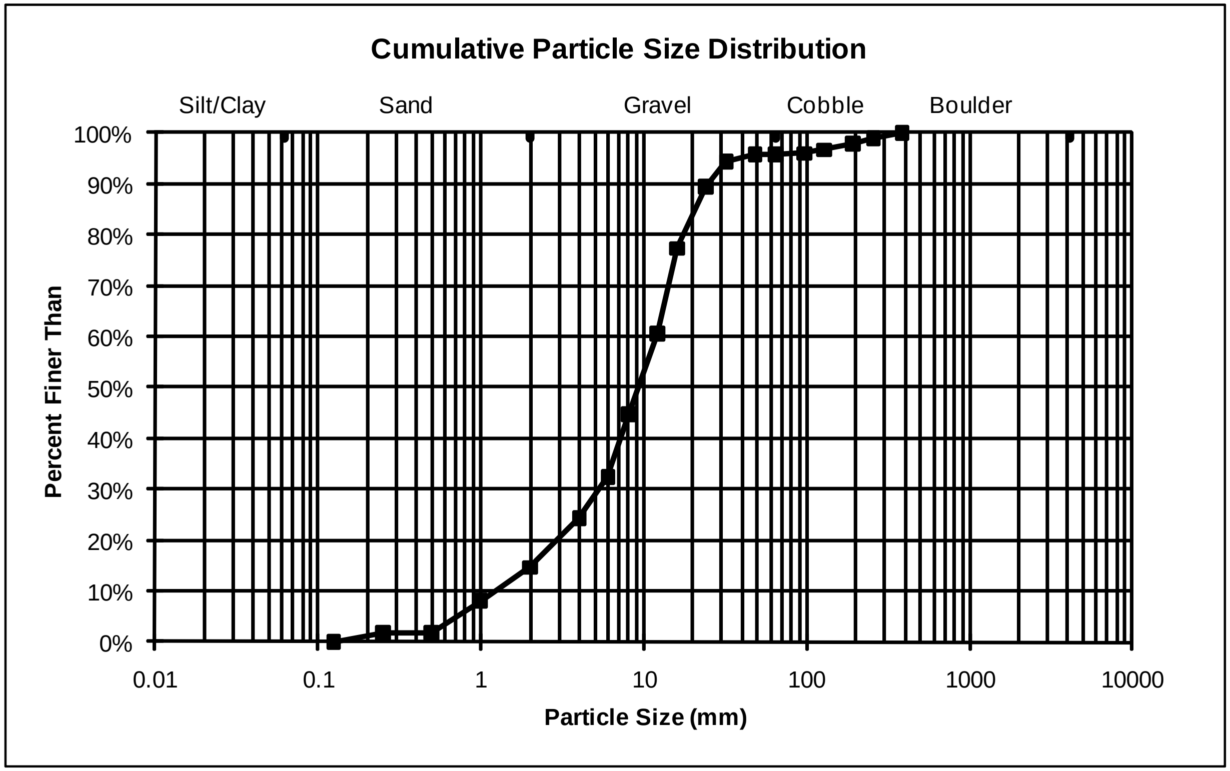
Pebble Count Worksheet

COMMENTS: ERO Reach

Particle Size (mm)	# in Size Class	% of Total	% Finer Than
<0.062	0	0.0%	
0.062 - 0.125	0	0.0%	0%
0.125 - 0.25	5	1.7%	2%
0.25 - .5	0	0.0%	2%
0.5 - 1.0	19	6.3%	8%
1 - 2	20	6.7%	15%
2 - 4	29	9.7%	24%
4 - 6	24	8.0%	32%
6 - 8	37	12.3%	45%
8 - 12	48	16.0%	61%
12 - 16	50	16.7%	77%
16 - 24	36	12.0%	89%
24 - 32	15	5.0%	94%
32 - 48	4	1.3%	96%
48 - 64	0	0.0%	96%
64 - 96	1	0.3%	96%
96 - 128	2	0.7%	97%
128 - 192	4	1.3%	98%
192 - 256	3	1.0%	99%
256 - 384	3	1.0%	100%
384 - 512			
512 - 1024			
1024 - 2048			
2048 - 4096			
Total	300.00		

STREAM NAME: East Fork Beaver Creek Reach 1
ID NUMBER: EBVR1
DATE: 8/30/2009
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	**D15**	**D35**	**D50**	**D84**	**D95**	**Lpart**
	2.048	**6.385**	**9.158**	**20.042**	**39.192**	**360.0**



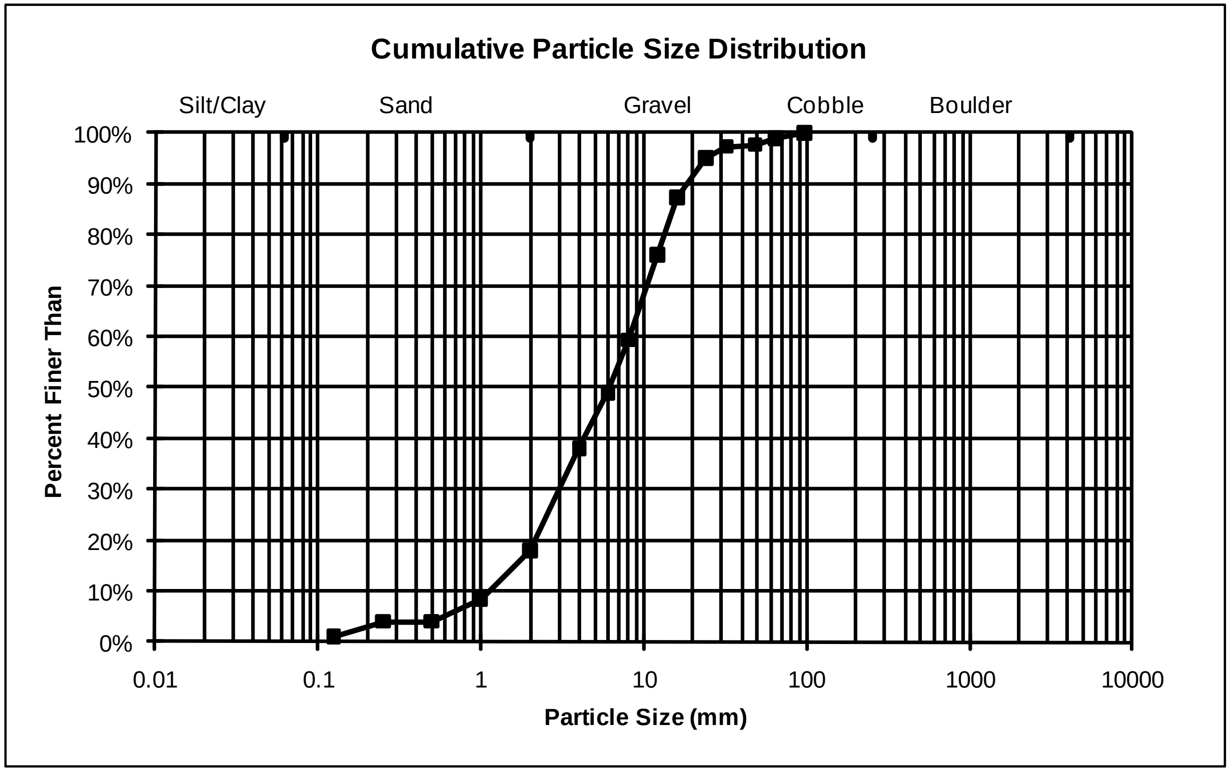
Pebble Count Worksheet

COMMENTS: Second reach 500 ft of ERO Reach

Particle Size (mm)	# in Size Class	% of Total	% Finer Than
<0.062	3	1.0%	
0.062 - 0.125	0	0.0%	1%
0.125 - 0.25	9	3.0%	4%
0.25 - .5	0	0.0%	4%
0.5 - 1.0	13	4.3%	8%
1 - 2	29	9.7%	18%
2 - 4	60	20.0%	38%
4 - 6	33	11.0%	49%
6 - 8	31	10.3%	59%
8 - 12	50	16.7%	76%
12 - 16	34	11.3%	87%
16 - 24	23	7.7%	95%
24 - 32	7	2.3%	97%
32 - 48	1	0.3%	98%
48 - 64	4	1.3%	99%
64 - 96	3	1.0%	100%
96 - 128			
128 - 192			
192 - 256			
256 - 384			
384 - 512			
512 - 1024			
1024 - 2048			
2048 - 4096			
Total	300.00		

STREAM NAME: Pike's Peak Highway - East Fork Beaver Creek Reach 2
ID NUMBER: EBVR2
DATE: 8/30/2009
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	1.613	3.605	6.169	14.702	24.000	80.0



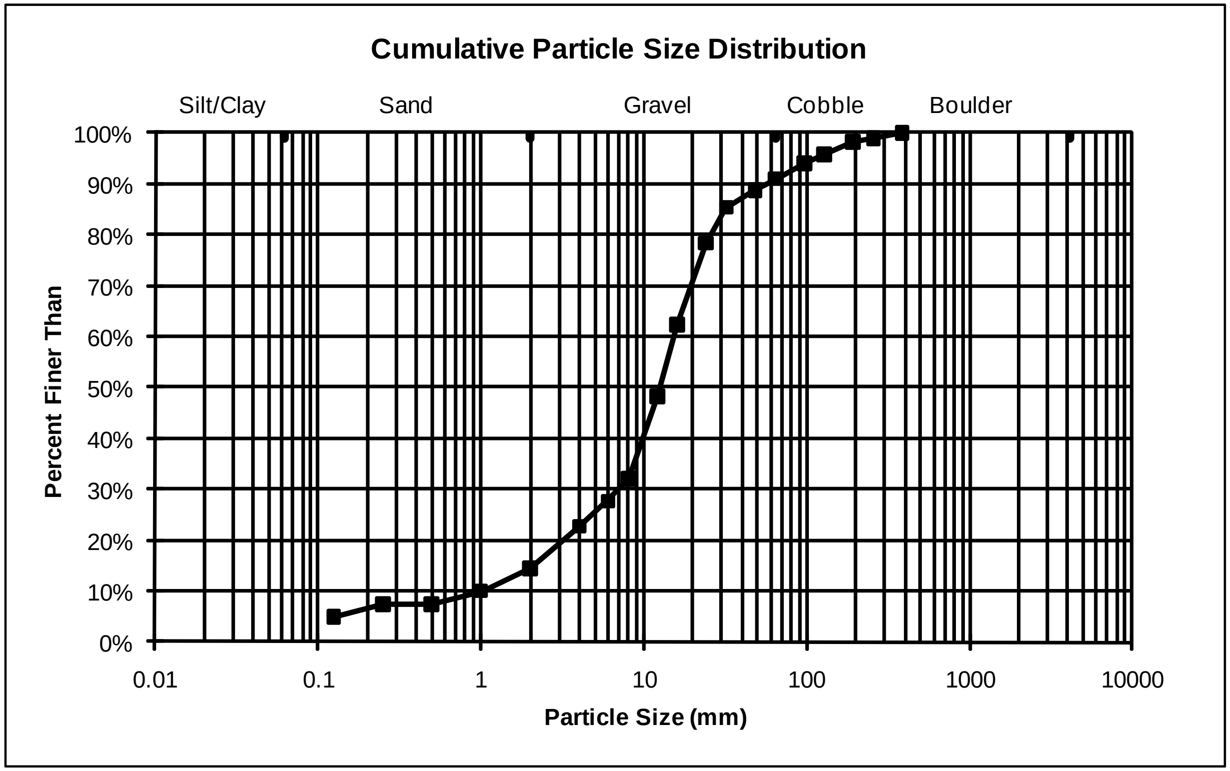
Pebble Count Worksheet

Particle Size (mm)	# in Size Class	% of Total	% Finer Than
<0.062	15	5.0%	
0.062 - 0.125	0	0.0%	5%
0.125 - 0.25	7	2.3%	7%
0.25 - .5	0	0.0%	7%
0.5 - 1.0	8	2.7%	10%
1 - 2	13	4.3%	14%
2 - 4	25	8.3%	23%
4 - 6	15	5.0%	28%
6 - 8	13	4.3%	32%
8 - 12	49	16.3%	48%
12 - 16	42	14.0%	62%
16 - 24	48	16.0%	78%
24 - 32	21	7.0%	85%
32 - 48	10	3.3%	89%
48 - 64	7	2.3%	91%
64 - 96	9	3.0%	94%
96 - 128	5	1.7%	96%
128 - 192	8	2.7%	98%
192 - 256	2	0.7%	99%
256 - 384	3	1.0%	100%
384 - 512			
512 - 1024			
1024 - 2048			
2048 - 4096			
Total	300.00		

COMMENTS: Reach established upstream from confluence with South Catamount Creek because of the transbasin diversion installed in Ski Creek

STREAM NAME: Pike's Peak Highway - Glen Cove Creek Reach 1
ID NUMBER: GLEN1
DATE: 8/23/2009
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	2.114	**8.619**	**12.418**	**30.294**	**114.087**	**350.0**



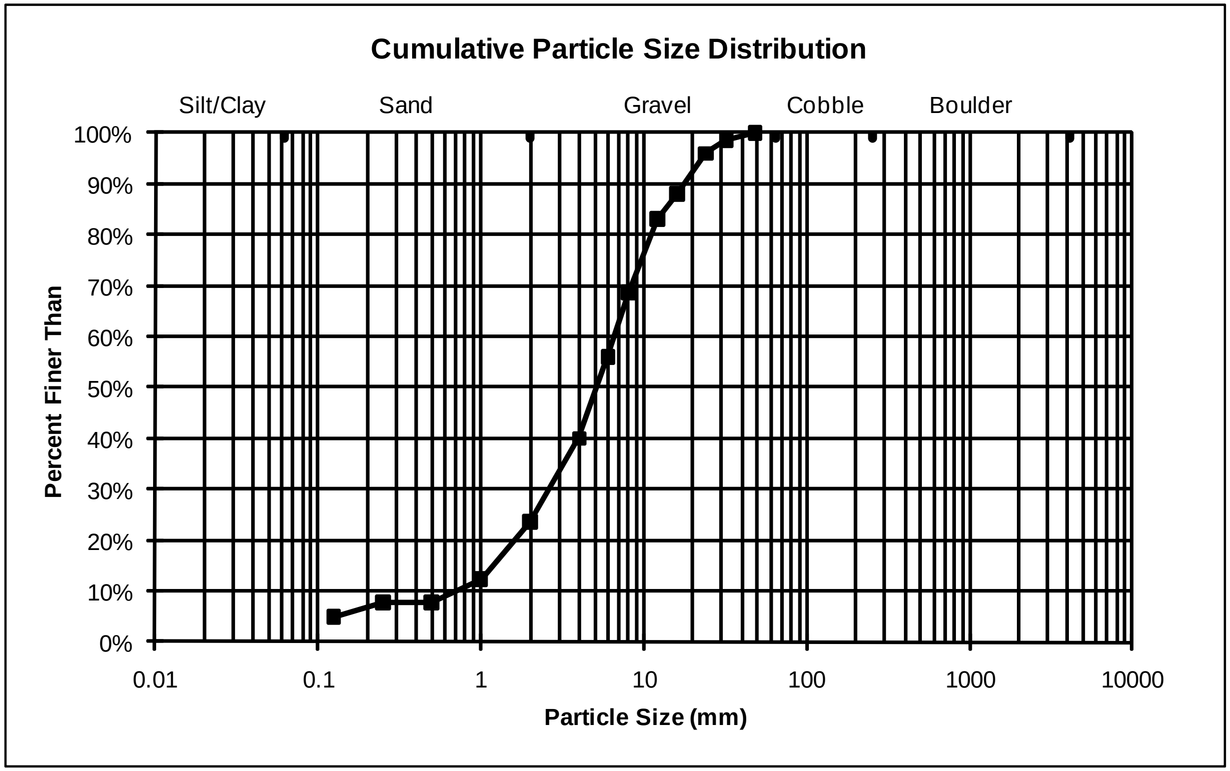
Pebble Count Worksheet

Particle Size (mm)	# in Size Class	% of Total	% Finer Than
<0.062	15	5.0%	
0.062 - 0.125	0	0.0%	5%
0.125 - 0.25	8	2.7%	8%
0.25 - .5	0	0.0%	8%
0.5 - 1.0	14	4.7%	12%
1 - 2	34	11.3%	24%
2 - 4	49	16.3%	40%
4 - 6	48	16.0%	56%
6 - 8	38	12.7%	69%
8 - 12	43	14.3%	83%
12 - 16	15	5.0%	88%
16 - 24	24	8.0%	96%
24 - 32	8	2.7%	99%
32 - 48	4	1.3%	100%
48 - 64			
64 - 96			
96 - 128			
128 - 192			
192 - 256			
256 - 384			
384 - 512			
512 - 1024			
1024 - 2048			
2048 - 4096			
Total	300.00		

COMMENTS: ERO Study Site

STREAM NAME: Pike's Peak Highway - North Catamount Creek Reach 1
ID NUMBER: NCAT1
DATE: 8/16/2009
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	**D15**	**D35**	**D50**	**D84**	**D95**	**Lpart**
	1.177	**3.235**	**5.154**	**12.711**	**22.814**	**44.0**



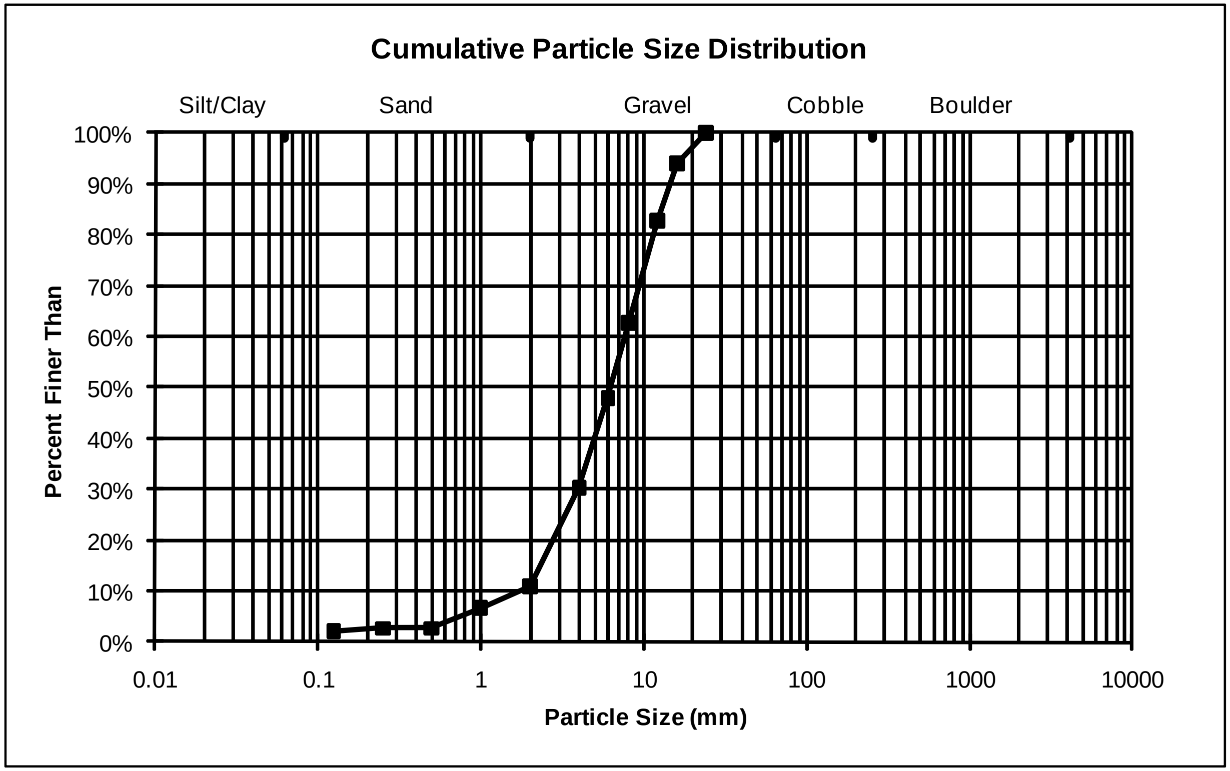
Pebble Count Worksheet

Particle Size (mm)	# in Size Class	% of Total	% Finer Than
<0.062	6	2.0%	
0.062 - 0.125	0	0.0%	2%
0.125 - 0.25	2	0.7%	3%
0.25 - .5	0	0.0%	3%
0.5 - 1.0	12	4.0%	7%
1 - 2	13	4.3%	11%
2 - 4	58	19.3%	30%
4 - 6	53	17.7%	48%
6 - 8	44	14.7%	63%
8 - 12	60	20.0%	83%
12 - 16	34	11.3%	94%
16 - 24	18	6.0%	100%
24 - 32			
32 - 48			
48 - 64			
64 - 96			
96 - 128			
128 - 192			
192 - 256			
256 - 384			
384 - 512			
512 - 1024			
1024 - 2048			
2044 - 4096			
Total	300.00		

COMMENTS: Second reach 0.5 miles upstream from ERO Study Site

STREAM NAME: Pike's Peak Highway - North Catamount Creek Reach 2
ID NUMBER: NCAT2
DATE: 8/16/2009
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	2.308	4.452	6.240	12.413	17.119	18.0



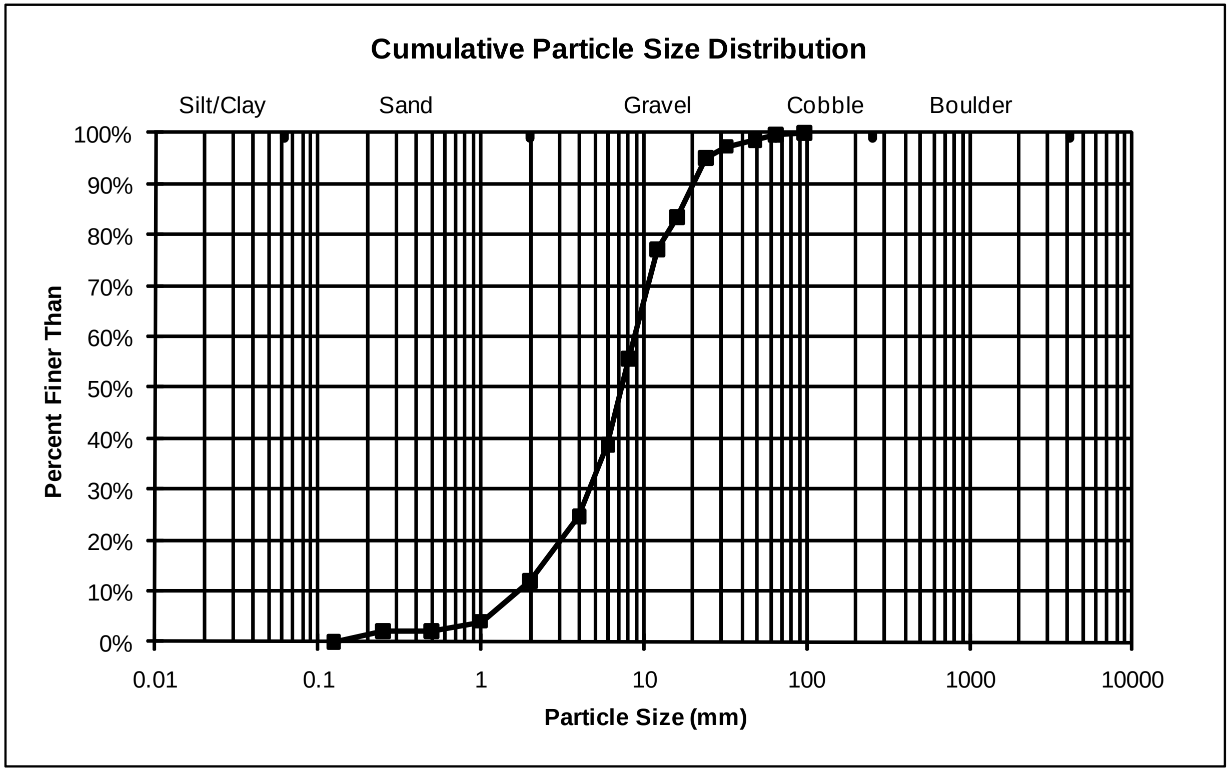
Pebble Count Worksheet

COMMENTS: ERO Study Site

Particle Size (mm)	# in Size Class	% of Total	% Finer Than
<0.062	0	0.0%	
0.062 - 0.125	0	0.0%	0%
0.125 - 0.25	6	2.0%	2%
0.25 - .5	0	0.0%	2%
0.5 - 1.0	6	2.0%	4%
1 - 2	24	8.0%	12%
2 - 4	38	12.7%	25%
4 - 6	42	14.0%	39%
6 - 8	51	17.0%	56%
8 - 12	64	21.3%	77%
12 - 16	19	6.3%	83%
16 - 24	35	11.7%	95%
24 - 32	7	2.3%	97%
32 - 48	4	1.3%	99%
48 - 64	3	1.0%	100%
64 - 96	1	0.3%	100%
96 - 128			
128 - 192			
192 - 256			
256 - 384			
384 - 512			
512 - 1024			
1024 - 2048			
2048 - 4096			
Total	300.00		

STREAM NAME: Pike's Peak Highway - North Fork Crystal Creek Reach 1
ID NUMBER: NCRY1
DATE: 9/20/2009
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	2.357	**5.396**	**7.268**	**16.375**	**24.000**	**65.0**



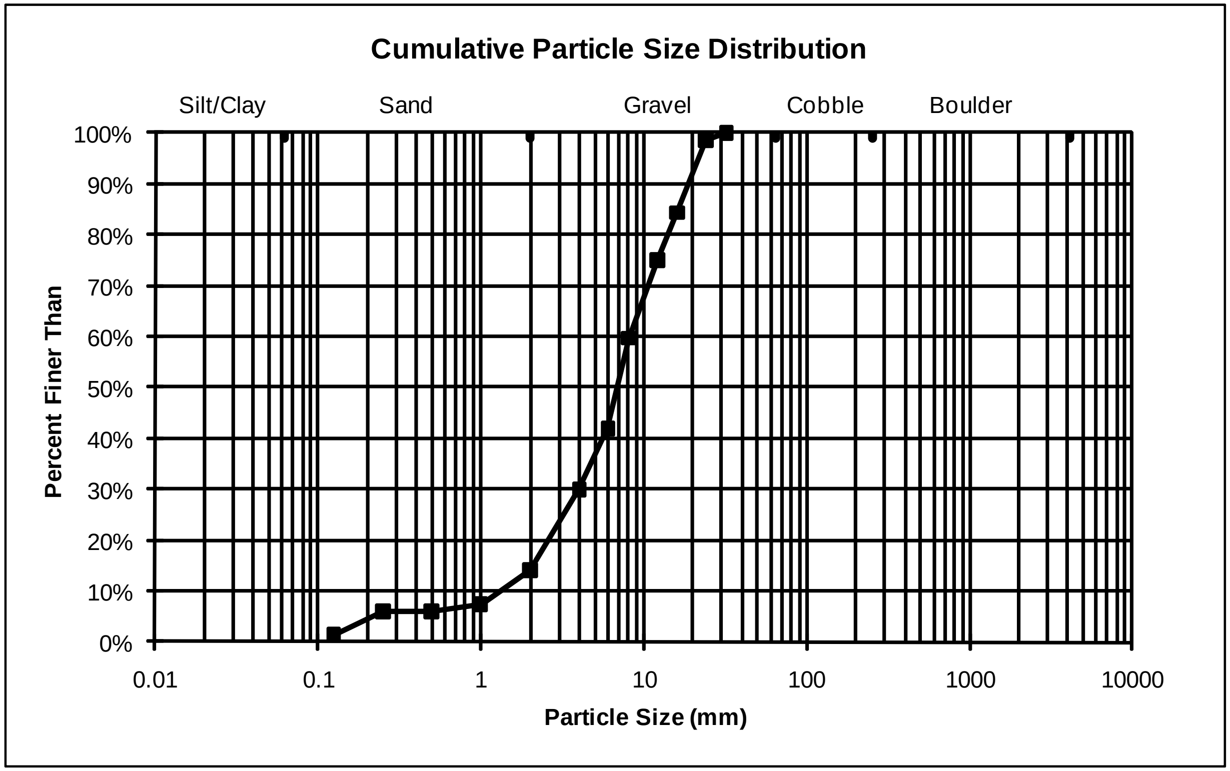
Pebble Count Worksheet

COMMENTS: Second reach 500 ft upstream from ERO Study Site

Particle Size (mm)	# in Size Class	% of Total	% Finer Than
<0.062	4	1.3%	
0.062 - 0.125	0	0.0%	1%
0.125 - 0.25	14	4.7%	6%
0.25 - .5	0	0.0%	6%
0.5 - 1.0	4	1.3%	7%
1 - 2	20	6.7%	14%
2 - 4	48	16.0%	30%
4 - 6	36	12.0%	42%
6 - 8	53	17.7%	60%
8 - 12	46	15.3%	75%
12 - 16	28	9.3%	84%
16 - 24	43	14.3%	99%
24 - 32	4	1.3%	100%
32 - 48			
48 - 64			
64 - 96			
96 - 128			
128 - 192			
192 - 256			
256 - 384			
384 - 512			
512 - 1024			
1024 - 2048			
2048 - 4096			
Total	300.00		

STREAM NAME: Pike's Peak Highway - North Fork Crystal Creek Reach 2
ID NUMBER: NCRY2
DATE: 9/20/2009
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	2.089	4.736	6.835	15.836	21.635	29.0



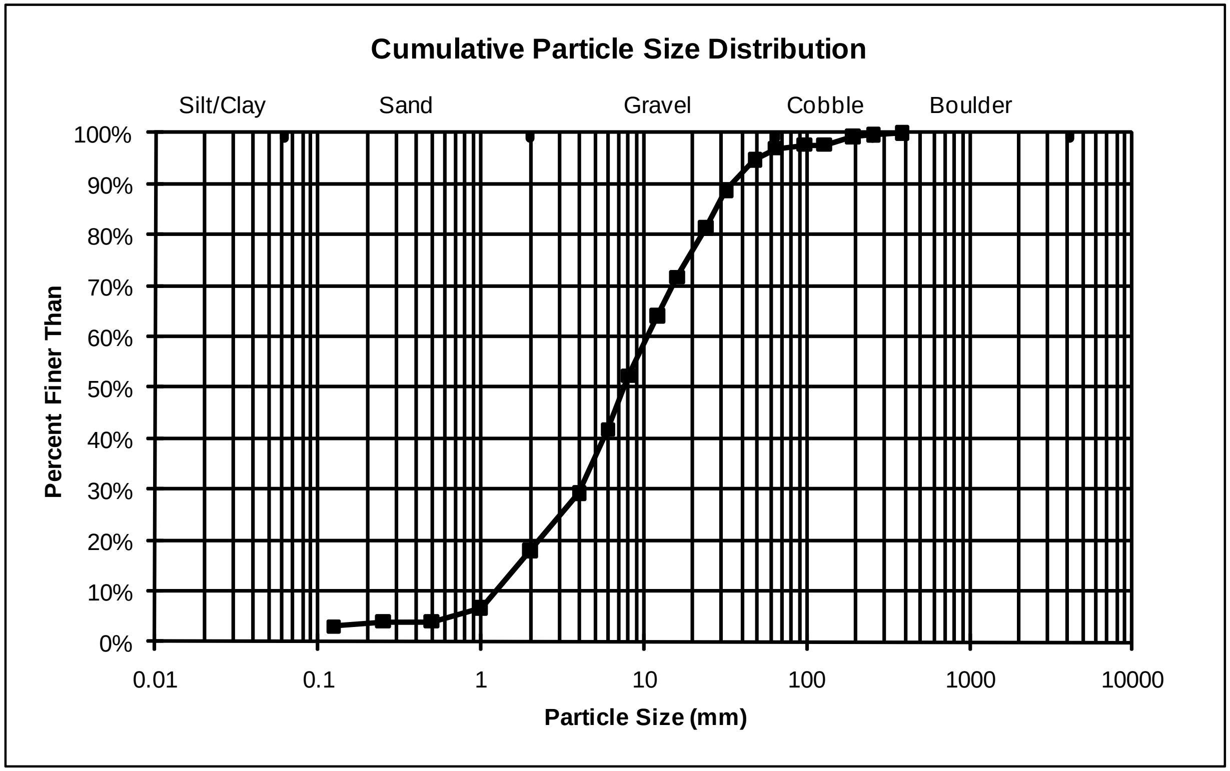
Pebble Count Worksheet

COMMENTS: ERO Reach

Particle Size (mm)	# in Size Class	% of Total	% Finer Than
<0.062	9	3.0%	
0.062 - 0.125	0	0.0%	3%
0.125 - 0.25	3	1.0%	4%
0.25 - .5	0	0.0%	4%
0.5 - 1.0	8	2.7%	7%
1 - 2	34	11.3%	18%
2 - 4	34	11.3%	29%
4 - 6	37	12.3%	42%
6 - 8	32	10.7%	52%
8 - 12	35	11.7%	64%
12 - 16	23	7.7%	72%
16 - 24	29	9.7%	81%
24 - 32	22	7.3%	89%
32 - 48	18	6.0%	95%
48 - 64	7	2.3%	97%
64 - 96	2	0.7%	98%
96 - 128	0	0.0%	98%
128 - 192	5	1.7%	99%
192 - 256	1	0.3%	100%
256 - 384	1	0.3%	100%
384 - 512			
512 - 1024			
1024 - 2048			
2048 - 4096			
Total	300.00		

STREAM NAME: Pike's Peak Highway - Oil Creek Reach 1
ID NUMBER: OILC1
DATE: 9/5/2009
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	1.665	4.819	7.512	26.647	50.014	320.0



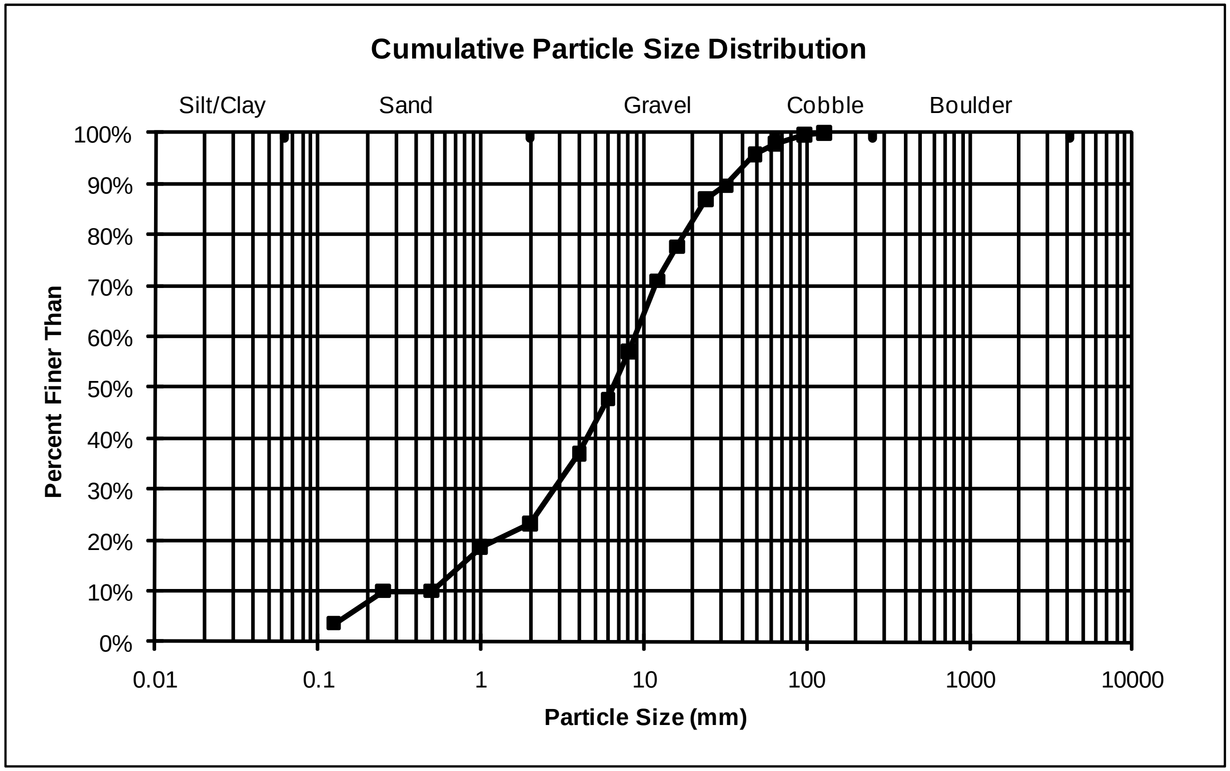
Pebble Count Worksheet

COMMENTS: ERO Study Site

Particle Size (mm)	# in Size Class	% of Total	% Finer Than
<0.062	11	3.7%	
0.062 - 0.125	0	0.0%	4%
0.125 - 0.25	19	6.3%	10%
0.25 - .5	0	0.0%	10%
0.5 - 1.0	26	8.7%	19%
1 - 2	14	4.7%	23%
2 - 4	41	13.7%	37%
4 - 6	32	10.7%	48%
6 - 8	28	9.3%	57%
8 - 12	42	14.0%	71%
12 - 16	20	6.7%	78%
16 - 24	28	9.3%	87%
24 - 32	8	2.7%	90%
32 - 48	18	6.0%	96%
48 - 64	7	2.3%	98%
64 - 96	5	1.7%	100%
96 - 128	1	0.3%	100%
128 - 192			
192 - 256			
256 - 384			
384 - 512			
512 - 1024			
1024 - 2048			
2048 - 4096			
Total	300.00		

STREAM NAME: Pike's Peak Highway - South Catamount Creek Reach 1
ID NUMBER: SCAT1
DATE: 9/20/2009
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	**D15**	**D35**	**D50**	**D84**	**D95**	**Lpart**
	0.746	**3.614**	**6.447**	**21.067**	**45.886**	**120.0**



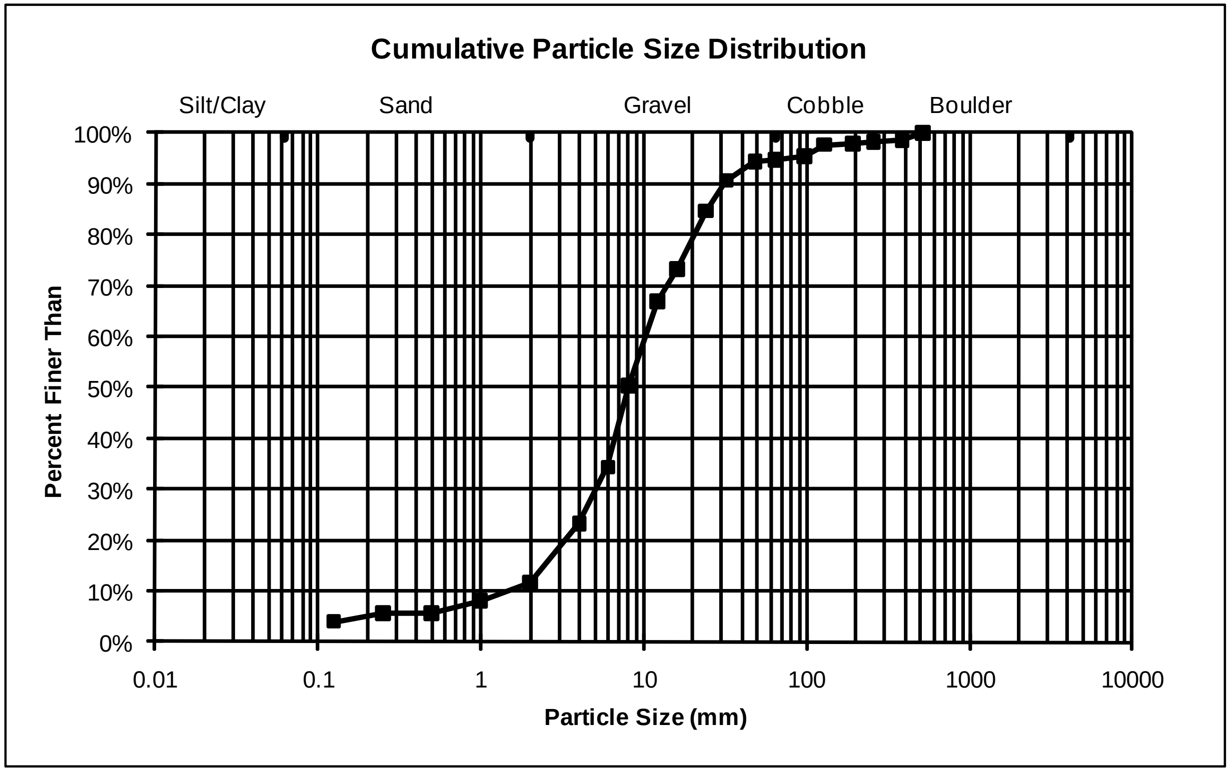
Pebble Count Worksheet

COMMENTS: Second reach 500 ft upstream from ERO Study Site

Particle Size (mm)	# in Size Class	% of Total	% Finer Than
<0.062	12	4.0%	
0.062 - 0.125	0	0.0%	4%
0.125 - 0.25	5	1.7%	6%
0.25 - .5	0	0.0%	6%
0.5 - 1.0	7	2.3%	8%
1 - 2	11	3.7%	12%
2 - 4	35	11.7%	23%
4 - 6	33	11.0%	34%
6 - 8	48	16.0%	50%
8 - 12	50	16.7%	67%
12 - 16	19	6.3%	73%
16 - 24	34	11.3%	85%
24 - 32	18	6.0%	91%
32 - 48	11	3.7%	94%
48 - 64	1	0.3%	95%
64 - 96	2	0.7%	95%
96 - 128	7	2.3%	98%
128 - 192	1	0.3%	98%
192 - 256	1	0.3%	98%
256 - 384	1	0.3%	99%
384 - 512	4	1.3%	100%
512 - 1024			
1024 - 2048			
2044 - 4096			
Total	300.00		

STREAM NAME: Pike's Peak Highway - South Catamount Creek Reach 2
ID NUMBER: SCAT2
DATE: 8/23/2009
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	**D15**	**D35**	**D50**	**D84**	**D95**	**Lpart**
	2.438	**6.072**	**7.952**	**23.434**	**78.384**	**310.0**



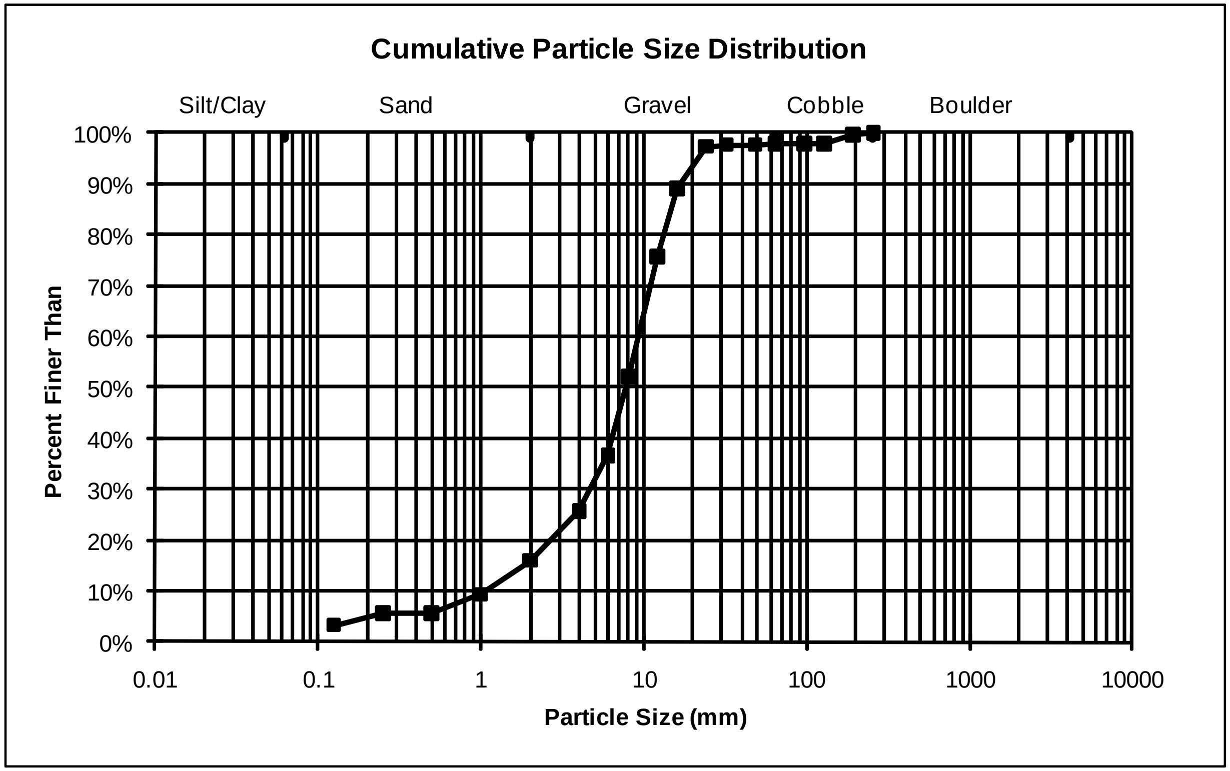
Pebble Count Worksheet

Particle Size (mm)	# in Size Class	% of Total	% Finer Than
<0.062	10	3.3%	
0.062 - 0.125	0	0.0%	3%
0.125 - 0.25	7	2.3%	6%
0.25 - .5	0	0.0%	6%
0.5 - 1.0	11	3.7%	9%
1 - 2	20	6.7%	16%
2 - 4	29	9.7%	26%
4 - 6	33	11.0%	37%
6 - 8	46	15.3%	52%
8 - 12	71	23.7%	76%
12 - 16	40	13.3%	89%
16 - 24	25	8.3%	97%
24 - 32	1	0.3%	98%
32 - 48	0	0.0%	98%
48 - 64	1	0.3%	98%
64 - 96	0	0.0%	98%
96 - 128	0	0.0%	98%
128 - 192	5	1.7%	100%
192 - 256	1	0.3%	100%
256 - 384			
384 - 512			
512 - 1024			
1024 - 2048			
2048 - 4096			
Total	300.00		

COMMENTS: Reach established upstream from confluence with Glen Cove Creek because of the transbasin diversion installed in Ski Creek

STREAM NAME: Pike's Peak Highway - South Catamount Creek Reach 3
ID NUMBER: SCAT3
DATE: 8/23/2009
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	**D15**	**D35**	**D50**	**D84**	**D95**	**Lpart**
	1.803	**5.642**	**7.705**	**14.364**	**21.424**	**208.0**



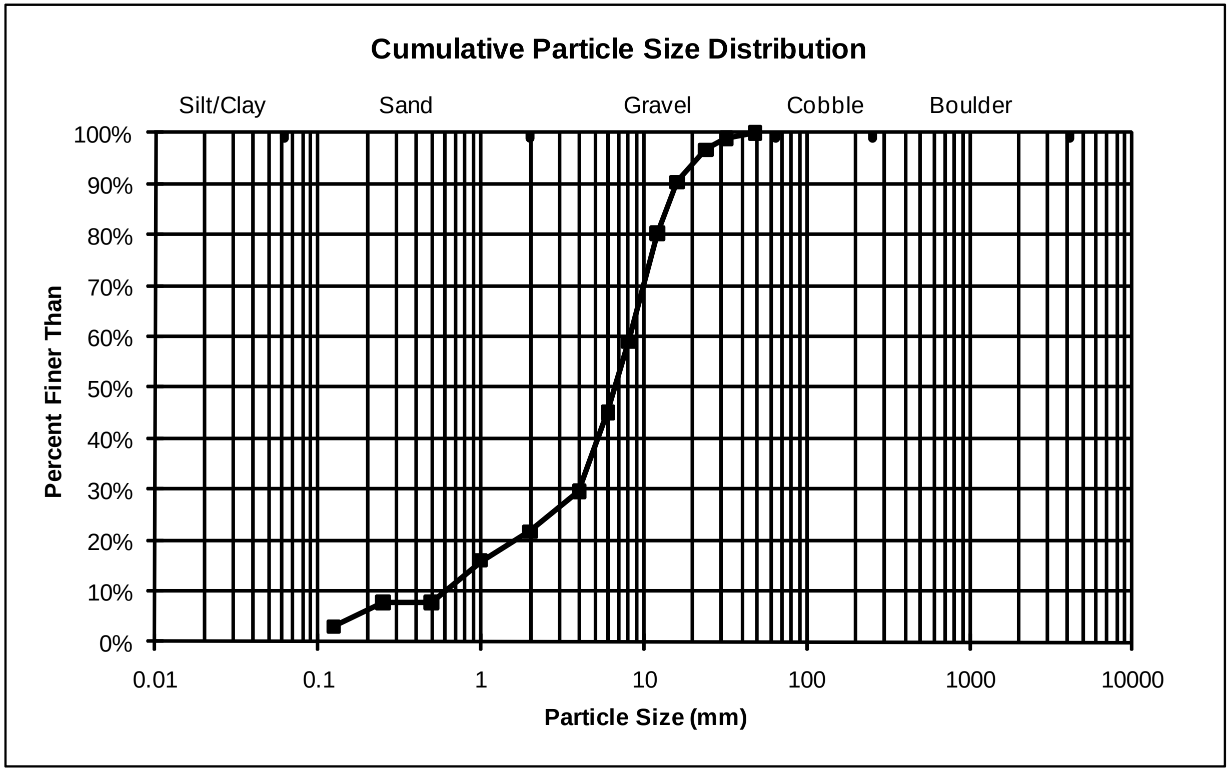
Pebble Count Worksheet

Particle Size (mm)	# in Size Class	% of Total	% Finer Than
<0.062	9	3.0%	
0.062 - 0.125	0	0.0%	3%
0.125 - 0.25	14	4.7%	8%
0.25 - .5	0	0.0%	8%
0.5 - 1.0	25	8.3%	16%
1 - 2	17	5.7%	22%
2 - 4	24	8.0%	30%
4 - 6	46	15.3%	45%
6 - 8	42	14.0%	59%
8 - 12	64	21.3%	80%
12 - 16	30	10.0%	90%
16 - 24	19	6.3%	97%
24 - 32	7	2.3%	99%
32 - 48	3	1.0%	100%
48 - 64			
64 - 96			
96 - 128			
128 - 192			
192 - 256			
256 - 384			
384 - 512			
512 - 1024			
1024 - 2048			
2048 - 4096			
Total	300.00		

COMMENTS: About 0.2 miles upstream form ERO Study Site

STREAM NAME: Pike's Peak Highway - Ski Creek Reach 1
ID NUMBER: SKIC1
DATE: 8/16/2009
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	**D15**	**D35**	**D50**	**D84**	**D95**	**Lpart**
	0.920	**4.606**	**6.649**	**13.335**	**21.571**	**42.0**



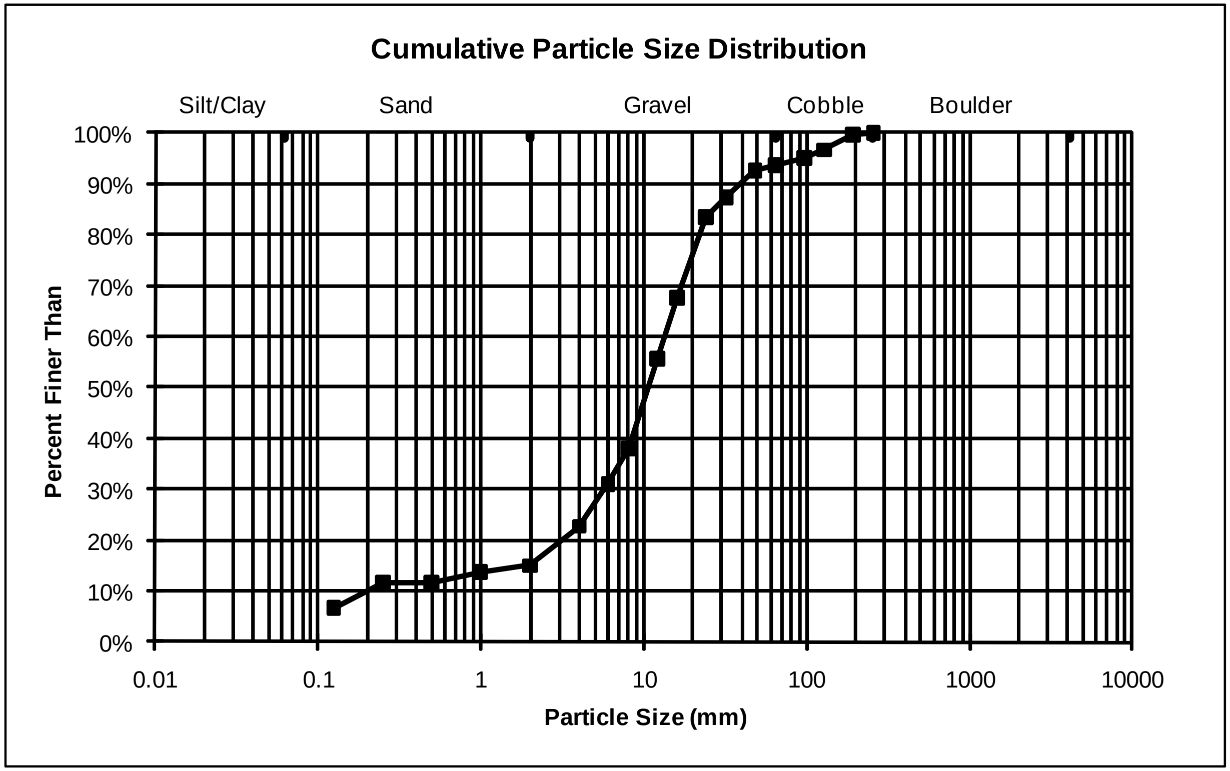
Pebble Count Worksheet

COMMENTS: Second reach near mile marker 10 on Pike's Peak Highway

Particle Size (mm)	# in Size Class	% of Total	% Finer Than
<0.062	20	6.7%	
0.062 - 0.125	0	0.0%	7%
0.125 - 0.25	15	5.0%	12%
0.25 - .5	0	0.0%	12%
0.5 - 1.0	6	2.0%	14%
1 - 2	4	1.3%	15%
2 - 4	23	7.7%	23%
4 - 6	25	8.3%	31%
6 - 8	21	7.0%	38%
8 - 12	53	17.7%	56%
12 - 16	36	12.0%	68%
16 - 24	47	15.7%	83%
24 - 32	12	4.0%	87%
32 - 48	16	5.3%	93%
48 - 64	3	1.0%	94%
64 - 96	4	1.3%	95%
96 - 128	5	1.7%	97%
128 - 192	9	3.0%	100%
192 - 256	1	0.3%	100%
256 - 384			
384 - 512			
512 - 1024			
1024 - 2048			
2048 - 4096			
Total	300.00		

STREAM NAME: Pike's Peak Highway - Ski Creek Reach 2
ID NUMBER: SKIC2
DATE: 7/25/2009
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	2.000	7.072	10.537	25.179	96.000	205.0



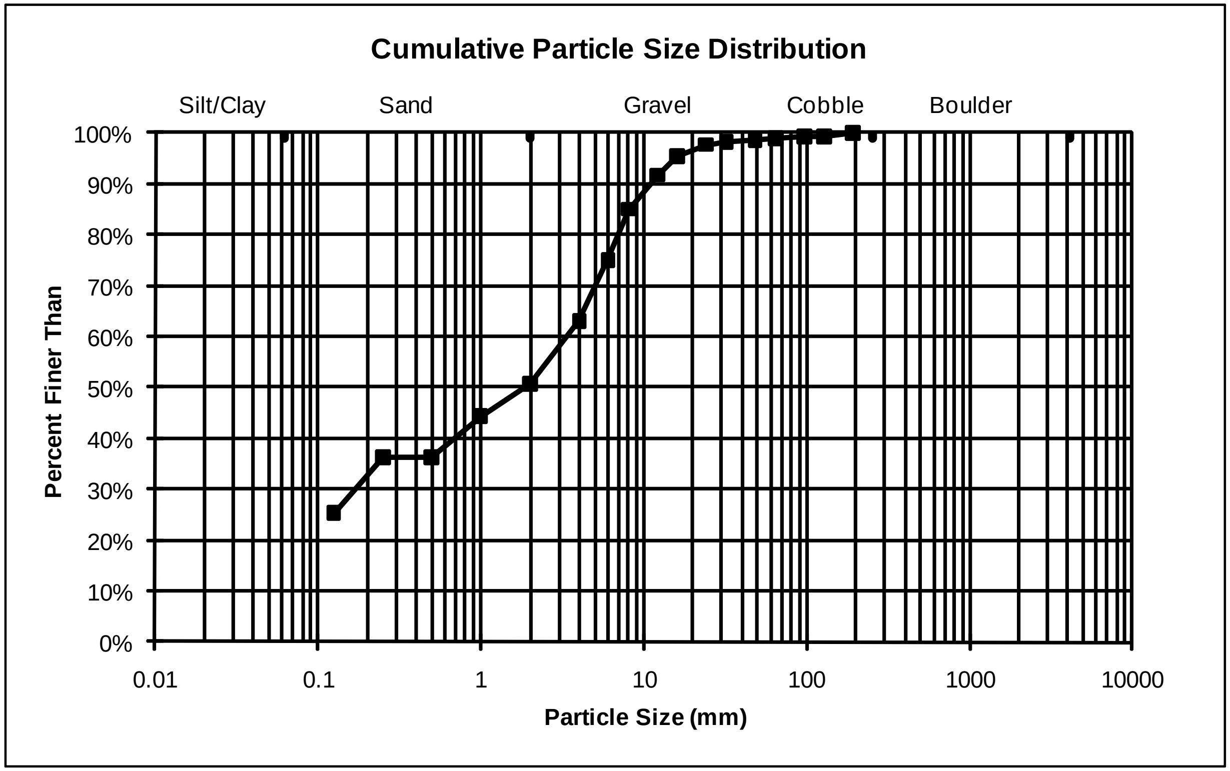
Pebble Count Worksheet

COMMENTS: ERO Reach

Particle Size (mm)	# in Size Class	% of Total	% Finer Than
<0.062	76	25.3%	
0.062 - 0.125	0	0.0%	25%
0.125 - 0.25	33	11.0%	36%
0.25 - .5	0	0.0%	36%
0.5 - 1.0	24	8.0%	44%
1 - 2	19	6.3%	51%
2 - 4	37	12.3%	63%
4 - 6	36	12.0%	75%
6 - 8	30	10.0%	85%
8 - 12	20	6.7%	92%
12 - 16	11	3.7%	95%
16 - 24	7	2.3%	98%
24 - 32	2	0.7%	98%
32 - 48	1	0.3%	99%
48 - 64	1	0.3%	99%
64 - 96	1	0.3%	99%
96 - 128	0	0.0%	99%
128 - 192	2	0.7%	100%
192 - 256			
256 - 384			
384 - 512			
512 - 1024			
1024 - 2048			
2048 - 4096			
Total	300.00		

STREAM NAME: Pike's Peak Highway - Severy Creek Reach 1
ID NUMBER: SVRY1
DATE: 9/27/2009
CREW: Derengowski, VonLoh, Winkler

Particle Size Distribution (mm)	**D15**	**D35**	**D50**	**D84**	**D95**	**Lpart**
	0.094	**0.230**	**1.859**	**7.773**	**15.587**	**170.0**



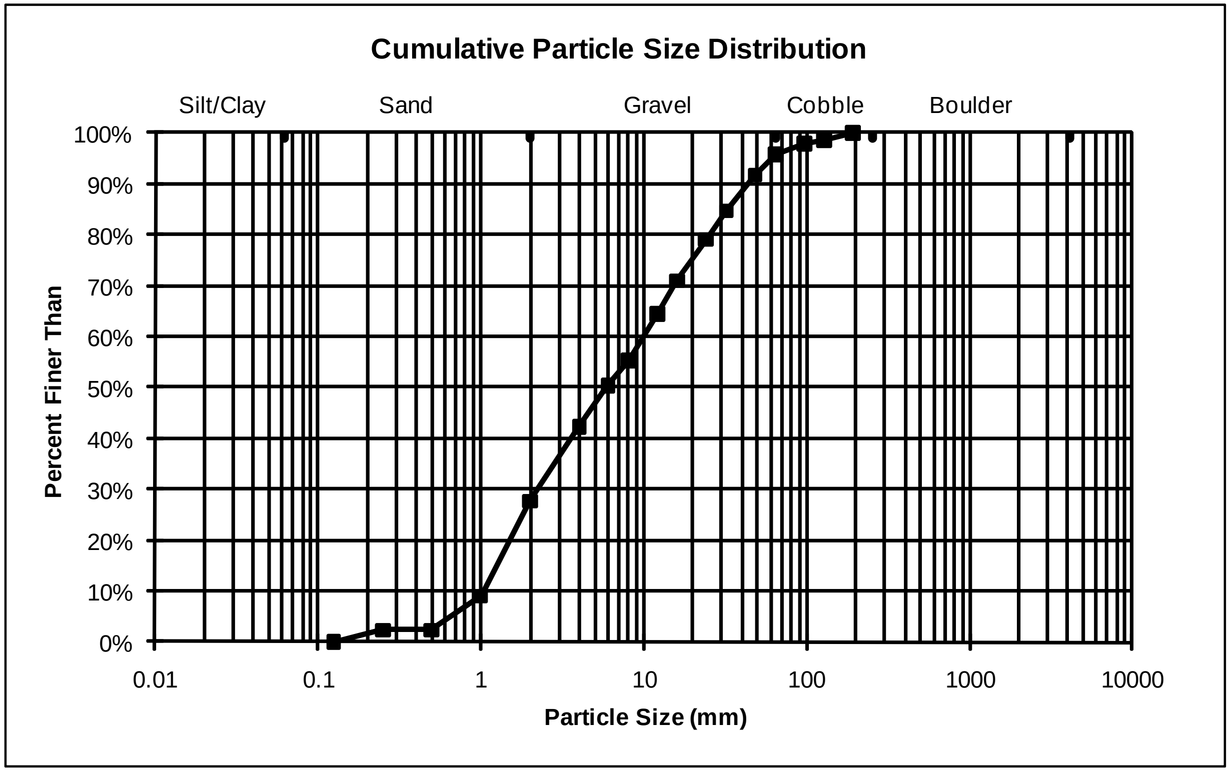
Pebble Count Worksheet

COMMENTS: Second reach 1000 ft upstream of ERO Reach

Particle Size (mm)	# in Size Class	% of Total	% Finer Than
<0.062	0	0.0%	
0.062 - 0.125	0	0.0%	0%
0.125 - 0.25	7	2.3%	2%
0.25 - .5	0	0.0%	2%
0.5 - 1.0	20	6.7%	9%
1 - 2	56	18.7%	28%
2 - 4	44	14.7%	42%
4 - 6	24	8.0%	50%
6 - 8	15	5.0%	55%
8 - 12	27	9.0%	64%
12 - 16	20	6.7%	71%
16 - 24	24	8.0%	79%
24 - 32	17	5.7%	85%
32 - 48	21	7.0%	92%
48 - 64	12	4.0%	96%
64 - 96	7	2.3%	98%
96 - 128	2	0.7%	99%
128 - 192	4	1.3%	100%
192 - 256			
256 - 384			
384 - 512			
512 - 1024			
1024 - 2048			
2044 - 4096			
Total	300.00		

STREAM NAME: Pike's Peak Highway - Severy Creek Reach 2
ID NUMBER: SVRY2
DATE: 9/27/2009
CREW: Derengowski, VonLoh, Winkler

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	1.250	2.828	5.899	30.935	61.004	165.0



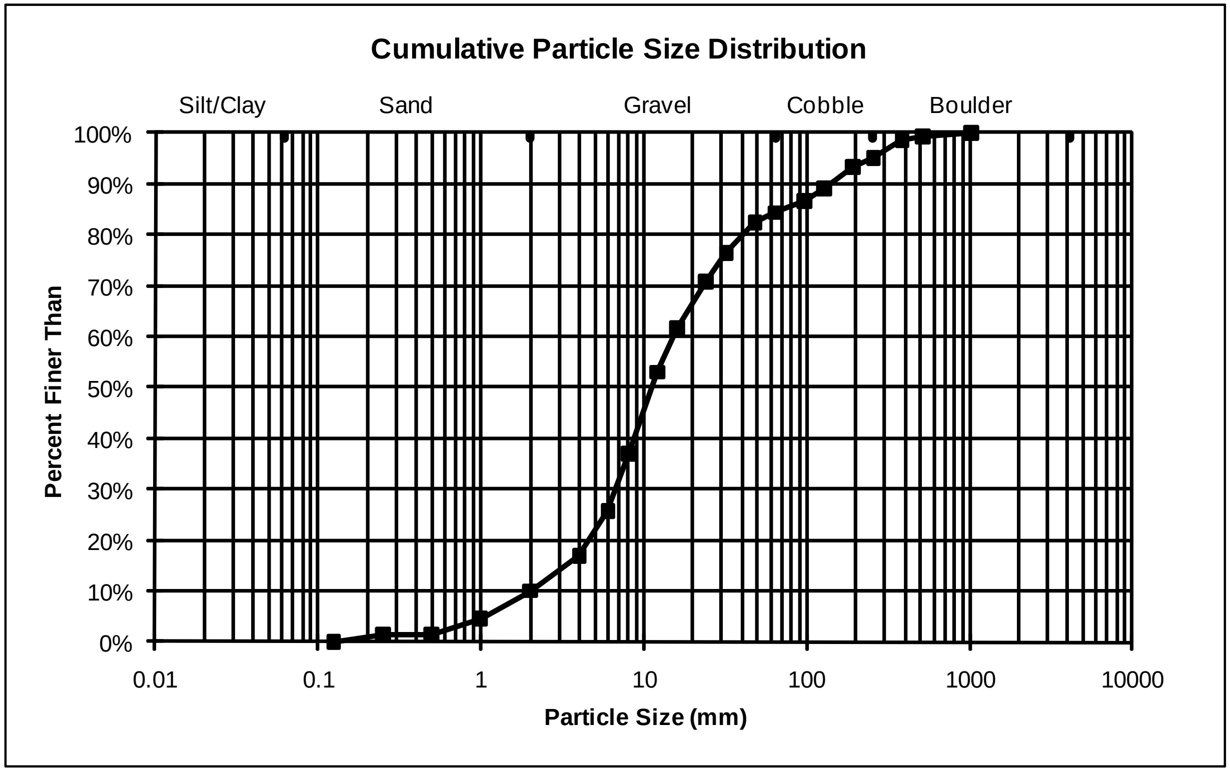
Pebble Count Worksheet

COMMENTS: ERO Reach

Particle Size (mm)	# in Size Class	% of Total	% Finer Than
<0.062	0	0.0%	
0.062 - 0.125	0	0.0%	0%
0.125 - 0.25	4	1.3%	1%
0.25 - .5	0	0.0%	1%
0.5 - 1.0	10	3.3%	5%
1 - 2	16	5.3%	10%
2 - 4	21	7.0%	17%
4 - 6	26	8.7%	26%
6 - 8	34	11.3%	37%
8 - 12	48	16.0%	53%
12 - 16	26	8.7%	62%
16 - 24	27	9.0%	71%
24 - 32	17	5.7%	76%
32 - 48	18	6.0%	82%
48 - 64	6	2.0%	84%
64 - 96	7	2.3%	87%
96 - 128	7	2.3%	89%
128 - 192	13	4.3%	93%
192 - 256	5	1.7%	95%
256 - 384	11	3.7%	99%
384 - 512	2	0.7%	99%
512 - 1024	2	0.7%	100%
1024 - 2048			
2048 - 4096			
Total	300.00		

STREAM NAME: Pike's Peak Highway - West Fork Beaver Creek Reach 1
ID NUMBER: WBVR1
DATE: 9/5/2009
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	3.281	7.604	11.122	61.004	256.000	700.0



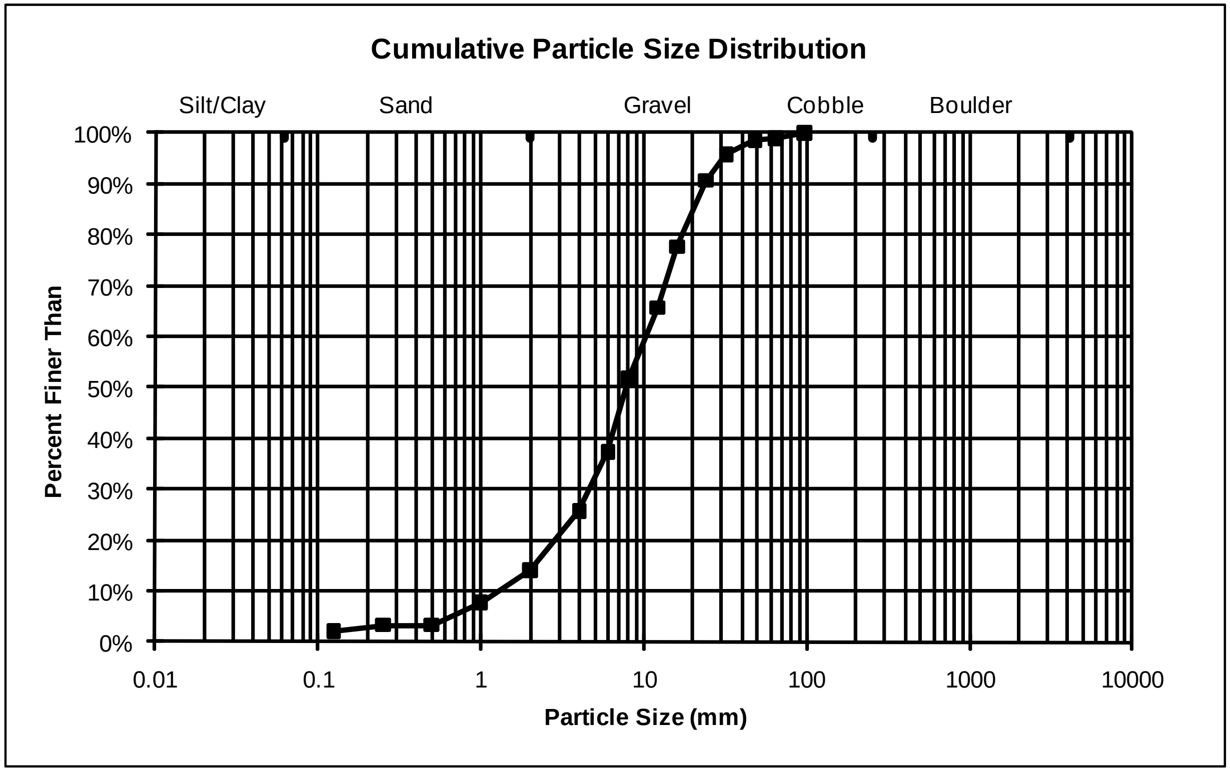
Pebble Count Worksheet

COMMENTS: Second reach 0.5 miles upstream of ERO Reach

Particle Size (mm)	# in Size Class	% of Total	% Finer Than
<0.062	6	2.0%	
0.062 - 0.125	0	0.0%	2%
0.125 - 0.25	4	1.3%	3%
0.25 - .5	0	0.0%	3%
0.5 - 1.0	13	4.3%	8%
1 - 2	19	6.3%	14%
2 - 4	35	11.7%	26%
4 - 6	35	11.7%	37%
6 - 8	43	14.3%	52%
8 - 12	42	14.0%	66%
12 - 16	36	12.0%	78%
16 - 24	39	13.0%	91%
24 - 32	15	5.0%	96%
32 - 48	9	3.0%	99%
48 - 64	1	0.3%	99%
64 - 96	3	1.0%	100%
96 - 128			
128 - 192			
192 - 256			
256 - 384			
384 - 512			
512 - 1024			
1024 - 2048			
2044 - 4096			
Total	300.00		

STREAM NAME: Pike's Peak Highway - West Fork Beaver Creek Reach 2
ID NUMBER: WBVR2
DATE: 8/1/2009
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	2.122	5.533	7.737	19.494	30.796	82.0



Appendix P

Stream Bar Sample

Particle Size Distribution and Graphs

2009

Summary of Stream Channel Particle Size Distribution from Sieve Analysis of Bar Samples on Pikes Peak 2008–2009

			Particle Size Distribution–Grab Samples 2008–2009					
Site Name	**ID**	**Date**	**D15**	**D35**	**D50**	**D84**	**D95**	**D100**
Boehmer Creek	BHMR1	9/25/2008	0.247	1.057	1.884	7.282	11.987	21.0
Boehmer Creek	BHMR2	9/25/2008	0.768	8.972	66.538	75.420	78.540	80.0
East Fork Beaver Creek	EBVR1	9/25/2008	0.651	2.190	3.293	7.493	10.971	20.0
East Fork Beaver Creek	EBVR2	9/25/2008	2.380	3.472	4.313	6.894	8.304	10.0
Glen Cove Creek	GLEN1	9/24/2008	0.128	0.807	1.407	7.057	12.388	16.0
North Catamount Creek	NCAT1	8/28/2008	2.711	4.232	5.471	8.360	10.688	15.0
North Catamount Creek	NCAT2	8/28/2008	0.894	2.885	4.314	8.773	12.585	17.0
North Fork Crystal Creek	NCRY1	9/17/2008	0.506	1.286	2.070	6.613	13.006	18.0
North Fork Crystal Creek	NCRY2	9/17/2008	0.366	1.984	3.437	9.906	14.681	19.0
Oil Creek	OILC1	10/2/2008	1.595	3.306	4.665	8.972	12.276	18.0
South Catamount Creek	SCAT1	10/1/2008	0.764	3.805	6.732	15.936	34.446	44.0
South Catamount Creek	SCAT2	9/10/2008	0.057	0.748	2.028	11.169	20.091	27.0
South Catamount Creek	SCAT3	9/10/2008	1.063	2.543	3.663	7.468	10.192	15.0
Ski Creek	SKIC1	9/24/2008	0.113	0.988	1.740	6.633	11.846	20.0
Ski Creek	SKIC2	10/1/2008	0.267	1.095	1.885	6.178	10.011	21.0
Severy Creek	SVRY1	9/3/2008	0.014	0.081	0.295	2.054	3.321	9.0
Severy Creek	SVRY2	9/3/2008	0.644	1.380	2.128	5.204	9.215	20.0
West Fork Beaver Creek	WBVR1	9/18/2008	1.887	3.763	5.282	10.316	14.274	20.0
West Fork Beaver Creek	WBVR2	9/18/2008	0.157	5.554	7.574	15.508	35.948	40.0
Boehmer Creek	BHMR1	8/30/2009	0.855	2.154	4.230	24.917	33.460	35.0
Boehmer Creek	BHMR2	8/29/2009	0.674	1.323	1.974	10.925	19.036	26.0
East Fork Beaver Creek	EBVR1	8/30/2009	0.775	2.142	3.463	8.129	13.720	18.0
East Fork Beaver Creek	EBVR2	8/30/2009	0.671	1.445	2.331	6.606	11.251	18.0
Glen Cove Creek	GLEN1	8/23/2009	0.699	2.582	5.110	14.646	26.122	38.0
North Catamount Creek	NCAT1	8/16/2009	3.107	5.051	6.409	10.584	14.268	20.0
North Catamount Creek	NCAT2	8/16/2009	1.109	2.699	3.836	7.969	11.106	15.0
North Fork Crystal Creek	NCRY1	9/20/2009	1.936	4.409	6.529	14.547	22.199	26.0
North Fork Crystal Creek	NCRY2	9/20/2009	0.206	1.207	2.039	5.057	8.974	17.0
Oil Creek	OILC1	9/5/2009	1.072	3.654	5.241	10.190	14.190	18.0

			Particle Size Distribution–Grab Samples 2008–2009					
Site Name	**ID**	**Date**	**D15**	**D35**	**D50**	**D84**	**D95**	**D100**
South Catamount Creek	SCAT1	9/20/2009	0.047	0.795	2.300	15.551	33.952	35.0
South Catamount Creek	SCAT2	8/23/2009	0.150	1.791	4.185	11.958	16.002	20.0
South Catamount Creek	SCAT3	8/23/2009	1.201	2.604	3.705	7.418	10.519	15.0
Ski Creek	SKIC1	8/16/2009	0.045	0.598	0.992	3.847	8.667	13.0
Ski Creek	SKIC2	7/25/2009	0.190	1.526	3.140	9.614	15.056	21.0
Severy Creek	SVRY1	9/27/2009	0.020	0.184	0.645	1.981	4.781	10.0
Severy Creek	SVRY2	9/27/2009	0.665	1.840	3.274	10.431	21.549	30.0
West Fork Beaver Creek	WBVR1	9/5/2009	0.322	1.268	2.252	9.214	23.664	30.0
West Fork Beaver Creek	WBVR2	8/1/2009	0.507	2.221	3.872	10.765	15.957	20.0

Sieve Analysis Worksheet

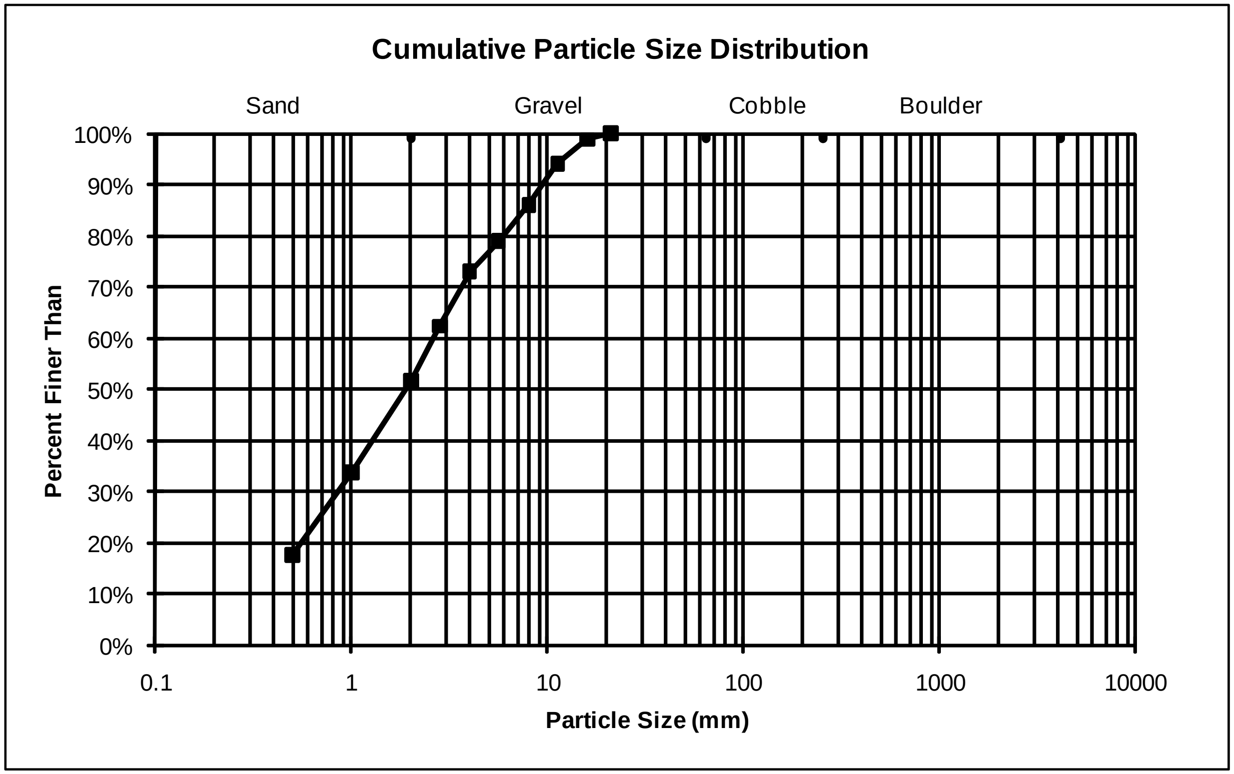
Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	117.90	17.5%	
0.5	107.70	16.0%	17.5%
1.0	120.80	18.0%	33.6%
2.0	72.40	10.8%	51.5%
2.8	71.60	10.7%	62.3%
4.0	39.40	5.9%	73.0%
5.6	47.10	7.0%	78.8%
8.0	55.50	8.3%	85.8%
11.2	31.50	4.7%	94.1%
16.0	8.10	1.2%	98.8%
21.0	*		100.0%
32.0			-
45.0			
64.0			
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	672.00		

*Measured value of the largest particle in the sample and not a sieve weight

COMMENTS: Bar Sample taken downstream from Cross Section E

SITE NAME: Pike's Peak Highway - Boehmer Creek Reach 1
ID NUMBER: BHMR1
DATE: 9/25/2008
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	**D15**	**D35**	**D50**	**D84**	**D95**	**Lpart**
	0.247	**1.057**	**1.884**	**7.282**	**11.987**	**21.0**



Sieve Analysis Worksheet

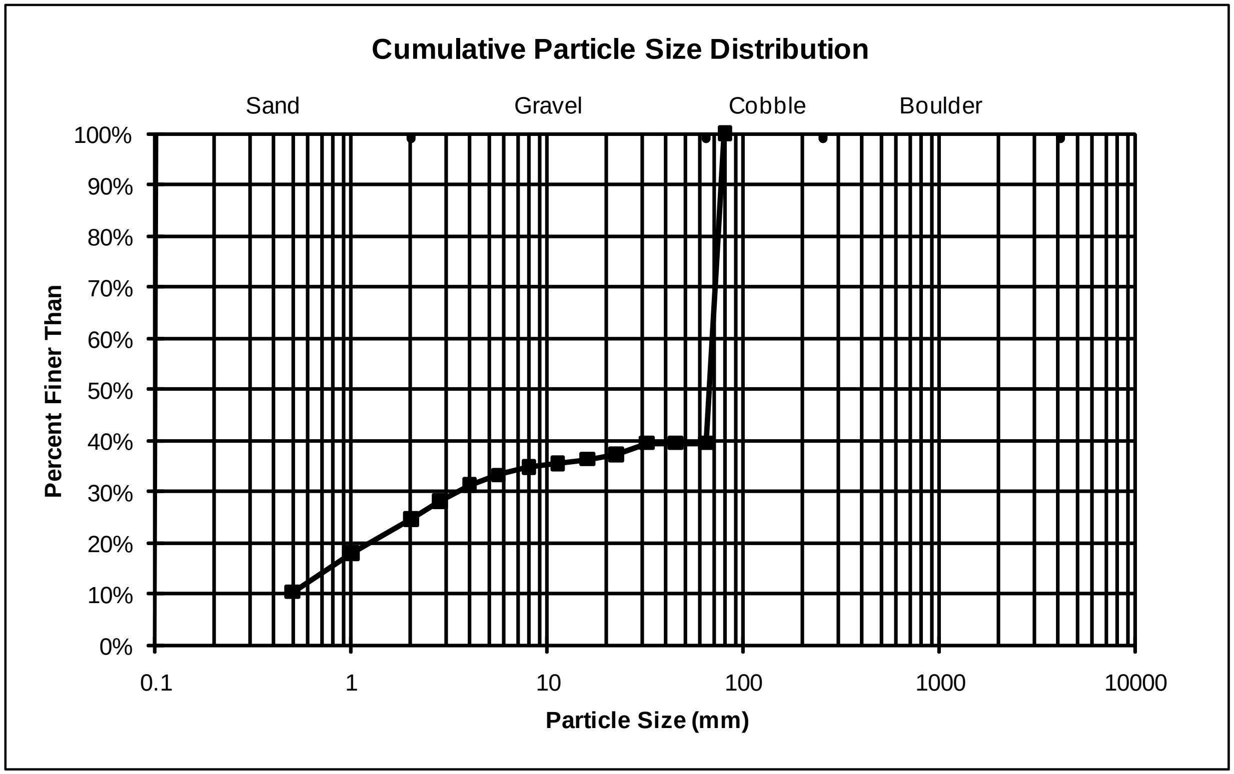
COMMENTS: Bar Sample taken 18 ft upstream of Cross Section B

Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	70.30	10.3%	
0.5	51.20	7.5%	10.3%
1.0	45.80	6.7%	17.9%
2.0	23.10	3.4%	24.6%
2.8	22.70	3.3%	28.0%
4.0	12.80	1.9%	31.3%
5.6	10.50	1.5%	33.2%
8.0	4.90	0.7%	34.8%
11.2	5.70	0.8%	35.5%
16.0	6.60	1.0%	36.3%
22.4	14.70	2.2%	37.3%
32.0	0.00	0.0%	39.4%
45.0	0.00	0.0%	39.4%
64.0	411.90	60.6%	39.4%
80	*		100.0%
128			-
181			
256			
362			
512			
1024			
2048			
4096			
Total	680.20		

*Measured value of the largest particle in the sample and not a sieve weight

SITE NAME: Pike's Peak Highway - Boehmer Creek Reach 2
ID NUMBER: BHMR2
DATE: 9/25/2008
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	0.768	8.972	66.538	75.420	78.540	80.0



Sieve Analysis Worksheet

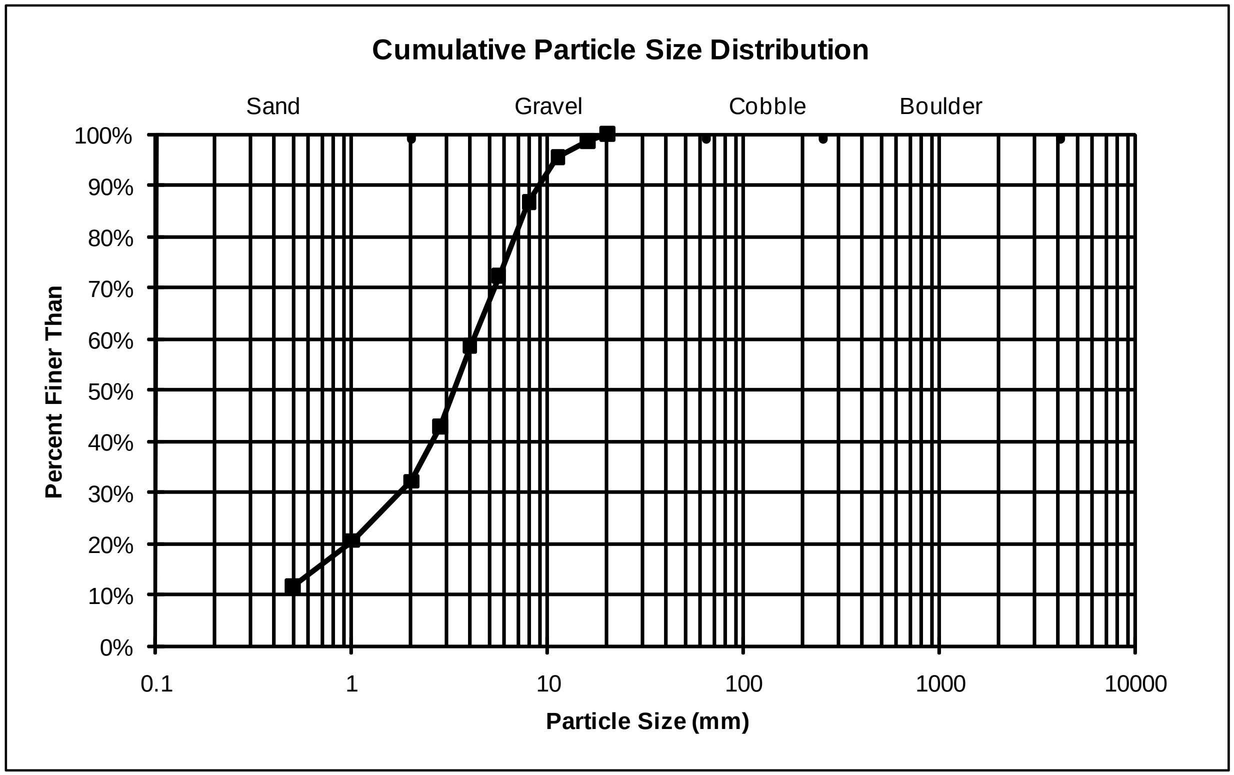
COMMENTS: Bar Sample taken 2 ft downstream of Cross Section B left bank

Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	128.40	11.6%	
0.5	97.60	8.8%	11.6%
1.0	128.50	11.6%	20.5%
2.0	117.60	10.7%	32.1%
2.8	175.00	15.9%	42.8%
4.0	151.60	13.7%	58.7%
5.6	156.90	14.2%	72.4%
8.0	98.60	8.9%	86.6%
11.2	34.20	3.1%	95.5%
16.0	14.90	1.4%	98.6%
20.0	*		100.0%
32.0			-
45.0			
64.0			
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	1103.30		

*Measured value of the largest particle in the sample and not a sieve weight

SITE NAME: Pike's Peak Highway - East Fork Beaver Creek Reach 1
ID NUMBER: EBVR1
DATE: 9/25/2008
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	0.651	2.190	3.293	7.493	10.971	20.0



Sieve Analysis Worksheet

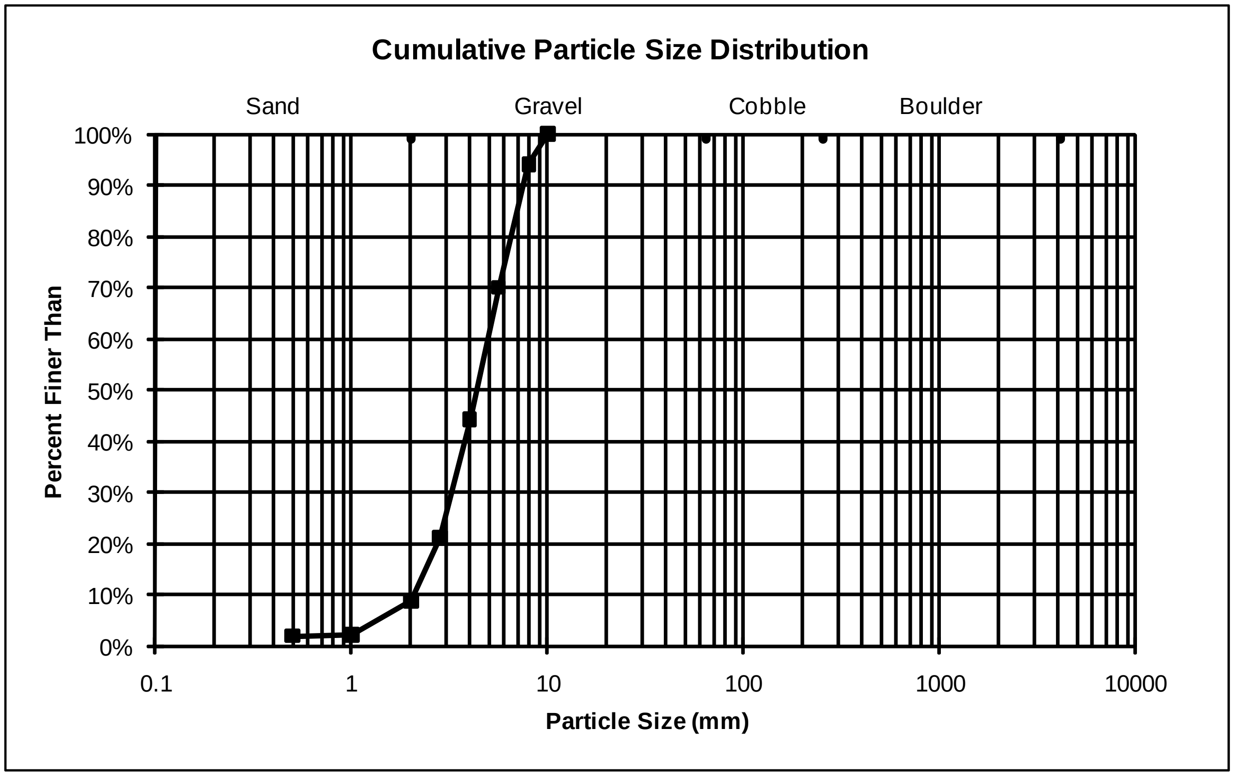
COMMENTS: Bar Sample taken 6 ft upstream of Cross Section E

Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	10.10	1.9%	
0.5	1.60	0.3%	1.9%
1.0	33.70	6.4%	2.2%
2.0	65.40	12.4%	8.6%
2.8	122.80	23.3%	21.0%
4.0	136.20	25.8%	44.2%
5.6	126.60	24.0%	70.0%
8.0	31.70	6.0%	94.0%
10.0	*		100.0%
16.0			-
22.4			
32.0			
45.0			
64.0			
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	528.10		

*Measured value of the largest particle in the sample and not a sieve weight

SITE NAME: Pike's Peak Highway - East Fork Beaver Creek Reach 2
ID NUMBER: EBVR2
DATE: 9/25/2008
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	2.380	3.472	4.313	6.894	8.304	10.0



Sieve Analysis Worksheet

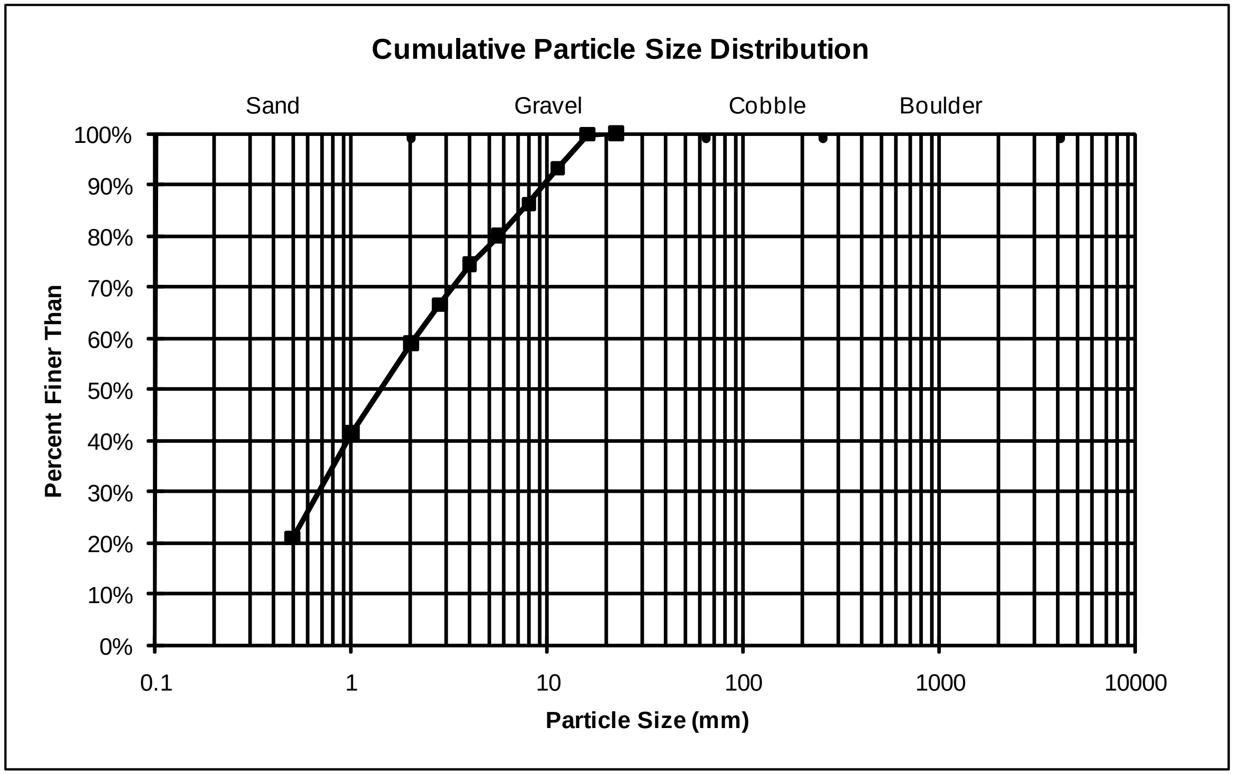
Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	261.00	20.8%	
0.5	256.20	20.5%	20.8%
1.0	220.80	17.6%	41.3%
2.0	94.50	7.5%	59.0%
2.8	99.90	8.0%	66.5%
4.0	68.40	5.5%	74.5%
5.6	78.20	6.2%	79.9%
8.0	86.70	6.9%	86.2%
11.2	83.20	6.6%	93.1%
16.0	2.90	0.2%	99.8%
22.4			100.0%
32.0			
45.0			
64.0			
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	1251.80		

*Measured value of the largest particle in the sample and not a sieve weight

COMMENTS: Bar Sample taken at Cross Section E right bank

SITE NAME: Pike's Peak Highway - Glen Cove Creek Reach 1
ID NUMBER: GLEN1
DATE: 9/24/2008
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	**D15**	**D35**	**D50**	**D84**	**D95**	**Lpart**
	0.128	**0.807**	**1.407**	**7.057**	**12.388**	**16.0**



Sieve Analysis Worksheet

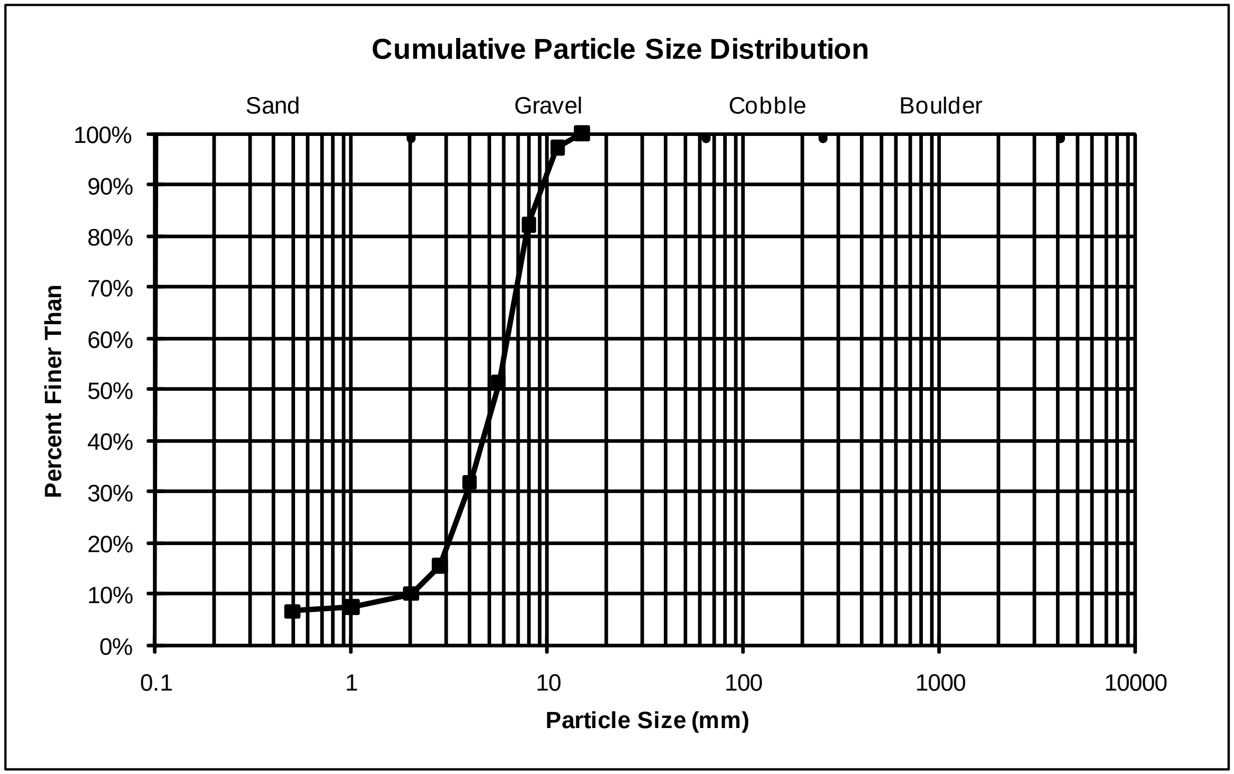
Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	57.70	6.5%	
0.5	7.60	0.9%	6.5%
1.0	23.10	2.6%	7.4%
2.0	49.60	5.6%	10.0%
2.8	143.60	16.2%	15.5%
4.0	174.50	19.6%	31.7%
5.6	272.40	30.7%	51.4%
8.0	133.80	15.1%	82.0%
11.2	25.80	2.9%	97.1%
15.0	*		100.0%
22.4			-
32.0			
45.0			
64.0			
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	888.10		

*Measured value of the largest particle in the sample and not a sieve weight

COMMENTS: Bar Sample taken between Cross Section B and C right bank

SITE NAME: Pike's Peak Highway - North Catamount Creek Reach 1
ID NUMBER: NCAT1
DATE: 8/28/2008
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	**D15**	**D35**	**D50**	**D84**	**D95**	**Lpart**
	2.711	**4.232**	**5.471**	**8.360**	**10.688**	**15.0**



Sieve Analysis Worksheet

Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	56.20	6.2%	
0.5	96.00	10.5%	6.2%
1.0	93.50	10.3%	16.7%
2.0	63.40	7.0%	27.0%
2.8	117.70	12.9%	33.9%
4.0	128.20	14.1%	46.8%
5.6	178.90	19.6%	60.9%
8.0	115.00	12.6%	80.5%
11.2	51.20	5.6%	93.2%
16.0	11.10	1.2%	98.8%
17.0	*		100.0%
32.0			-
45.0			
64.0			
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	911.20		

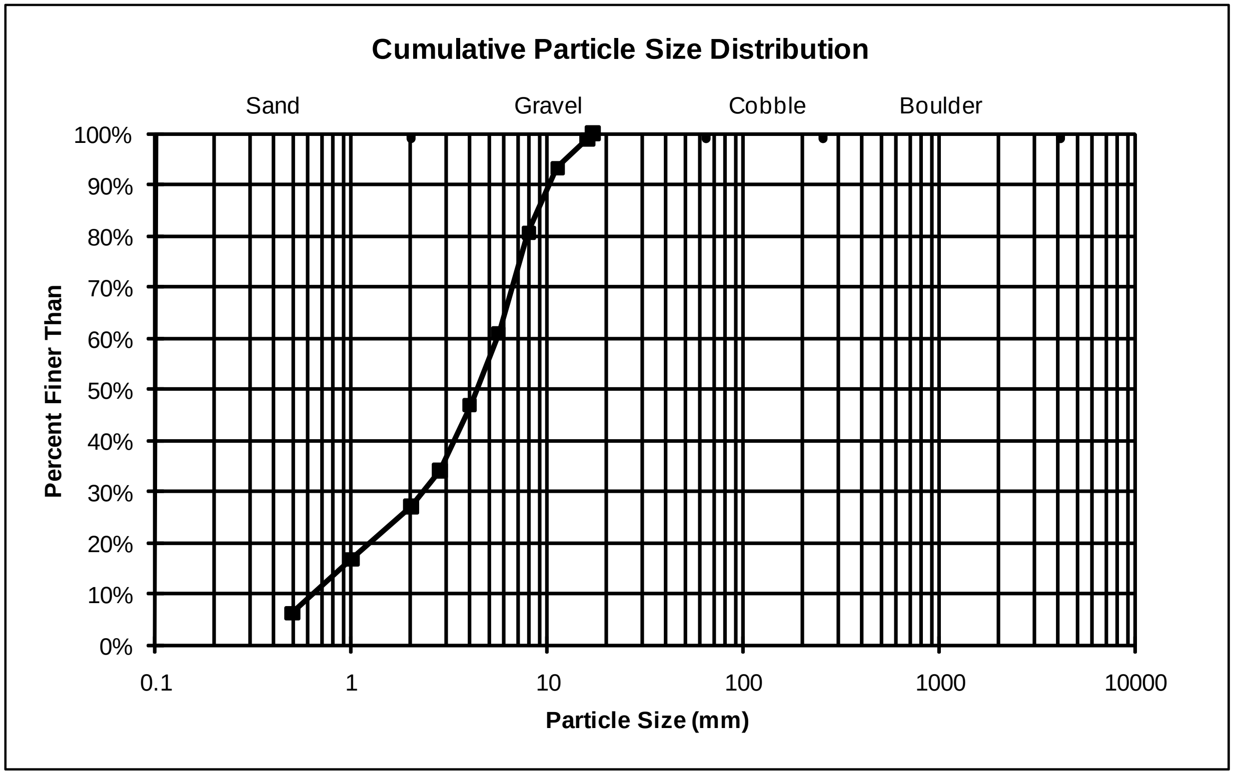
*Measured value of the largest particle in the sample and not a sieve weight

COMMENTS: Bar Sample taken 3 ft downstream of Cross Section B

SITE NAME: Pike's Peak Highway - North Catamount Creek Reach 2
ID NUMBER: NCAT2
DATE: 8/28/2008
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)

D15	D35	D50	D84	D95	Lpart
0.894	2.885	4.314	8.773	12.585	17.0



Sieve Analysis Worksheet

Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	96.80	14.8%	
0.5	81.10	12.4%	14.8%
1.0	142.00	21.7%	27.1%
2.0	75.90	11.6%	48.8%
2.8	75.00	11.4%	60.4%
4.0	53.50	8.2%	71.8%
5.6	56.10	8.6%	80.0%
8.0	29.10	4.4%	88.6%
11.2	31.10	4.7%	93.0%
16.0	14.70	2.2%	97.8%
18.0	*		100.0%
32.0			-
45.0			
64.0			
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	655.30		

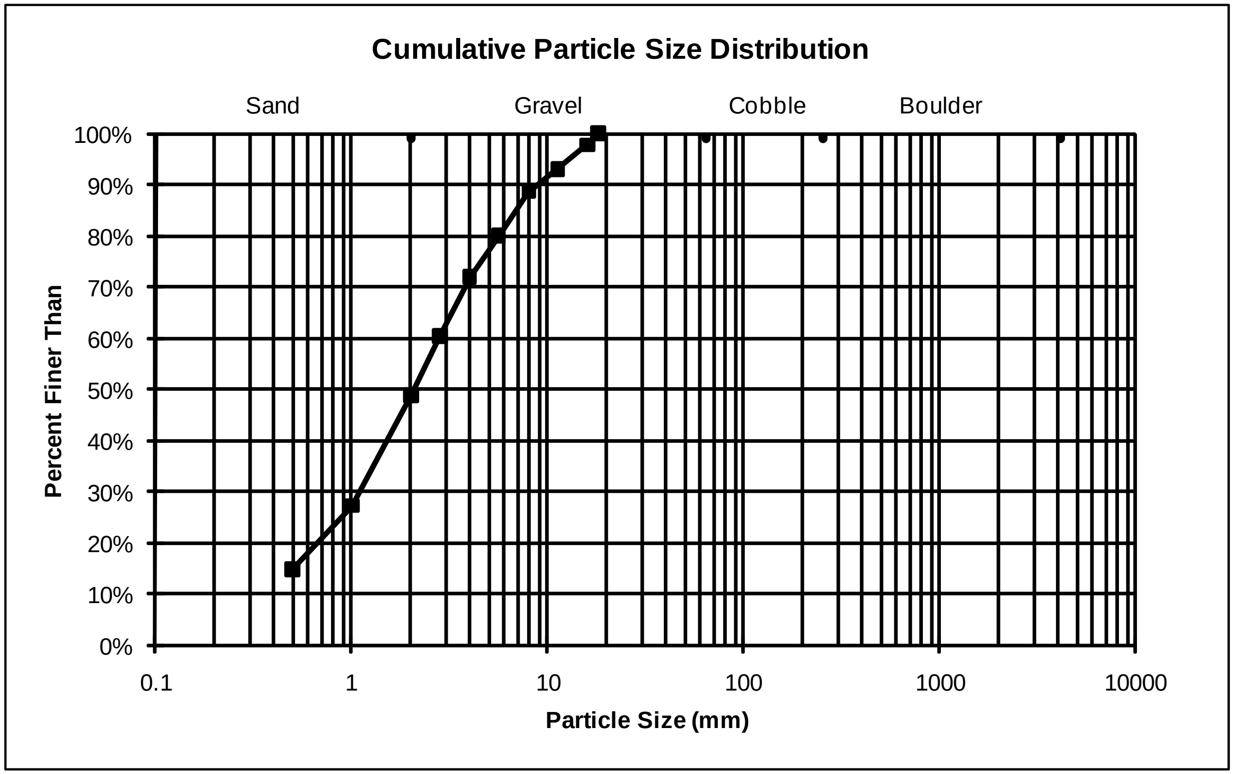
*Measured value of the largest particle in the sample and not a sieve weight

COMMENTS: Bar Sample taken at Cross Section A left bank

SITE NAME: Pike's Peak Highway - North Fork Crystal Creek
ID NUMBER: NCRY1
DATE: 9/17/2008
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)

D15	D35	D50	D84	D95	Lpart
0.506	1.286	2.070	6.613	13.006	18.0



Sieve Analysis Worksheet

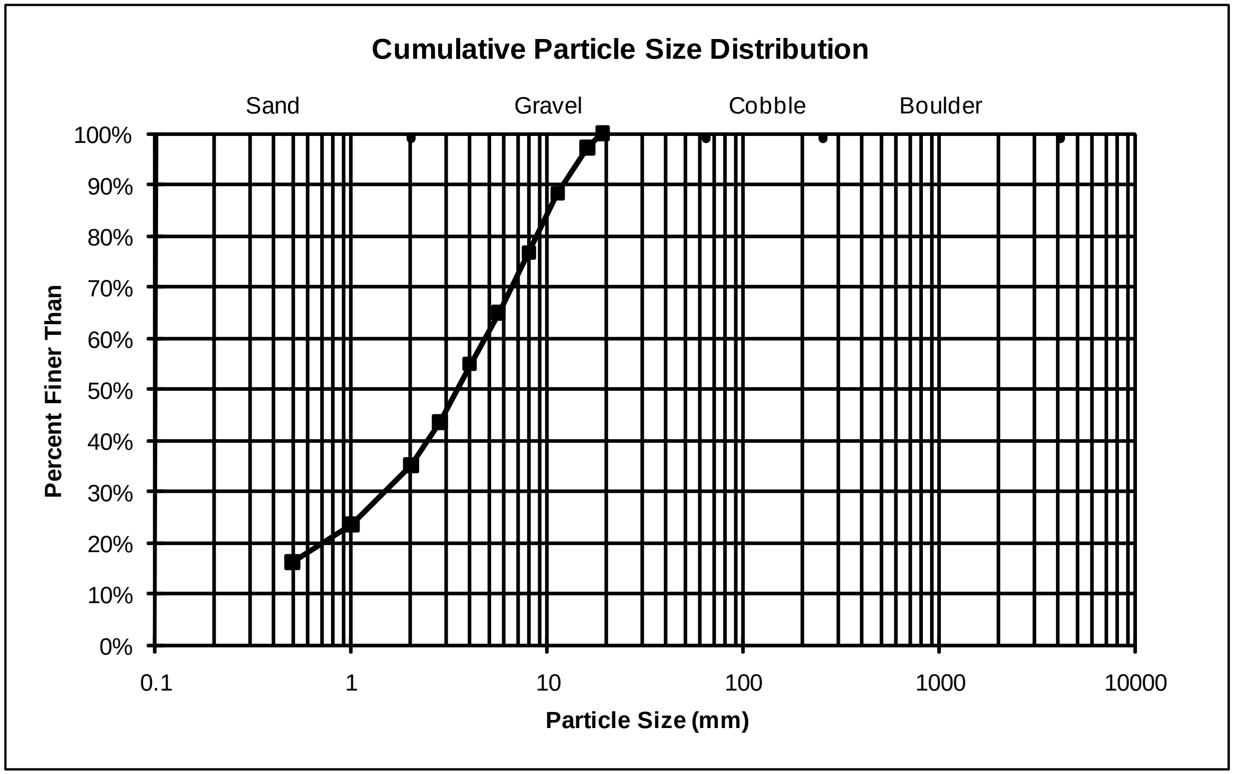
COMMENTS: Bar Sample taken upstream of Cross Section E

Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	109.80	16.0%	
0.5	51.20	7.5%	16.0%
1.0	79.60	11.6%	23.5%
2.0	56.80	8.3%	35.1%
2.8	78.30	11.4%	43.4%
4.0	69.20	10.1%	54.9%
5.6	79.90	11.7%	65.0%
8.0	79.40	11.6%	76.6%
11.2	61.10	8.9%	88.2%
16.0	19.50	2.8%	97.2%
19.0	*		100.0%
32.0			-
45.0			
64.0			
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	684.80		

*Measured value of the largest particle in the sample and not a sieve weight

SITE NAME: Pike's Peak Highway - North Fork Crystal Creek Reach 2
ID NUMBER: NCRY2
DATE: 9/17/2008
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	0.366	1.984	3.437	9.906	14.681	19.0



Sieve Analysis Worksheet

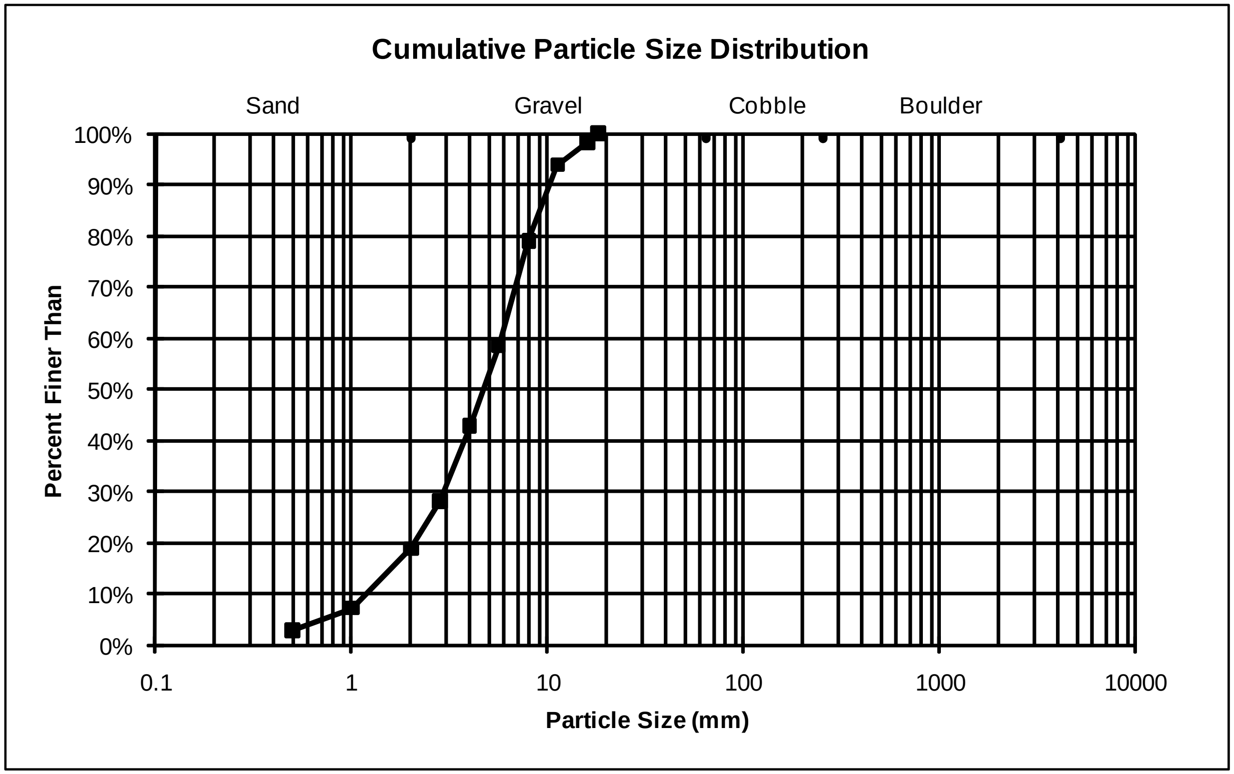
Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	24.00	2.7%	
0.5	39.70	4.5%	2.7%
1.0	103.10	11.6%	7.2%
2.0	82.90	9.3%	18.8%
2.8	130.80	14.7%	28.1%
4.0	138.20	15.6%	42.9%
5.6	181.50	20.5%	58.5%
8.0	132.70	15.0%	78.9%
11.2	39.40	4.4%	93.9%
16.0	15.10	1.7%	98.3%
18.0	*		100.0%
32.0			-
45.0			
64.0			
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	887.40		

*Measured value of the largest particle in the sample and not a sieve weight

COMMENTS: Bar Sample taken 4 ft downstream of Cross Section A

SITE NAME: Pike's Peak Highway - Oil Creek Reach 1
ID NUMBER: OILC1
DATE: 10/2/2008
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	1.595	3.306	4.665	8.972	12.276	18.0



Sieve Analysis Worksheet

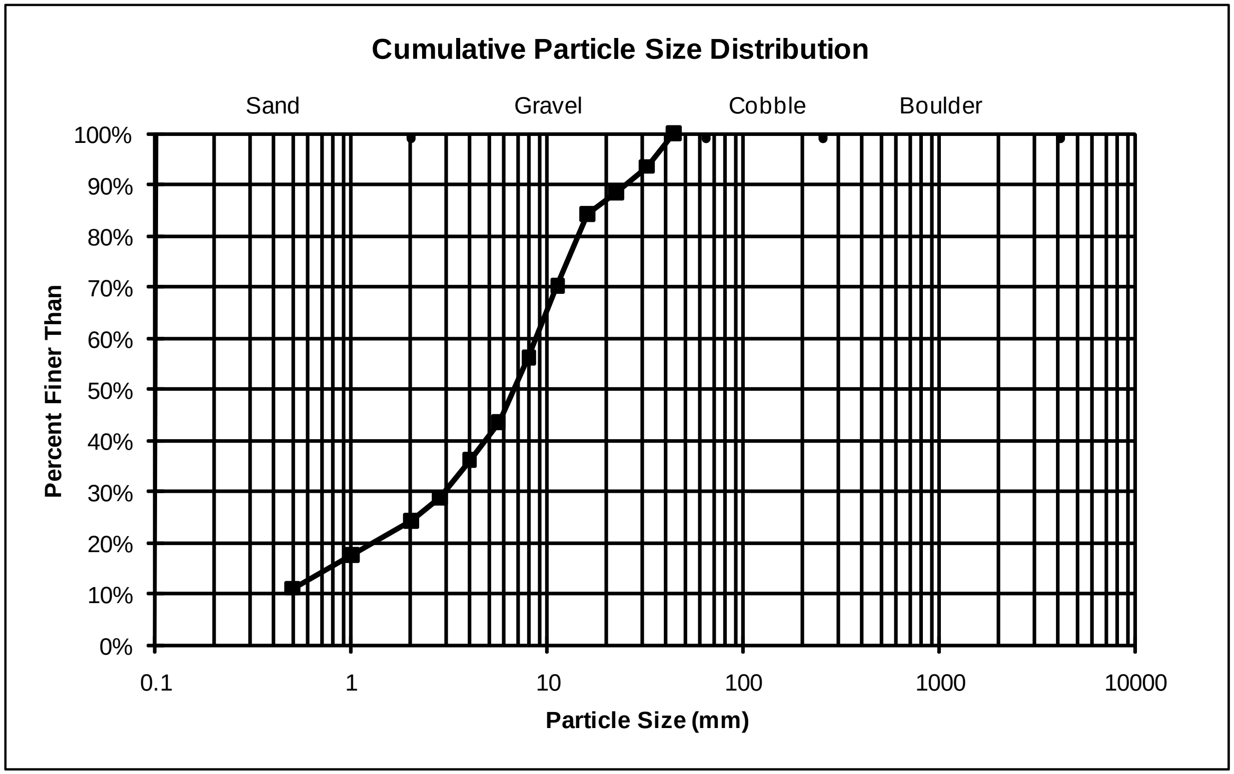
COMMENTS: Bar Sample taken 40 ft downstream of Cross Section A

Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	104.00	11.0%	
0.5	61.90	6.5%	11.0%
1.0	63.80	6.7%	17.5%
2.0	41.10	4.3%	24.3%
2.8	69.90	7.4%	28.6%
4.0	70.20	7.4%	36.0%
5.6	119.80	12.7%	43.5%
8.0	133.00	14.1%	56.1%
11.2	132.00	14.0%	70.2%
16.0	40.60	4.3%	84.2%
22.4	47.70	5.0%	88.5%
32.0	61.50	6.5%	93.5%
44.0	*		100.0%
64.0			-
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	945.50		

*Measured value of the largest particle in the sample and not a sieve weight

SITE NAME: Pike's Peak Highway - South Catamount Creek Reach 1
ID NUMBER: SCAT1
DATE: 10/1/2008
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	0.764	3.805	6.732	15.936	34.446	44.0



Sieve Analysis Worksheet

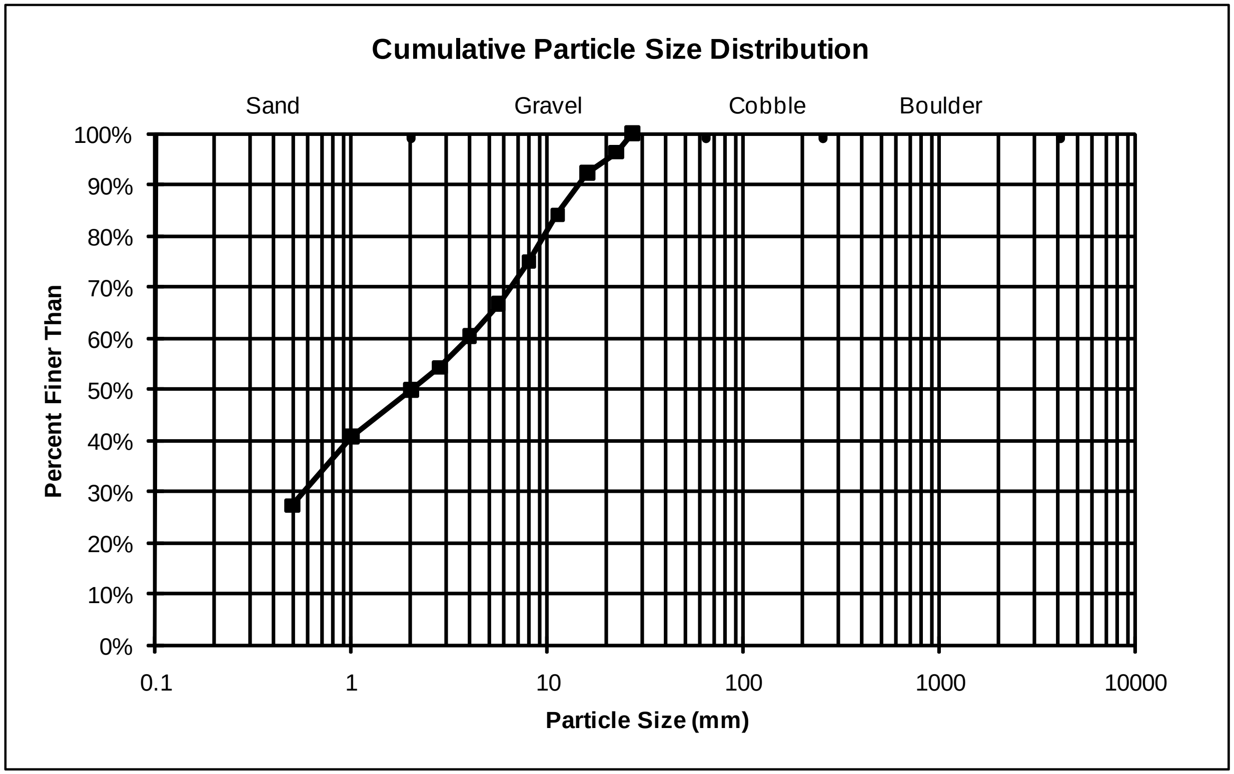
COMMENTS: Bar Sample taken 10 ft upstream of Cross Section E left bank

Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	202.30	27.2%	
0.5	99.80	13.4%	27.2%
1.0	68.30	9.2%	40.6%
2.0	32.90	4.4%	49.8%
2.8	45.60	6.1%	54.2%
4.0	46.90	6.3%	60.4%
5.6	60.90	8.2%	66.7%
8.0	68.40	9.2%	74.9%
11.2	61.60	8.3%	84.1%
16.0	29.00	3.9%	92.4%
22.4	27.80	3.7%	96.3%
27.0	*		100.0%
45.0			-
64.0			
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	743.50		

*Measured value of the largest particle in the sample and not a sieve weight

SITE NAME: Pike's Peak Highway - South Catamount Creek Reach 2
ID NUMBER: SCAT2
DATE: 9/10/2008
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	0.057	0.748	2.028	11.169	20.091	27.0



Sieve Analysis Worksheet

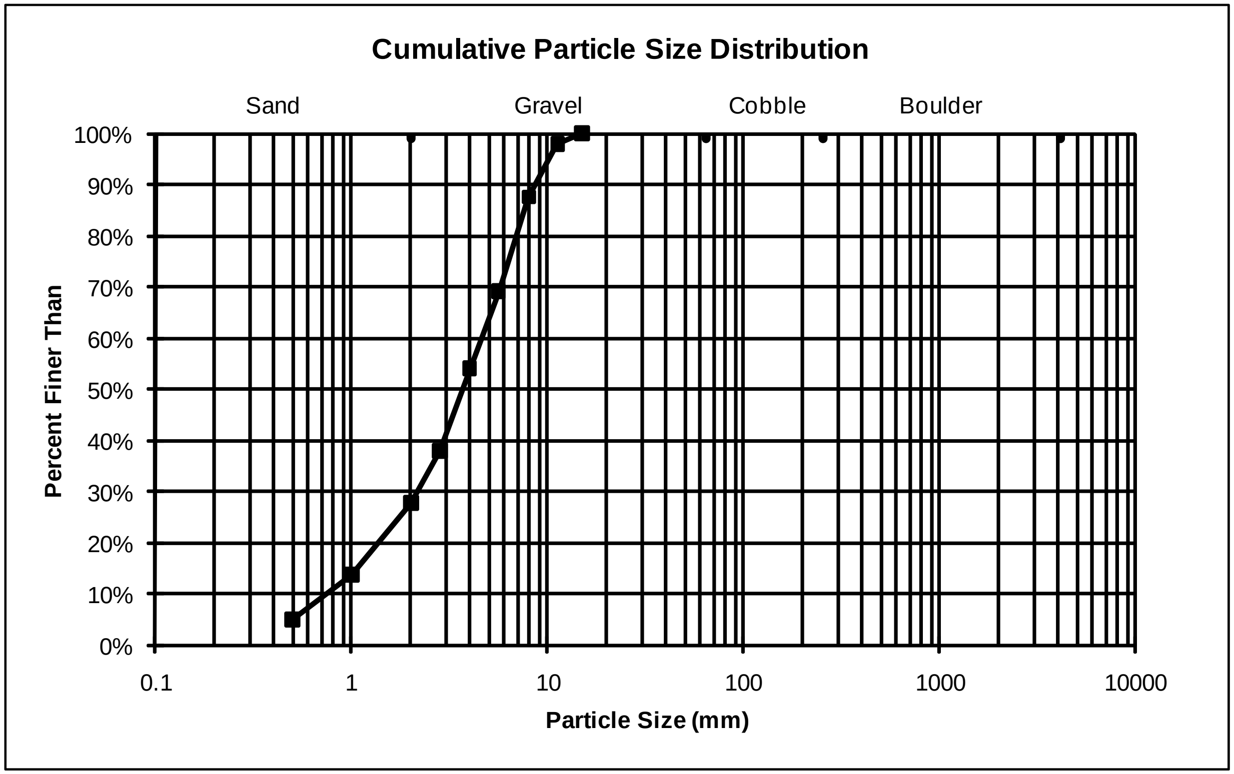
Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	36.30	4.8%	
0.5	67.50	8.9%	4.8%
1.0	105.50	14.0%	13.8%
2.0	76.60	10.2%	27.7%
2.8	121.10	16.1%	37.9%
4.0	114.90	15.2%	54.0%
5.6	138.40	18.3%	69.2%
8.0	78.20	10.4%	87.5%
11.2	15.80	2.1%	97.9%
15.0	*		100.0%
22.4			-
32.0			
45.0			
64.0			
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	754.30		

*Measured value of the largest particle in the sample and not a sieve weight

COMMENTS: Bar Sample taken between Cross Section D and E right bank

SITE NAME: Pike's Peak Highway - South Catamount Creek Reach 3
ID NUMBER: SCAT3
DATE: 9/10/2008
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	1.063	2.543	3.663	7.468	10.192	15.0



Sieve Analysis Worksheet

Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	217.90	21.6%	
0.5	137.50	13.6%	21.6%
1.0	186.30	18.5%	35.2%
2.0	93.20	9.2%	53.7%
2.8	98.10	9.7%	63.0%
4.0	76.60	7.6%	72.7%
5.6	79.10	7.8%	80.3%
8.0	61.70	6.1%	88.1%
11.2	48.80	4.8%	94.2%
16.0	9.30	0.9%	99.1%
20.0	*		100.0%
32.0			-
45.0			
64.0			
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	1008.50		

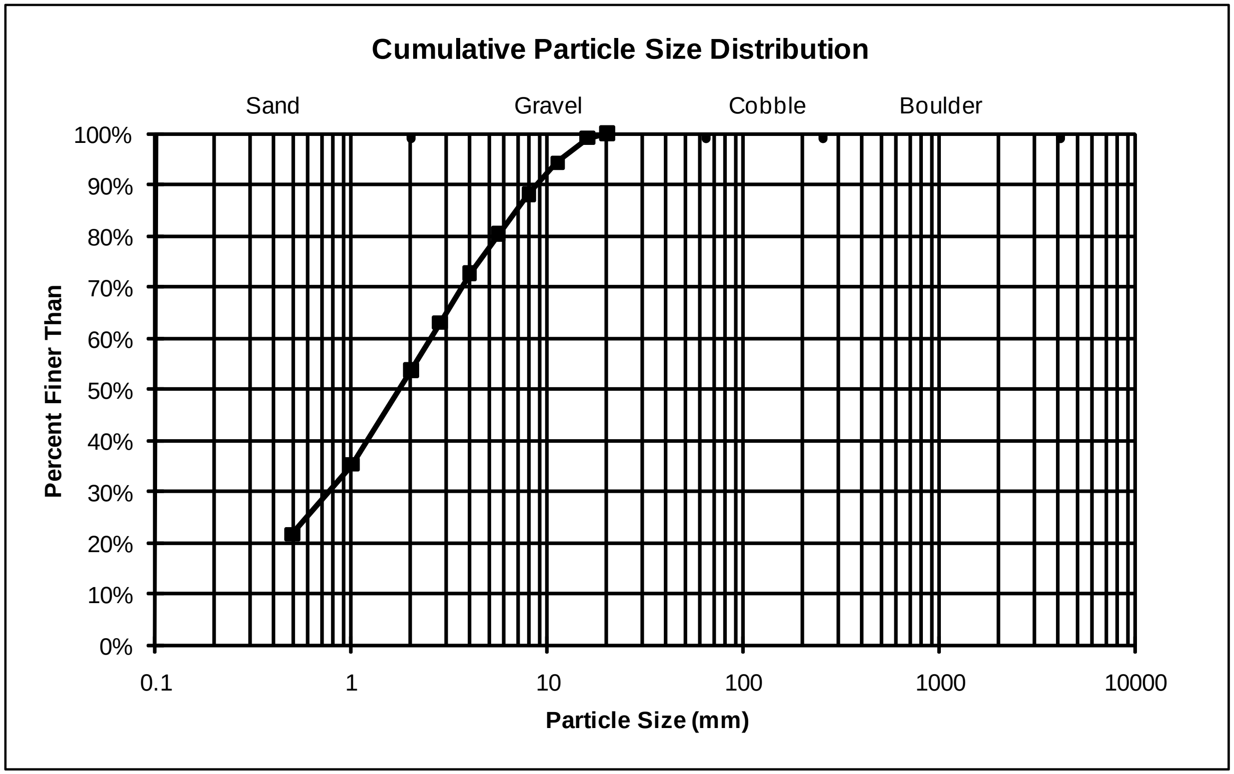
*Measured value of the largest particle in the sample and not a sieve weight

COMMENTS: Bar sample taken 10 ft downstream of Cross Section D

SITE NAME: Pike's Peak Highway - Ski Creek Reach 1
ID NUMBER: SKIC1
DATE: 9/24/2008
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)

D15	D35	D50	D84	D95	Lpart
0.113	0.988	1.740	6.633	11.846	20.0



Sieve Analysis Worksheet

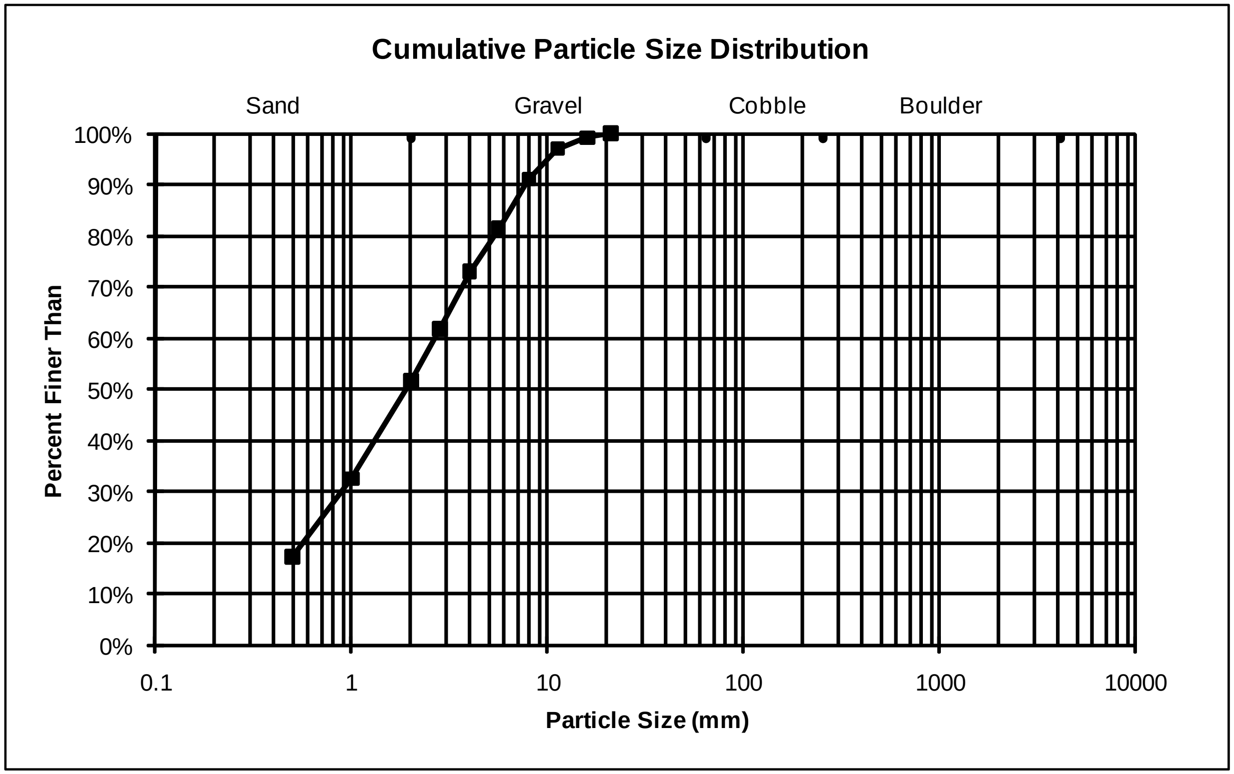
Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	183.30	17.2%	
0.5	162.40	15.3%	17.2%
1.0	203.70	19.1%	32.5%
2.0	107.50	10.1%	51.6%
2.8	119.40	11.2%	61.7%
4.0	89.10	8.4%	73.0%
5.6	103.30	9.7%	81.3%
8.0	63.30	5.9%	91.0%
11.2	23.10	2.2%	97.0%
16.0	9.00	0.8%	99.2%
21.0	*		100.0%
32.0			-
45.0			
64.0			
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	1064.10		

*Measured value of the largest particle in the sample and not a sieve weight

COMMENTS: Bar Sample taken 6 ft upstream of Cross Section B

SITE NAME: Pike's Peak Highway - Ski Creek Reach 2
ID NUMBER: SKIC2
DATE: 10/1/2008
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	0.267	**1.095**	**1.885**	**6.178**	**10.011**	**21.0**



Sieve Analysis Worksheet

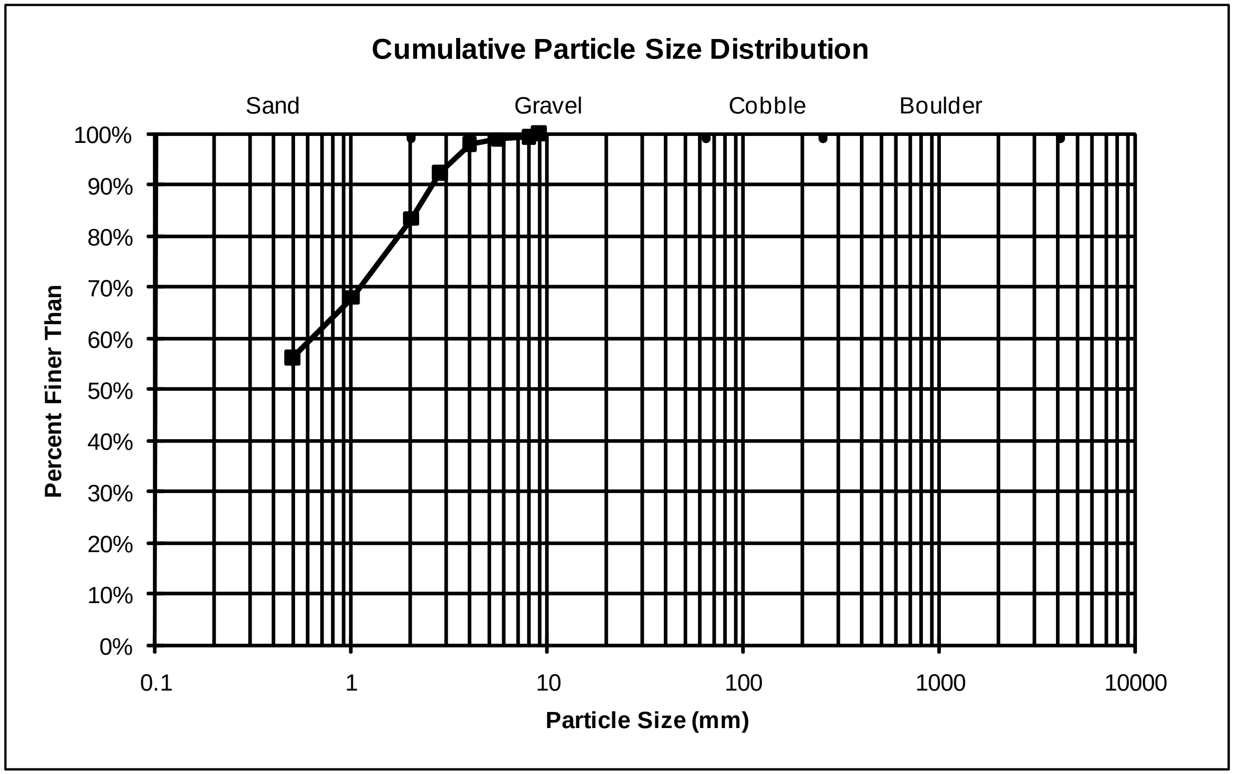
COMMENTS: Bar Sample taken at Cross Section A

Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	167.90	56.1%	
0.5	35.30	11.8%	56.1%
1.0	46.10	15.4%	67.9%
2.0	26.80	9.0%	83.3%
2.8	17.20	5.7%	92.2%
4.0	2.40	0.8%	98.0%
5.6	1.60	0.5%	98.8%
8.0	2.00	0.7%	99.3%
9.0	*		100.0%
16.0			-
22.4			
32.0			
45.0			
64.0			
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	299.30		

*Measured value of the largest particle in the sample and not a sieve weight

SITE NAME: Pike's Peak Highway - Severy Creek Reach 1
ID NUMBER: SVRY1
DATE: 9/3/2008
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	**D15**	**D35**	**D50**	**D84**	**D95**	**Lpart**
	0.014	**0.081**	**0.295**	**2.054**	**3.321**	**9.0**



Sieve Analysis Worksheet

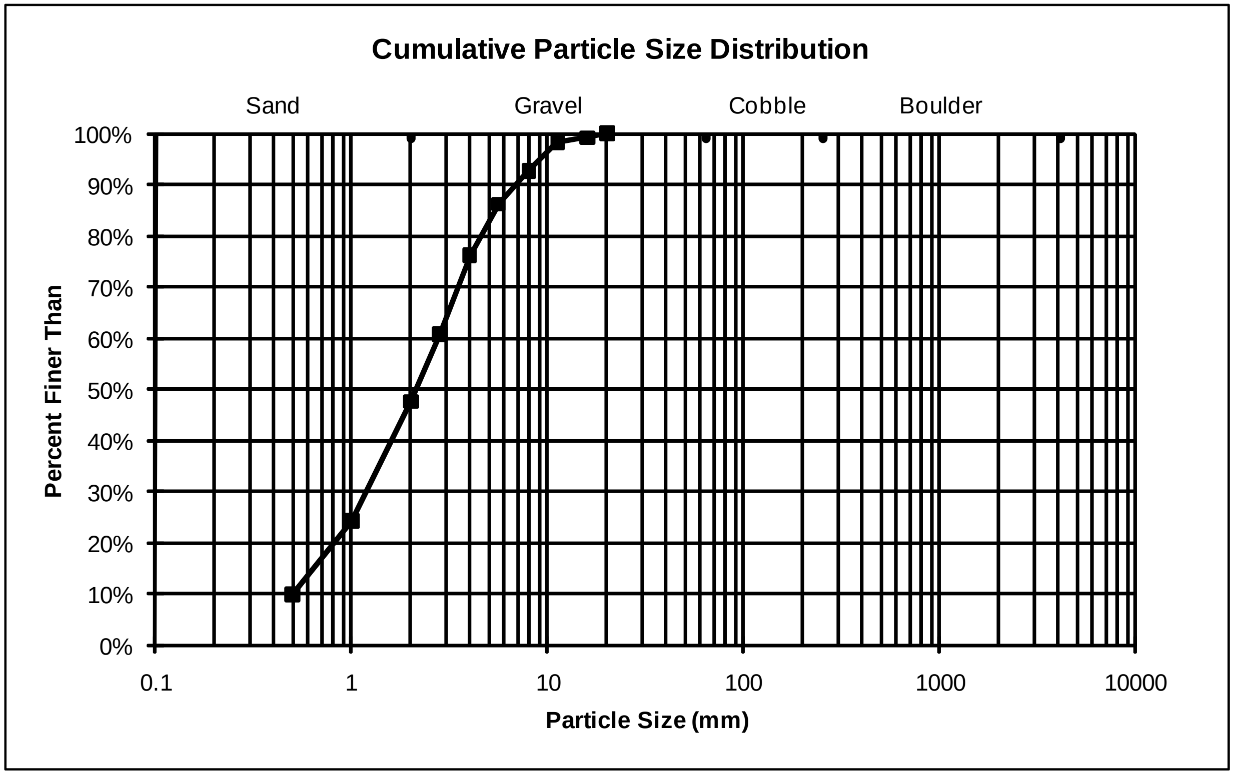
COMMENTS: Bar Sample taken downstream of Cross Section E

Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	115.90	9.8%	
0.5	169.50	14.3%	9.8%
1.0	277.80	23.5%	24.1%
2.0	156.90	13.2%	47.6%
2.8	181.40	15.3%	60.8%
4.0	119.40	10.1%	76.1%
5.6	77.00	6.5%	86.2%
8.0	64.90	5.5%	92.7%
11.2	11.60	1.0%	98.2%
16.0	10.00	0.8%	99.2%
20.0	*		100.0%
32.0			-
45.0			
64.0			
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	1184.40		

*Measured value of the largest particle in the sample and not a sieve weight

SITE NAME: Pike's Peak Highway - Severy Creek Reach 2
ID NUMBER: SVRY2
DATE: 9/3/2008
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	0.644	1.380	2.128	5.204	9.215	20.0



Sieve Analysis Worksheet

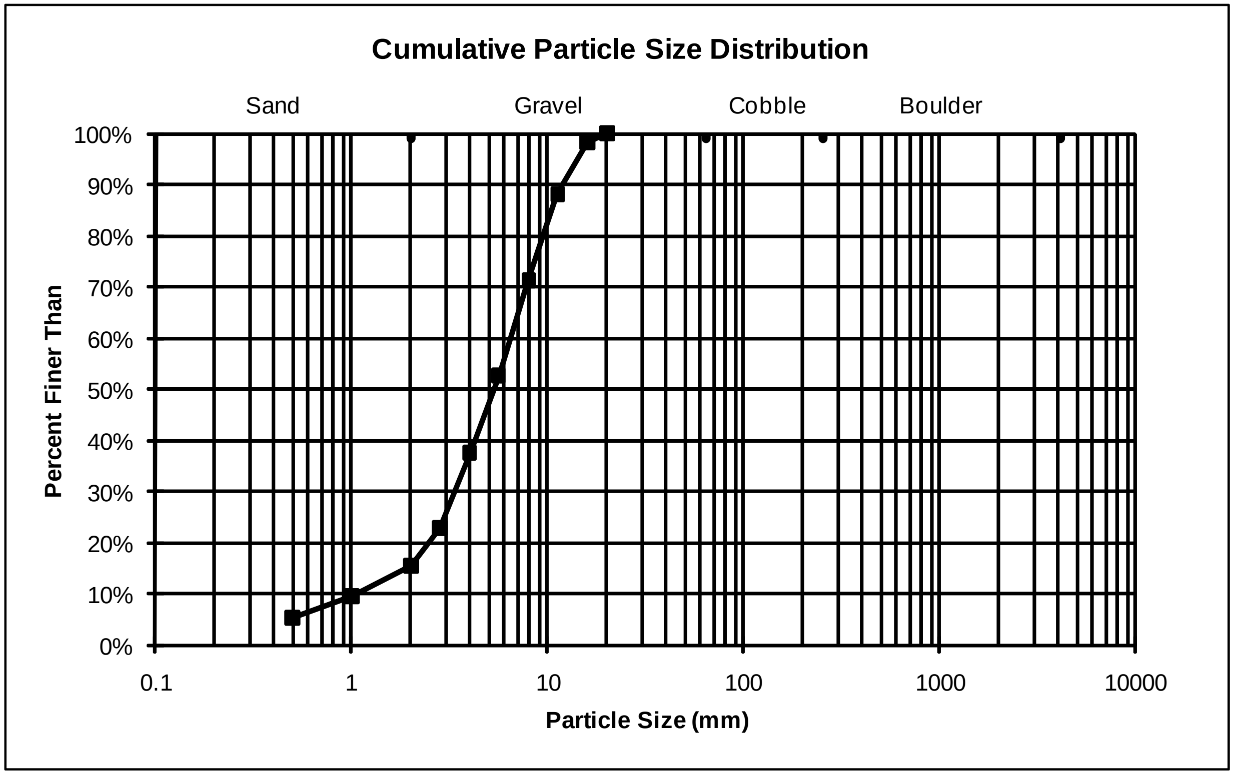
COMMENTS: Bar Sample taken between Cross Section D and E

Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	43.10	5.2%	
0.5	34.80	4.2%	5.2%
1.0	50.50	6.1%	9.4%
2.0	60.20	7.3%	15.5%
2.8	122.00	14.7%	22.8%
4.0	125.00	15.1%	37.5%
5.6	154.20	18.6%	52.6%
8.0	139.70	16.9%	71.2%
11.2	83.70	10.1%	88.1%
16.0	14.60	1.8%	98.2%
20.0	*		100.0%
32.0			-
45.0			
64.0			
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	827.80		

*Measured value of the largest particle in the sample and not a sieve weight

SITE NAME: Pike's Peak Highway - West Fork Beaver Creek Reach 1
ID NUMBER: WBVR1
DATE: 9/18/2008
CREW: Derengoski, VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	1.887	**3.763**	**5.282**	**10.316**	**14.274**	**20.0**



Sieve Analysis Worksheet

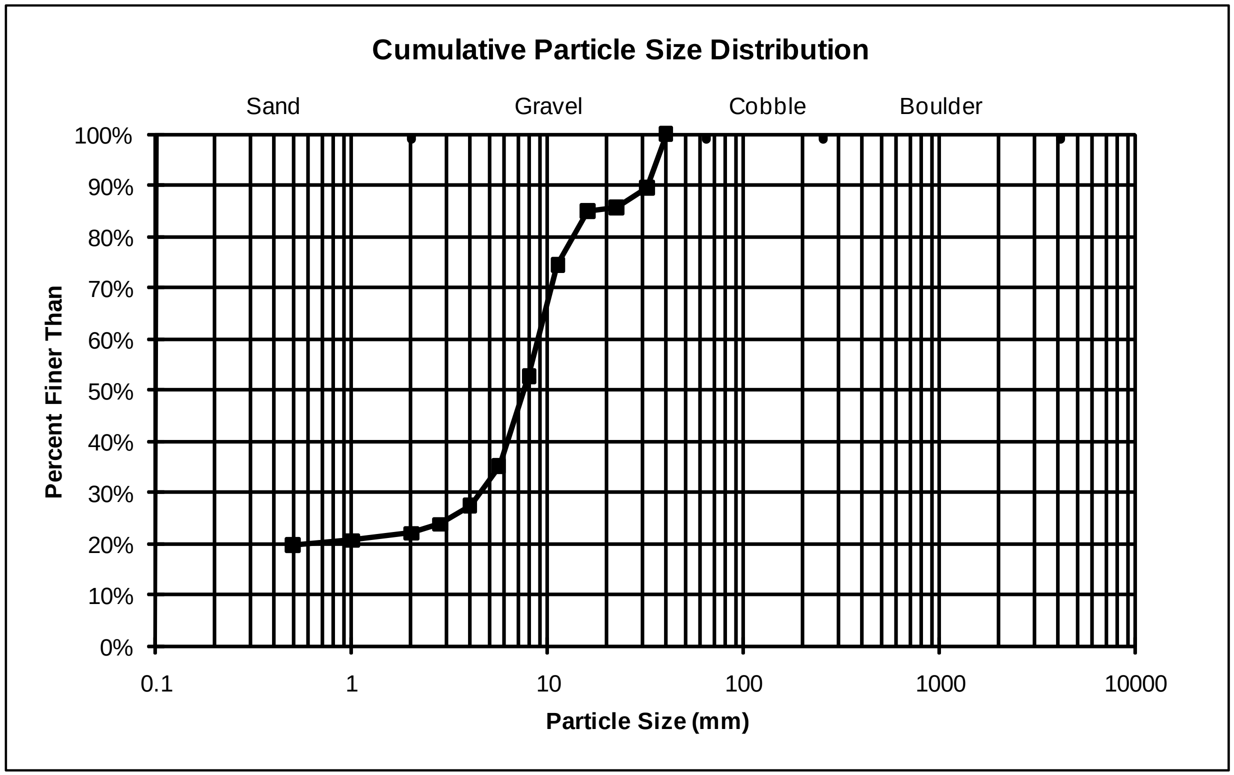
Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	161.90	19.7%	
0.5	7.10	0.9%	19.7%
1.0	11.60	1.4%	20.5%
2.0	14.60	1.8%	22.0%
2.8	29.90	3.6%	23.7%
4.0	64.30	7.8%	27.4%
5.6	143.90	17.5%	35.2%
8.0	178.50	21.7%	52.7%
11.2	86.60	10.5%	74.4%
16.0	4.80	0.6%	84.9%
22.4	33.30	4.0%	85.5%
32.0	85.90	10.4%	89.6%
40.0	*		100.0%
64.0			-
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	822.40		

*Measured value of the largest particle in the sample and not a sieve weight

COMMENTS: Bar Sample taken between Cross Section B and C

SITE NAME: Pike's Peak Highway - West Fork Beaver Creek Reach 2
ID NUMBER: WBVR2
DATE: 9/18/2008
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	0.157	**5.554**	**7.574**	**15.508**	**35.948**	**40.0**



Sieve Analysis Worksheet

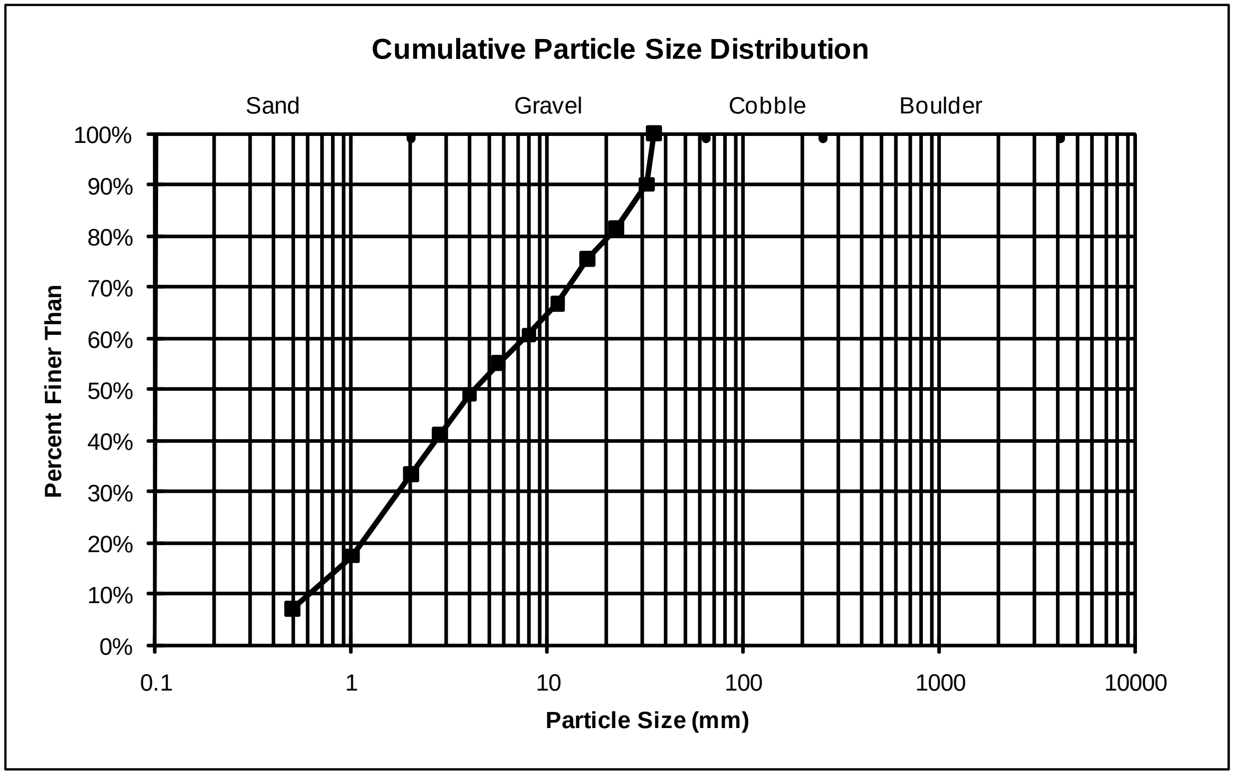
Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	61.20	7.0%	
0.5	90.80	10.4%	7.0%
1.0	139.70	15.9%	17.3%
2.0	68.70	7.8%	33.3%
2.8	69.10	7.9%	41.1%
4.0	52.90	6.0%	49.0%
5.6	48.50	5.5%	55.0%
8.0	53.70	6.1%	60.6%
11.2	75.80	8.6%	66.7%
16.0	53.40	6.1%	75.3%
22.4	75.50	8.6%	81.4%
32.0	87.30	10.0%	90.0%
35.0	*		100.0%
64.0			-
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	876.60		

*Measured value of the largest particle in the sample and not a sieve weight

COMMENTS: Bar Sample taken downstream from Cross Section E

SITE NAME: Pike's Peak Highway - Boehmer Creek Reach 1
ID NUMBER: BHMR1
DATE: 8/30/2009
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	0.855	2.154	4.230	24.917	33.460	35.0



Sieve Analysis Worksheet

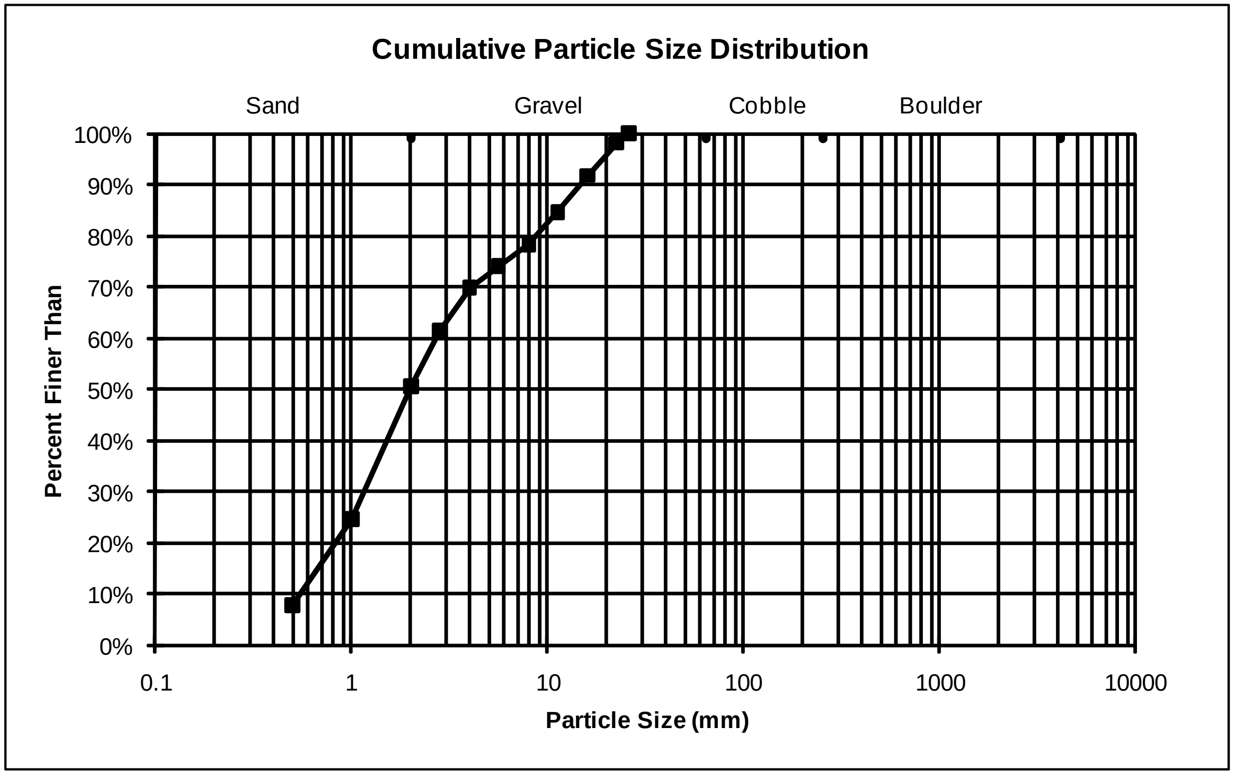
COMMENTS: Bar Sample taken 18 ft upstream of Cross Section B

Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	59.30	7.8%	
0.5	127.80	16.7%	7.8%
1.0	198.20	26.0%	24.5%
2.0	83.10	10.9%	50.5%
2.8	64.10	8.4%	61.4%
4.0	32.80	4.3%	69.8%
5.6	31.80	4.2%	74.1%
8.0	47.50	6.2%	78.2%
11.2	55.50	7.3%	84.5%
16.0	48.30	6.3%	91.7%
22.4	14.80	1.9%	98.1%
26.0	*		100.0%
45.0			-
64.0			
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	763.20		

*Measured value of the largest particle in the sample and not a sieve weight

SITE NAME: Pike's Peak Highway - Boehmer Creek Reach 2
ID NUMBER: BHMR2
DATE: 8/29/2009
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	0.674	1.323	1.974	10.925	19.036	26.0



Sieve Analysis Worksheet

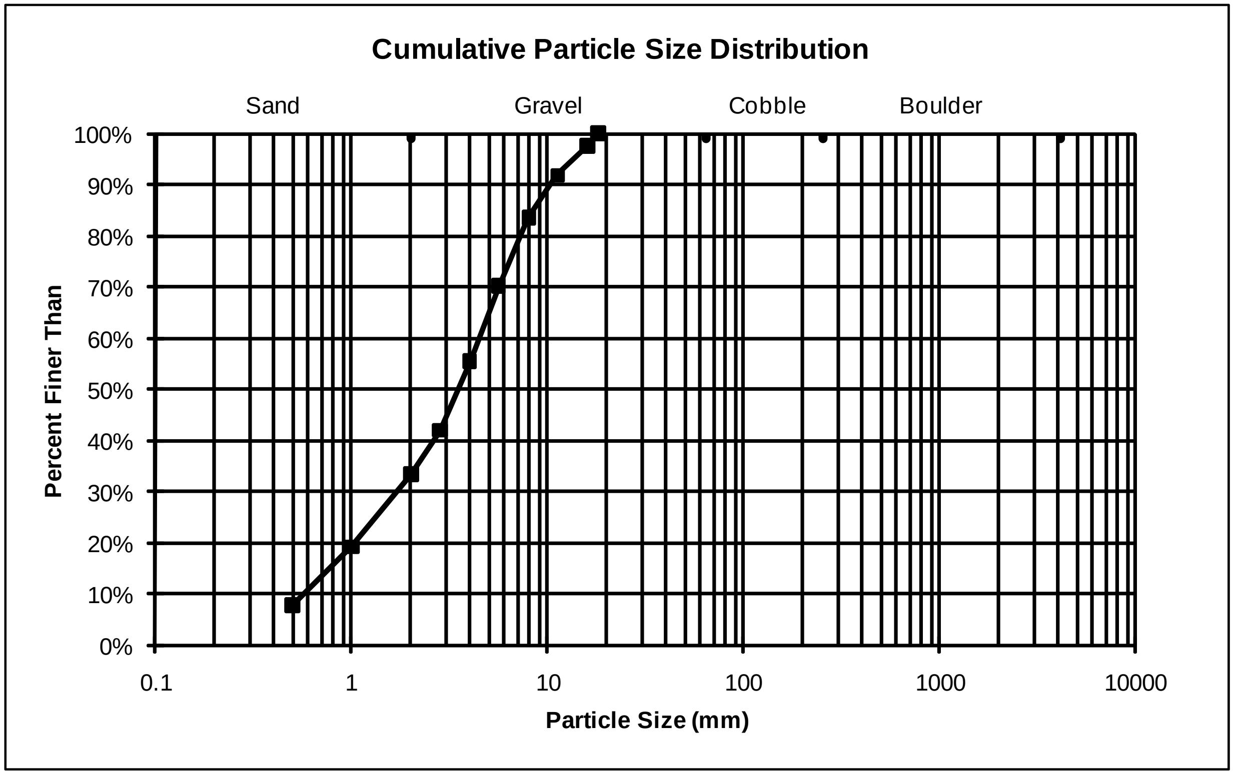
Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	39.90	7.8%	
0.5	58.30	11.4%	7.8%
1.0	72.00	14.1%	19.2%
2.0	44.20	8.6%	33.2%
2.8	69.80	13.6%	41.9%
4.0	74.70	14.6%	55.5%
5.6	69.20	13.5%	70.1%
8.0	41.80	8.2%	83.6%
11.2	29.00	5.7%	91.8%
16.0	13.10	2.6%	97.4%
18.0	*		100.0%
32.0			-
45.0			
64.0			
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	512.00		

*Measured value of the largest particle in the sample and not a sieve weight

COMMENTS: Bar Sample taken 2 ft downstream of Cross Section B left bank

SITE NAME: Pike's Peak Highway - East Fork Beaver Creek Reach 1
ID NUMBER: EBVR1
DATE: 8/30/2009
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	0.775	2.142	3.463	8.129	13.720	18.0



Sieve Analysis Worksheet

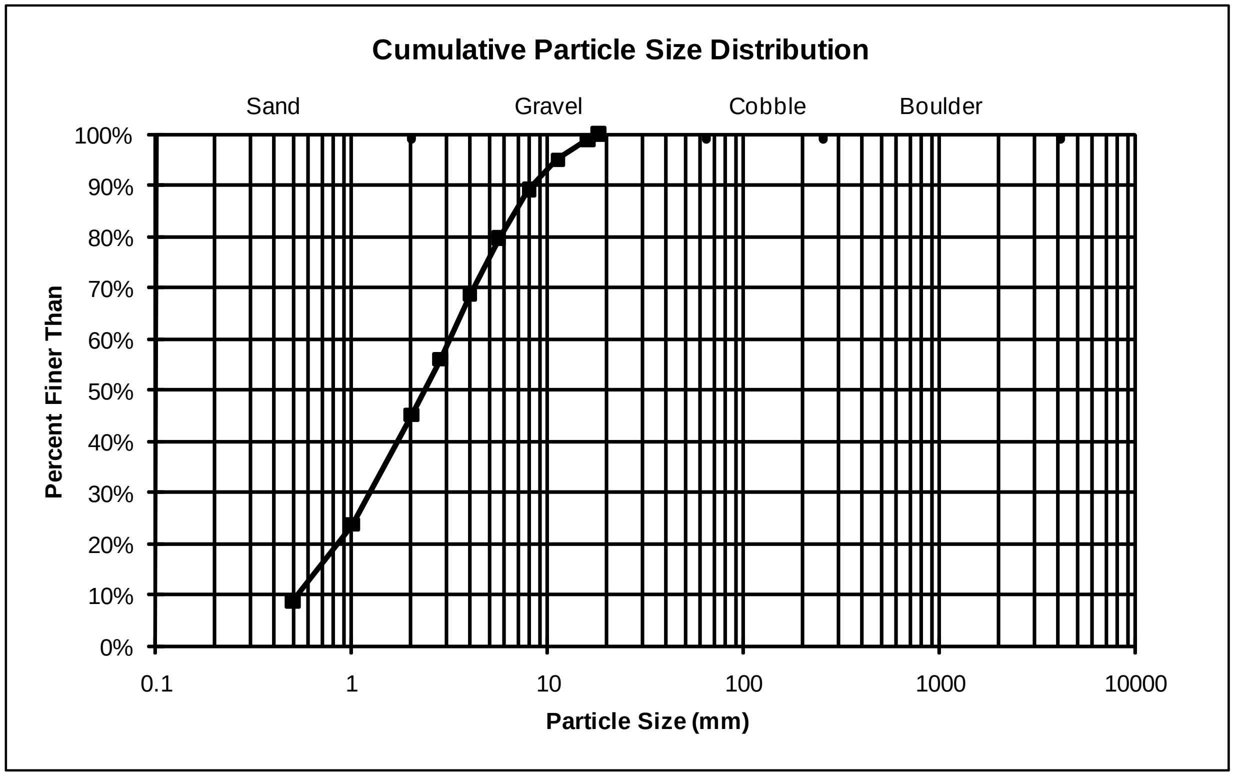
Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	42.40	8.6%	
0.5	73.80	15.0%	8.6%
1.0	105.00	21.4%	23.7%
2.0	53.60	10.9%	45.0%
2.8	62.80	12.8%	55.9%
4.0	53.20	10.8%	68.7%
5.6	47.10	9.6%	79.6%
8.0	28.50	5.8%	89.1%
11.2	18.80	3.8%	95.0%
16.0	6.00	1.2%	98.8%
18.0	*		100.0%
32.0			-
45.0			
64.0			
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	491.20		

*Measured value of the largest particle in the sample and not a sieve weight

COMMENTS: Bar Sample taken 6 ft upstream of Cross Section E

SITE NAME: Pike's Peak Highway - East Fork Beaver Creek Reach 2
ID NUMBER: EBVR2
DATE: 8/30/2009
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	0.671	1.445	2.331	6.606	11.251	18.0



Sieve Analysis Worksheet

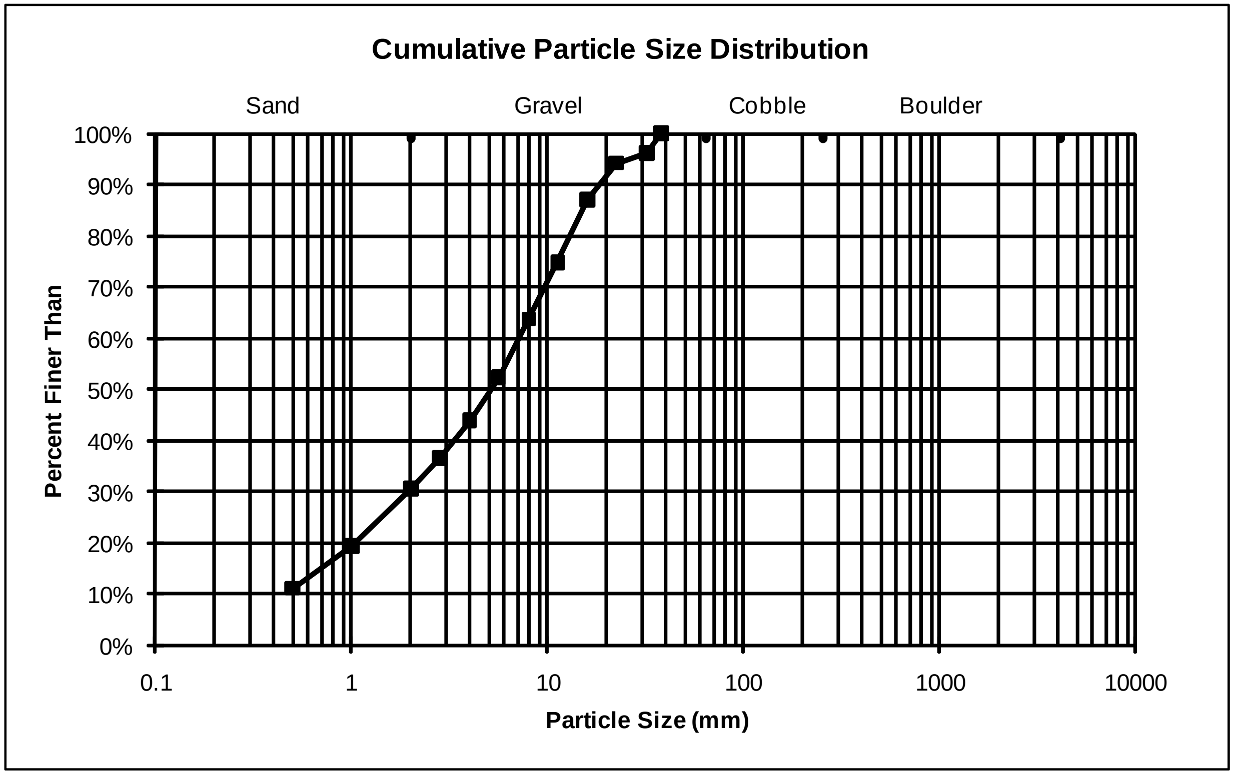
Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	110.10	11.0%	
0.5	82.80	8.3%	11.0%
1.0	112.30	11.2%	19.3%
2.0	59.40	5.9%	30.5%
2.8	75.30	7.5%	36.4%
4.0	83.10	8.3%	44.0%
5.6	113.80	11.4%	52.3%
8.0	111.90	11.2%	63.6%
11.2	122.30	12.2%	74.8%
16.0	71.70	7.2%	87.0%
22.4	18.70	1.9%	94.2%
32.0	39.40	3.9%	96.1%
38.0	*		100.0%
64.0			-
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	1000.80		

*Measured value of the largest particle in the sample and not a sieve weight

COMMENTS: Bar Sample taken at Cross Section E right bank

SITE NAME: Pike's Peak Highway - Glen Cove Creek Reach 1
ID NUMBER: GLEN1
DATE: 8/23/2009
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	0.699	2.582	5.110	14.646	26.122	38.0



Sieve Analysis Worksheet

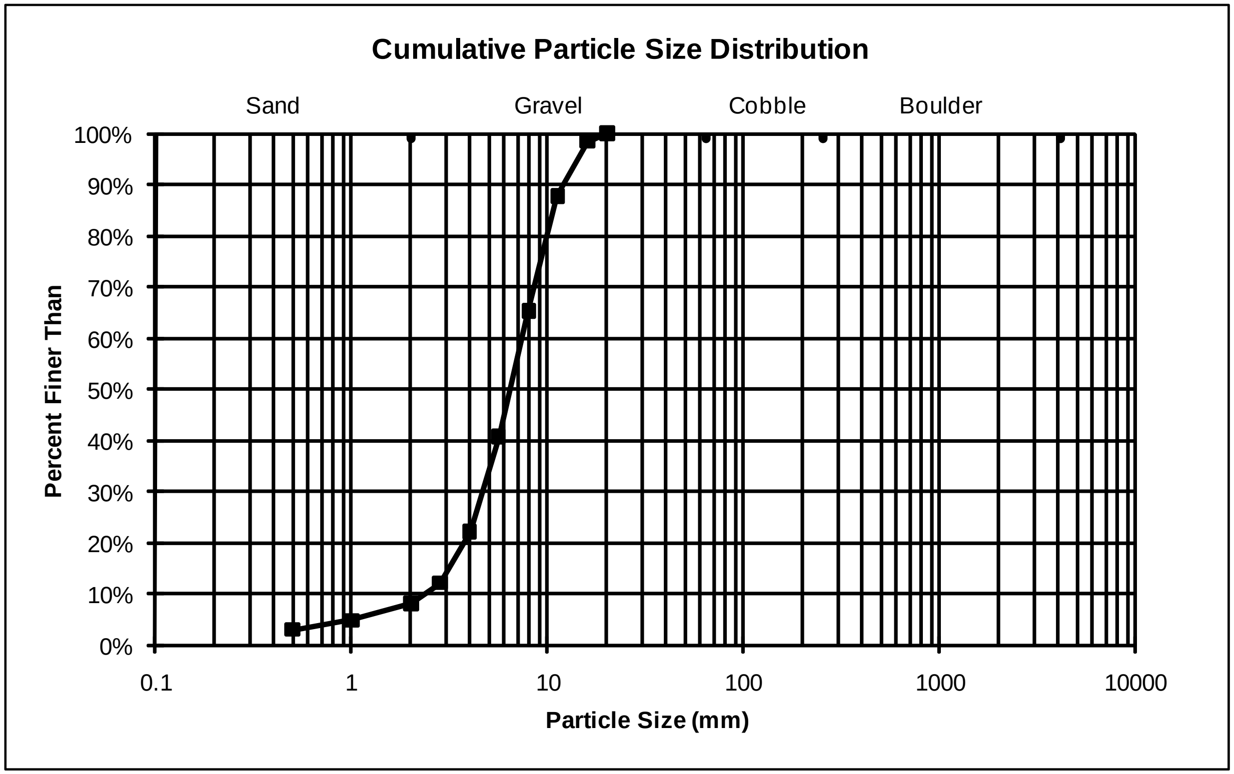
COMMENTS: Bar Sample taken between Cross Section B and C right bank

Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	25.30	3.0%	
0.5	15.20	1.8%	3.0%
1.0	27.70	3.3%	4.8%
2.0	34.50	4.1%	8.0%
2.8	84.70	10.0%	12.1%
4.0	158.50	18.7%	22.1%
5.6	208.10	24.5%	40.7%
8.0	191.60	22.6%	65.2%
11.2	90.20	10.6%	87.8%
16.0	13.50	1.6%	98.4%
20.0	*		100.0%
32.0			-
45.0			
64.0			
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	849.30		

*Measured value of the largest particle in the sample and not a sieve weight

SITE NAME: Pike's Peak Highway - North Catamount Creek Reach 1
ID NUMBER: NCAT1
DATE: 8/16/2009
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	3.107	5.051	6.409	10.584	14.268	20.0



Sieve Analysis Worksheet

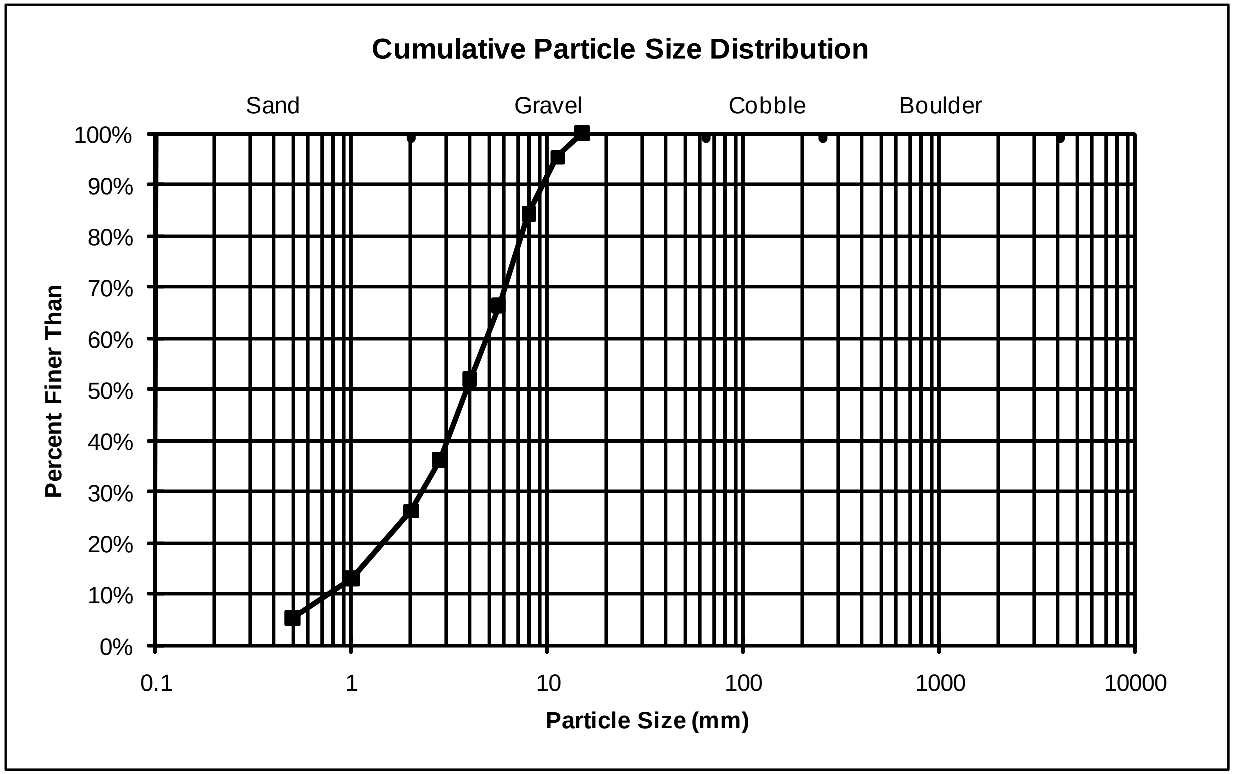
COMMENTS: Bar Sample taken 3 ft downstream of Cross Section B

Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	50.70	5.2%	
0.5	75.60	7.8%	5.2%
1.0	126.70	13.1%	13.1%
2.0	96.20	9.9%	26.1%
2.8	152.60	15.8%	36.1%
4.0	140.60	14.5%	51.8%
5.6	172.40	17.8%	66.4%
8.0	107.30	11.1%	84.2%
11.2	45.70	4.7%	95.3%
15.0	*		100.0%
22.4			-
32.0			
45.0			
64.0			
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	967.80		

*Measured value of the largest particle in the sample and not a sieve weight

SITE NAME: Pike's Peak Highway - North Catamount Creek Reach 2
ID NUMBER: NCAT2
DATE: 8/16/2009
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	1.109	2.699	3.836	7.969	11.106	15.0



Sieve Analysis Worksheet

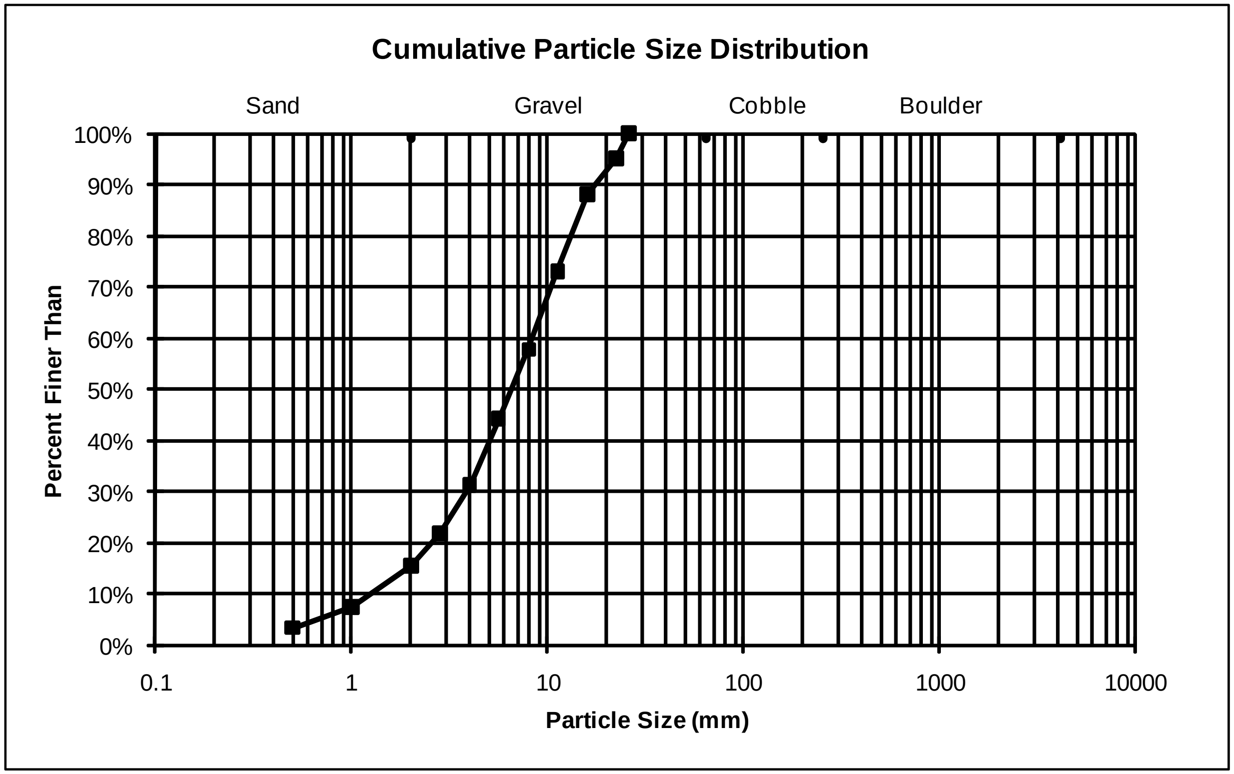
Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	29.90	3.3%	
0.5	37.60	4.1%	3.3%
1.0	72.60	8.0%	7.4%
2.0	57.50	6.3%	15.4%
2.8	87.30	9.6%	21.7%
4.0	117.50	12.9%	31.3%
5.6	123.60	13.6%	44.2%
8.0	139.70	15.3%	57.7%
11.2	136.00	14.9%	73.1%
16.0	65.70	7.2%	88.0%
22.4	43.80	4.8%	95.2%
26.0	*		100.0%
45.0			-
64.0			
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	911.20		

*Measured value of the largest particle in the sample and not a sieve weight

COMMENTS: Bar Sample taken at Cross Section A left bank

SITE NAME: Pike's Peak Highway - North Fork Crystal Creek
ID NUMBER: NCRY1
DATE: 9/20/2009
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	1.936	**4.409**	**6.529**	**14.547**	**22.199**	**26.0**



Sieve Analysis Worksheet

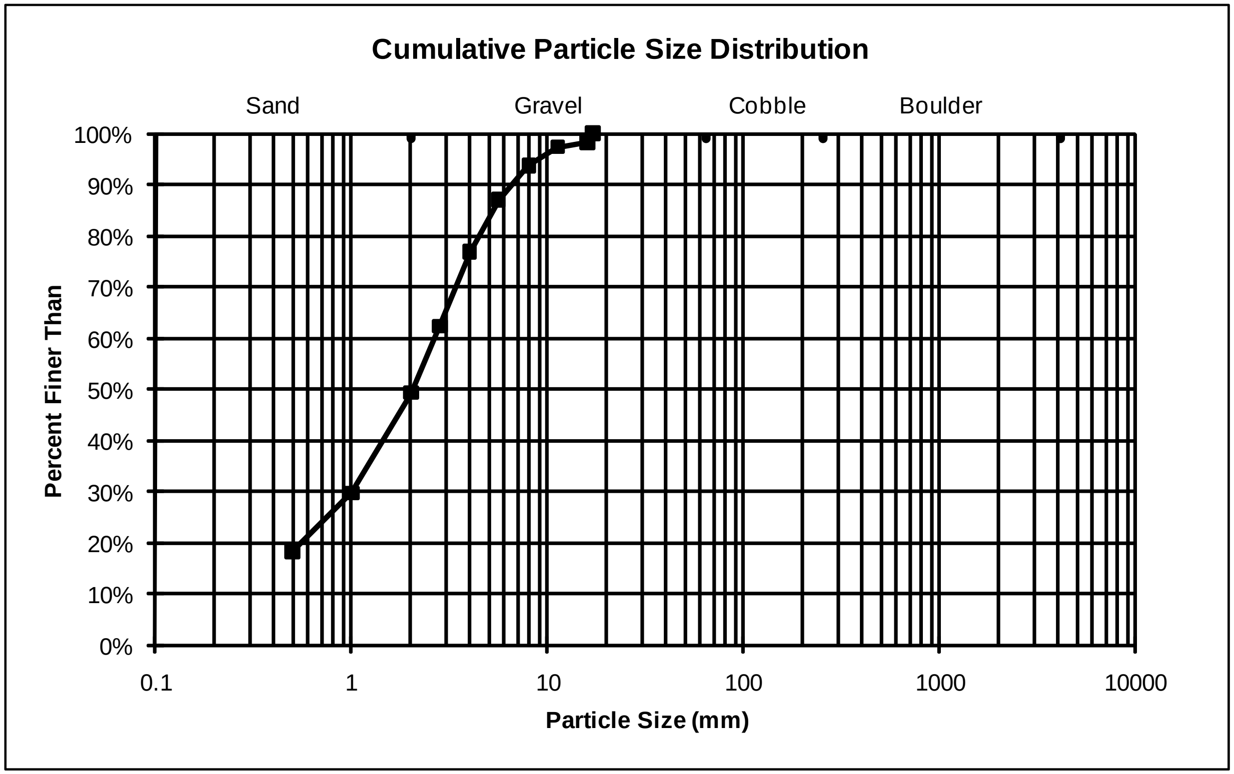
Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	101.10	18.4%	
0.5	62.50	11.3%	18.4%
1.0	107.70	19.6%	29.7%
2.0	72.00	13.1%	49.3%
2.8	80.00	14.5%	62.3%
4.0	56.50	10.3%	76.9%
5.6	36.80	6.7%	87.1%
8.0	19.50	3.5%	93.8%
11.2	4.80	0.9%	97.3%
16.0	9.90	1.8%	98.2%
17.0	*		100.0%
32.0			-
45.0			
64.0			
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	550.80		

*Measured value of the largest particle in the sample and not a sieve weight

COMMENTS: Bar Sample taken upstream of Cross Section E

SITE NAME: Pike's Peak Highway - North Fork Crystal Creek Reach 2
ID NUMBER: NCRY2
DATE: 9/20/2009
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	0.206	1.207	2.039	5.057	8.974	17.0



Sieve Analysis Worksheet

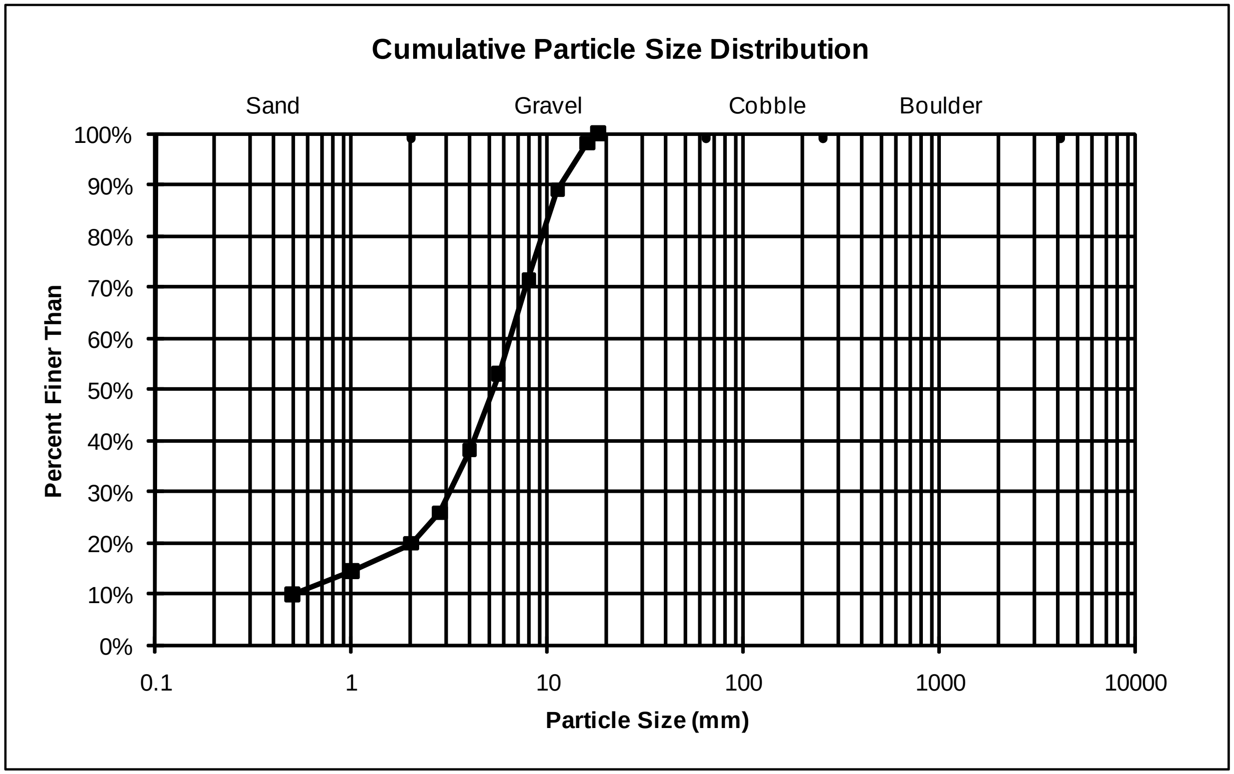
Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	58.60	9.7%	
0.5	28.70	4.8%	9.7%
1.0	32.10	5.3%	14.5%
2.0	36.50	6.0%	19.8%
2.8	74.20	12.3%	25.8%
4.0	89.30	14.8%	38.1%
5.6	111.90	18.5%	52.9%
8.0	105.30	17.4%	71.5%
11.2	55.50	9.2%	88.9%
16.0	11.50	1.9%	98.1%
18.0	*		100.0%
32.0			-
45.0			
64.0			
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	603.60		

*Measured value of the largest particle in the sample and not a sieve weight

COMMENTS: Bar Sample taken 4 ft downstream of Cross Section A

SITE NAME: Pike's Peak Highway - Oil Creek Reach 1
ID NUMBER: OILC1
DATE: 9/5/2009
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	1.072	3.654	5.241	10.190	14.190	18.0



Sieve Analysis Worksheet

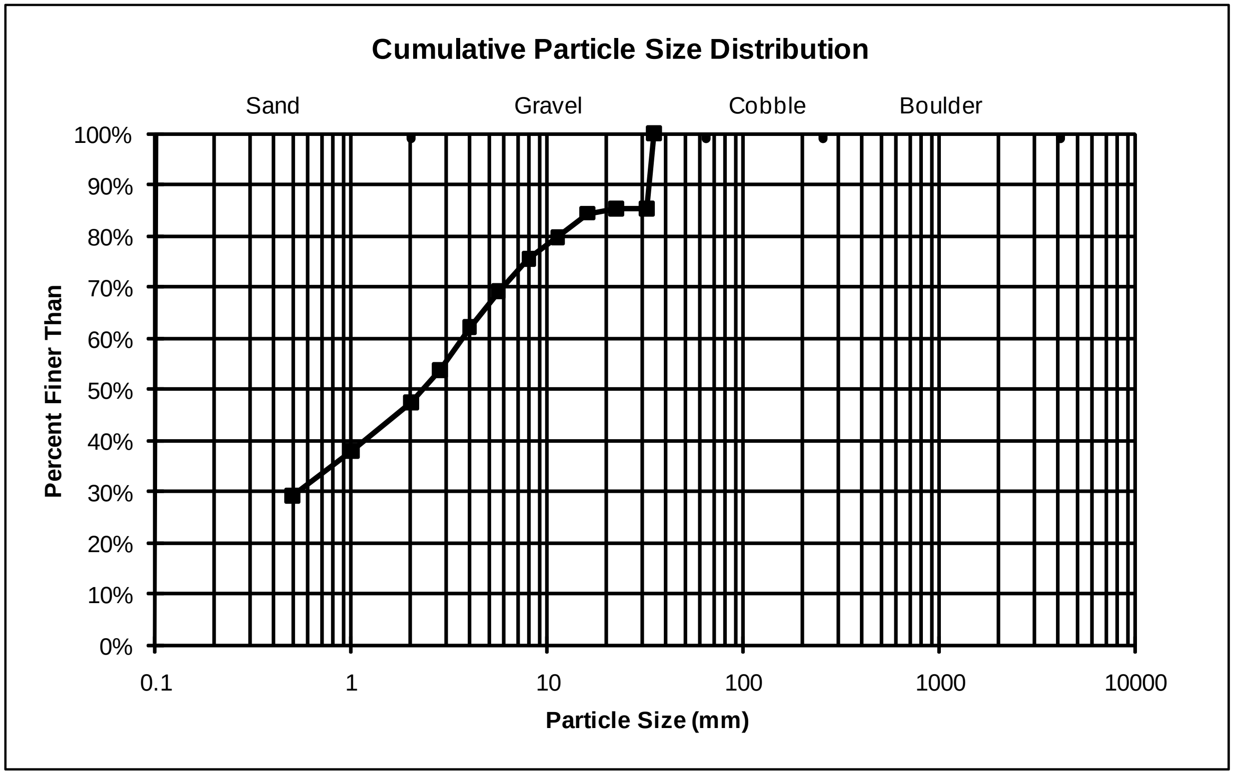
COMMENTS: Bar Sample taken 40 ft downstream of Cross Section A

Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	182.90	29.1%	
0.5	55.00	8.8%	29.1%
1.0	59.20	9.4%	37.9%
2.0	40.20	6.4%	47.3%
2.8	52.10	8.3%	53.7%
4.0	45.10	7.2%	62.0%
5.6	38.30	6.1%	69.2%
8.0	27.70	4.4%	75.3%
11.2	29.00	4.6%	79.7%
16.0	5.60	0.9%	84.4%
22.4	0.00	0.0%	85.3%
32.0	92.50	14.7%	85.3%
35.0	*		100.0%
64.0			-
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	627.60		

*Measured value of the largest particle in the sample and not a sieve weight

SITE NAME: Pike's Peak Highway - South Catamount Creek Reach 1
ID NUMBER: SCAT1
DATE: 9/20/2009
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	0.047	0.795	2.300	15.551	33.952	35.0



Sieve Analysis Worksheet

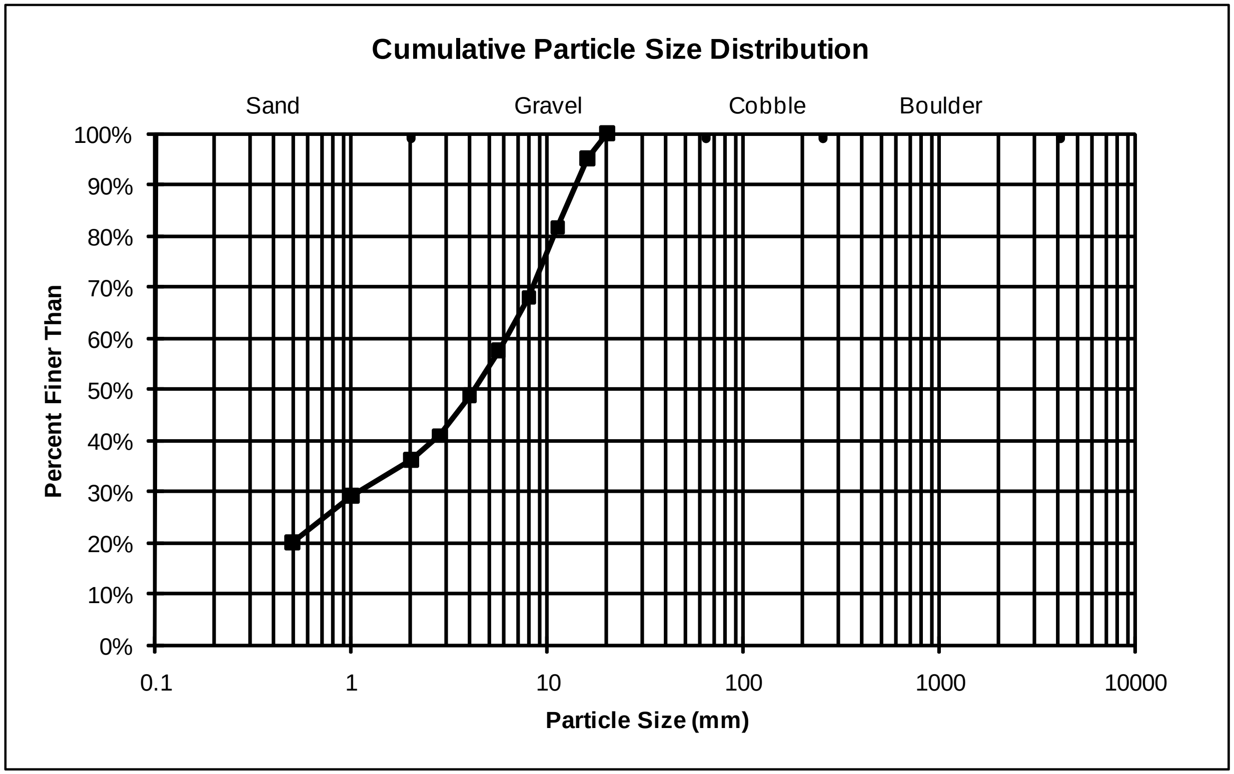
COMMENTS: Bar Sample taken 10 ft upstream of Cross Section E left bank

Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	106.40	19.9%	
0.5	49.20	9.2%	19.9%
1.0	37.10	7.0%	29.2%
2.0	25.60	4.8%	36.1%
2.8	42.30	7.9%	40.9%
4.0	46.50	8.7%	48.8%
5.6	55.00	10.3%	57.5%
8.0	73.00	13.7%	67.8%
11.2	71.90	13.5%	81.5%
16.0	26.70	5.0%	95.0%
20.0	*		100.0%
32.0			-
45.0			
64.0			
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	533.70		

*Measured value of the largest particle in the sample and not a sieve weight

SITE NAME: Pike's Peak Highway - South Catamount Creek Reach 2
ID NUMBER: SCAT2
DATE: 8/23/2009
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	0.150	1.791	4.185	11.958	16.002	20.0



Sieve Analysis Worksheet

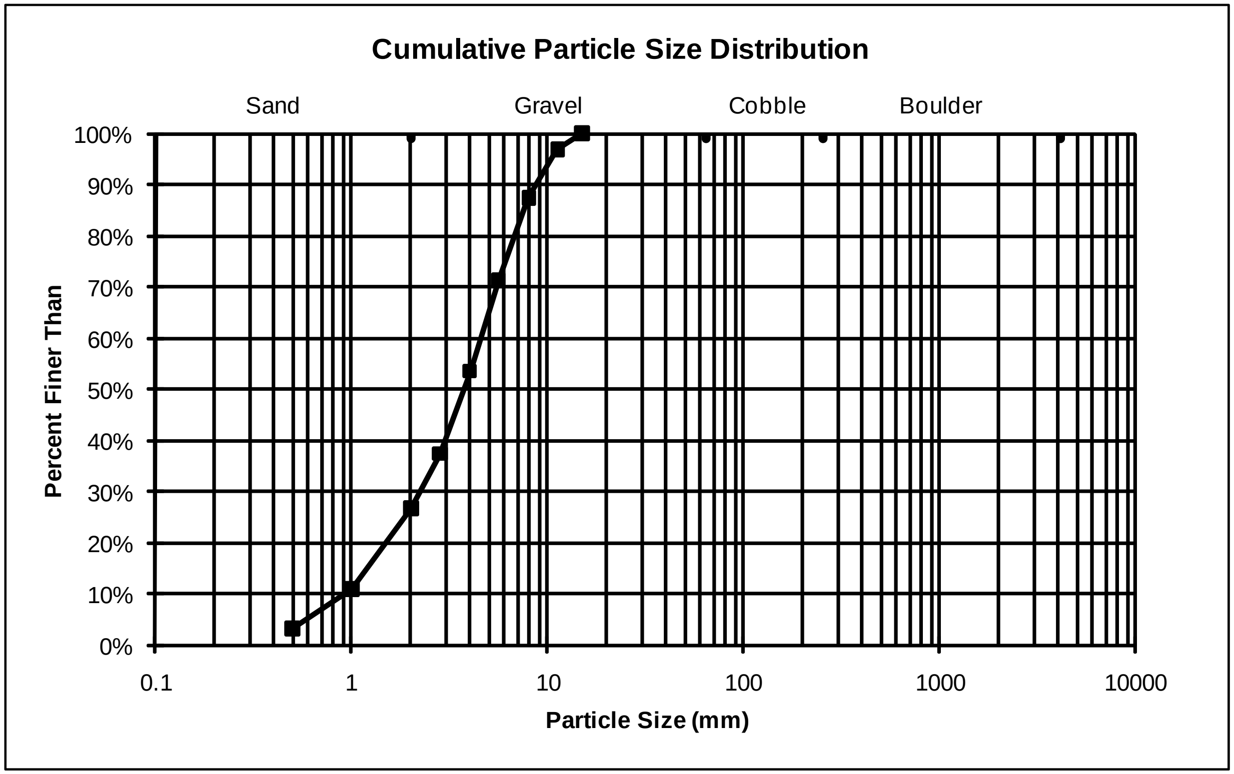
COMMENTS: Bar Sample taken between Cross Section D and E right bank

Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	29.70	3.2%	
0.5	70.70	7.6%	3.2%
1.0	145.20	15.7%	10.9%
2.0	99.60	10.8%	26.6%
2.8	149.30	16.1%	37.3%
4.0	166.00	17.9%	53.5%
5.6	147.60	16.0%	71.4%
8.0	86.60	9.4%	87.4%
11.2	30.10	3.3%	96.7%
15.0	*		100.0%
22.4			-
32.0			
45.0			
64.0			
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	924.80		

*Measured value of the largest particle in the sample and not a sieve weight

SITE NAME: Pike's Peak Highway - South Catamount Creek Reach 3
ID NUMBER: SCAT3
DATE: 8/23/2009
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	1.201	2.604	3.705	7.418	10.519	15.0



Sieve Analysis Worksheet

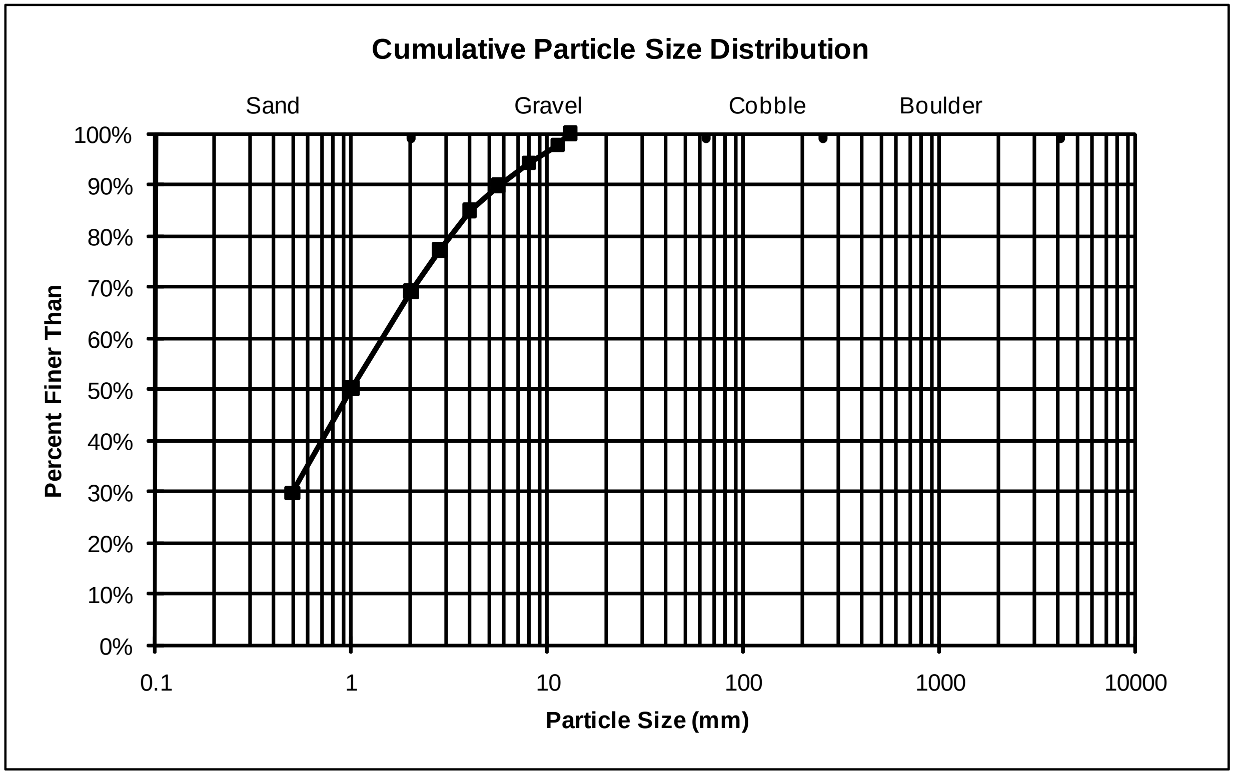
Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	174.60	29.7%	
0.5	121.00	20.6%	29.7%
1.0	111.20	18.9%	50.2%
2.0	47.90	8.1%	69.1%
2.8	44.50	7.6%	77.3%
4.0	29.90	5.1%	84.8%
5.6	25.00	4.2%	89.9%
8.0	20.90	3.6%	94.2%
11.2	13.50	2.3%	97.7%
13.0	*		100.0%
22.4			-
32.0			
45.0			
64.0			
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	588.50		

*Measured value of the largest particle in the sample and not a sieve weight

COMMENTS: Bar sample taken 10 ft downstream of Cross Section D

SITE NAME: Pike's Peak Highway - Ski Creek Reach 1
ID NUMBER: SKIC1
DATE: 8/16/2009
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	0.045	0.598	0.992	3.847	8.667	13.0



Sieve Analysis Worksheet

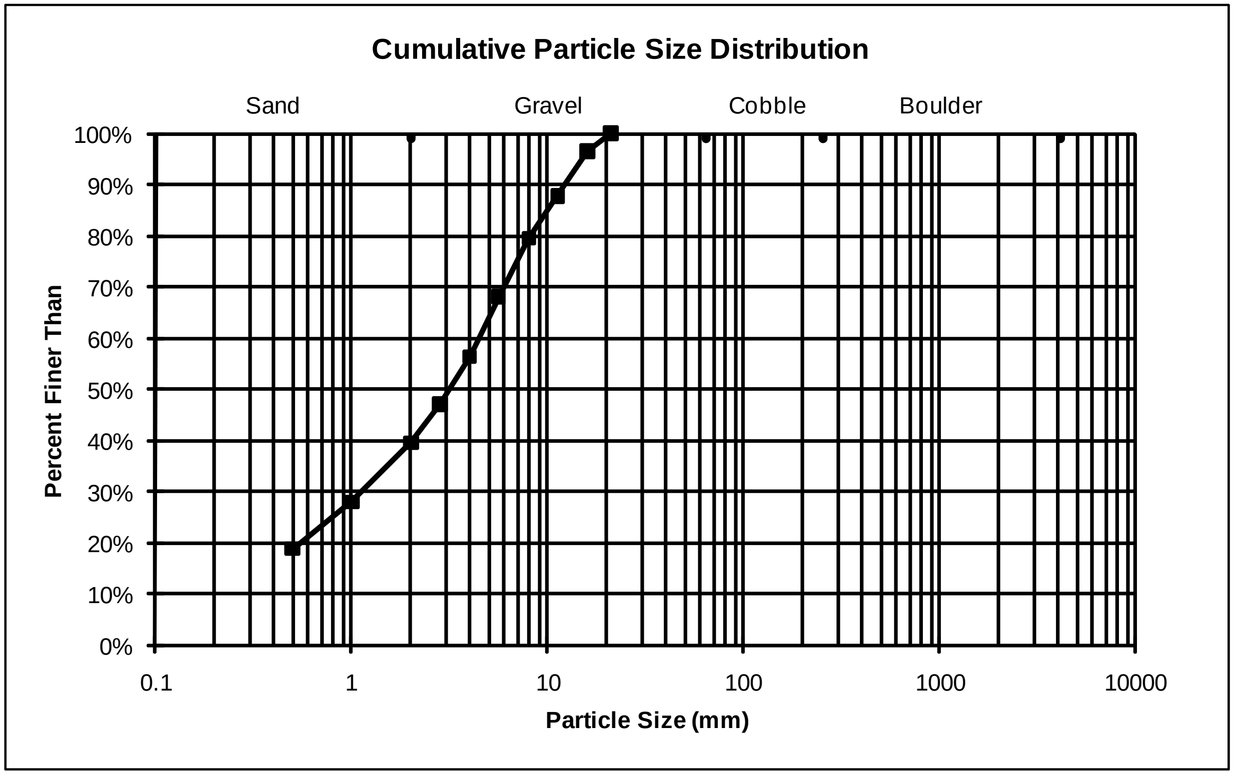
Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	173.50	18.7%	
0.5	85.10	9.2%	18.7%
1.0	107.20	11.6%	27.9%
2.0	69.30	7.5%	39.5%
2.8	86.40	9.3%	47.0%
4.0	108.00	11.7%	56.3%
5.6	105.70	11.4%	68.0%
8.0	77.60	8.4%	79.4%
11.2	80.30	8.7%	87.8%
16.0	32.60	3.5%	96.5%
21.0	*		100.0%
32.0			-
45.0			
64.0			
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	925.70		

*Measured value of the largest particle in the sample and not a sieve weight

COMMENTS: Bar Sample taken 6 ft upstream of Cross Section B

SITE NAME: Pike's Peak Highway - Ski Creek Reach 2
ID NUMBER: SKIC2
DATE: 7/25/2009
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	0.190	1.526	3.140	9.614	15.056	21.0



Sieve Analysis Worksheet

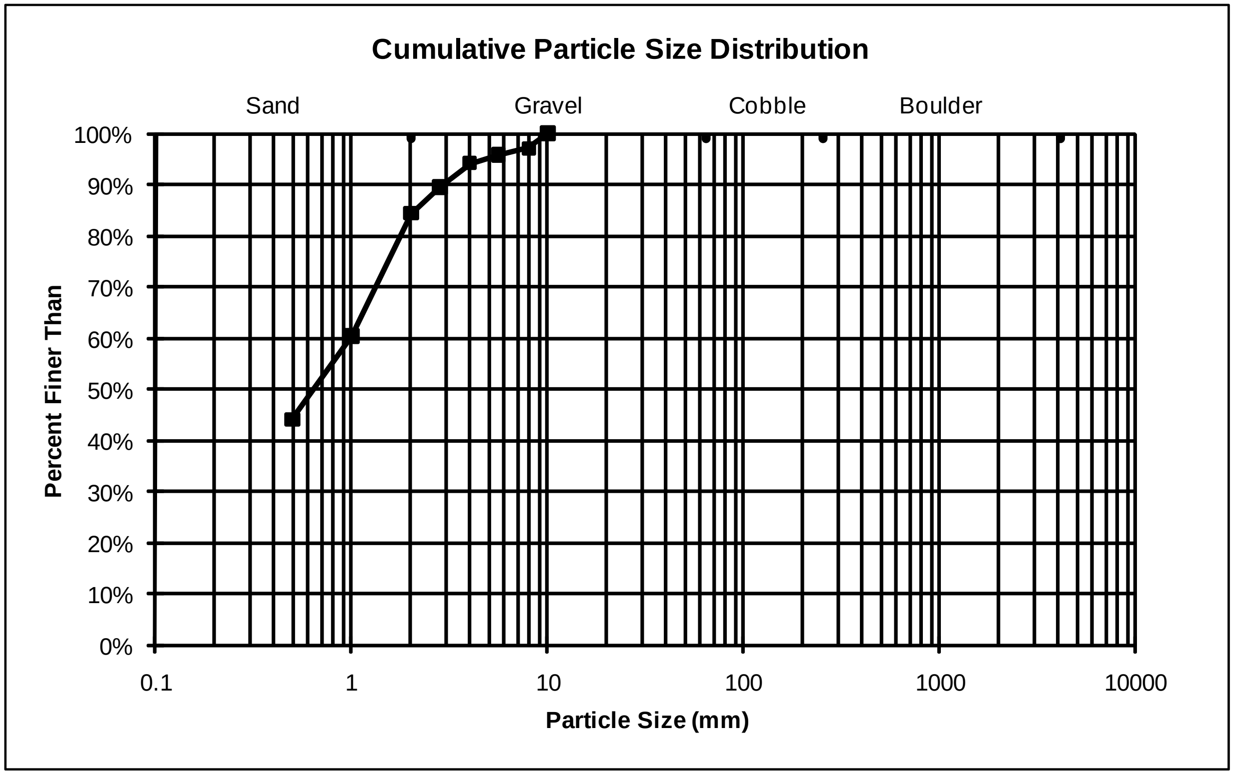
COMMENTS: Bar Sample taken at Cross Section A

Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	191.20	44.1%	
0.5	70.30	16.2%	44.1%
1.0	104.50	24.1%	60.3%
2.0	22.80	5.3%	84.3%
2.8	20.00	4.6%	89.6%
4.0	6.60	1.5%	94.2%
5.6	5.90	1.4%	95.7%
8.0	12.70	2.9%	97.1%
10.0	*		100.0%
16.0			-
22.4			
32.0			
45.0			
64.0			
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	434.00		

*Measured value of the largest particle in the sample and not a sieve weight

SITE NAME: Pike's Peak Highway - Severy Creek Reach 1
ID NUMBER: SVRY1
DATE: 9/27/2009
CREW: Derengowski, VonLoh, Winkler

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	0.020	0.184	0.645	1.981	4.781	10.0



Sieve Analysis Worksheet

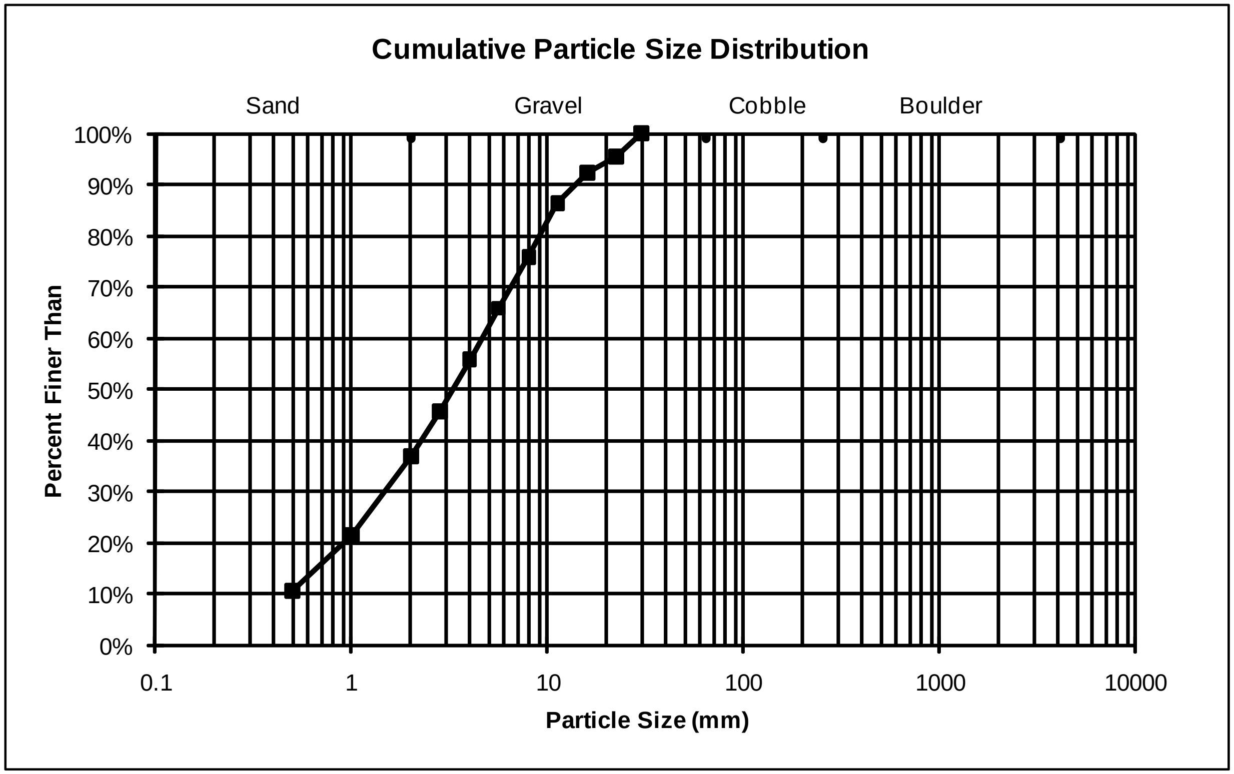
COMMENTS: Bar Sample taken downstream of Cross Section E

Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	85.60	10.5%	
0.5	88.50	10.9%	10.5%
1.0	125.70	15.5%	21.4%
2.0	70.80	8.7%	36.9%
2.8	82.40	10.1%	45.6%
4.0	82.60	10.2%	55.7%
5.6	80.70	9.9%	65.8%
8.0	84.90	10.4%	75.8%
11.2	48.70	6.0%	86.2%
16.0	25.80	3.2%	92.2%
22.4	37.70	4.6%	95.4%
30.0	*		100.0%
45.0			-
64.0			
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	813.40		

*Measured value of the largest particle in the sample and not a sieve weight

SITE NAME: Pike's Peak Highway - Severy Creek Reach 2
ID NUMBER: SVRY2
DATE: 9/27/2009
CREW: Derengowski, VonLoh, Winkler

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	0.665	1.840	3.274	10.431	21.549	30.0



Sieve Analysis Worksheet

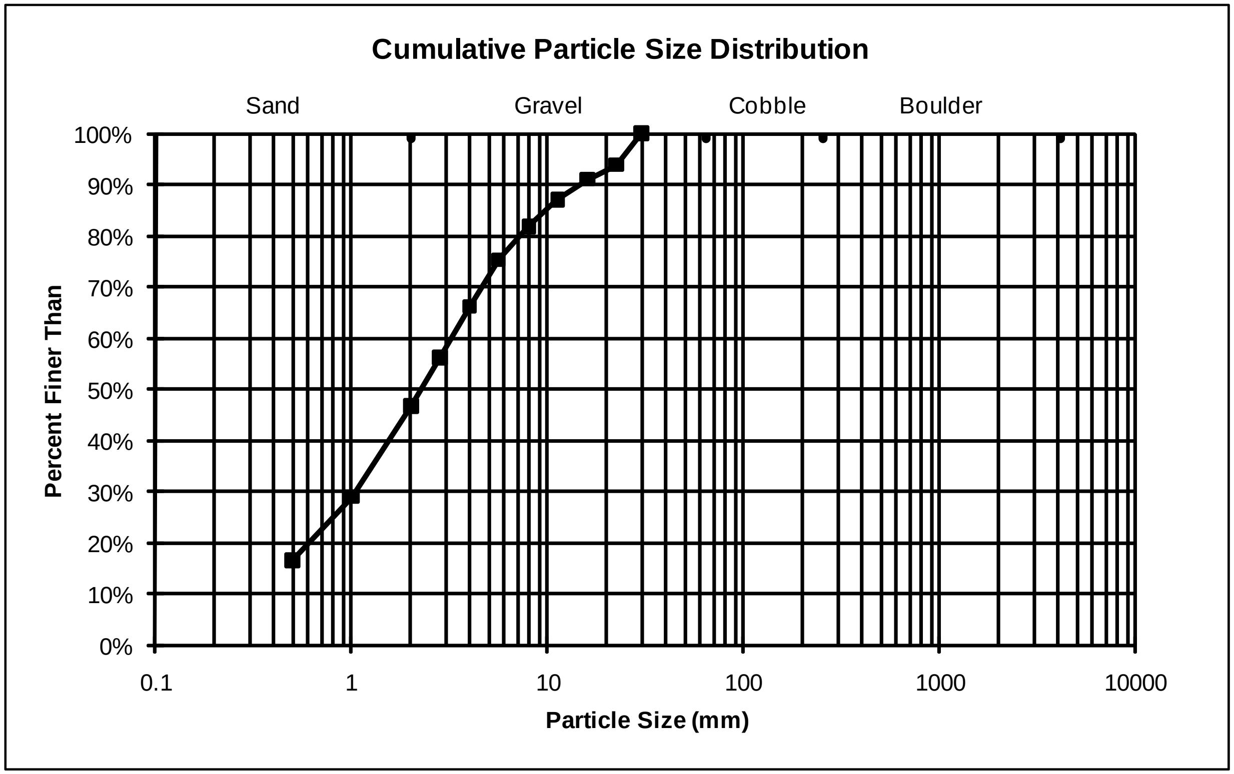
Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	119.80	16.5%	
0.5	90.00	12.4%	16.5%
1.0	129.20	17.8%	28.9%
2.0	68.00	9.4%	46.7%
2.8	73.60	10.1%	56.1%
4.0	66.00	9.1%	66.2%
5.6	46.90	6.5%	75.3%
8.0	38.90	5.4%	81.7%
11.2	28.40	3.9%	87.1%
16.0	20.50	2.8%	91.0%
22.4	44.70	6.2%	93.8%
30.0	*		100.0%
45.0			-
64.0			
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	726.00		

*Measured value of the largest particle in the sample and not a sieve weight

COMMENTS: Bar Sample taken between Cross Section D and E

SITE NAME: Pike's Peak Highway - West Fork Beaver Creek Reach 1
ID NUMBER: WBVR1
DATE: 9/5/2009
CREW: Derengoski, VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	0.322	1.268	2.252	9.214	23.664	30.0



Sieve Analysis Worksheet

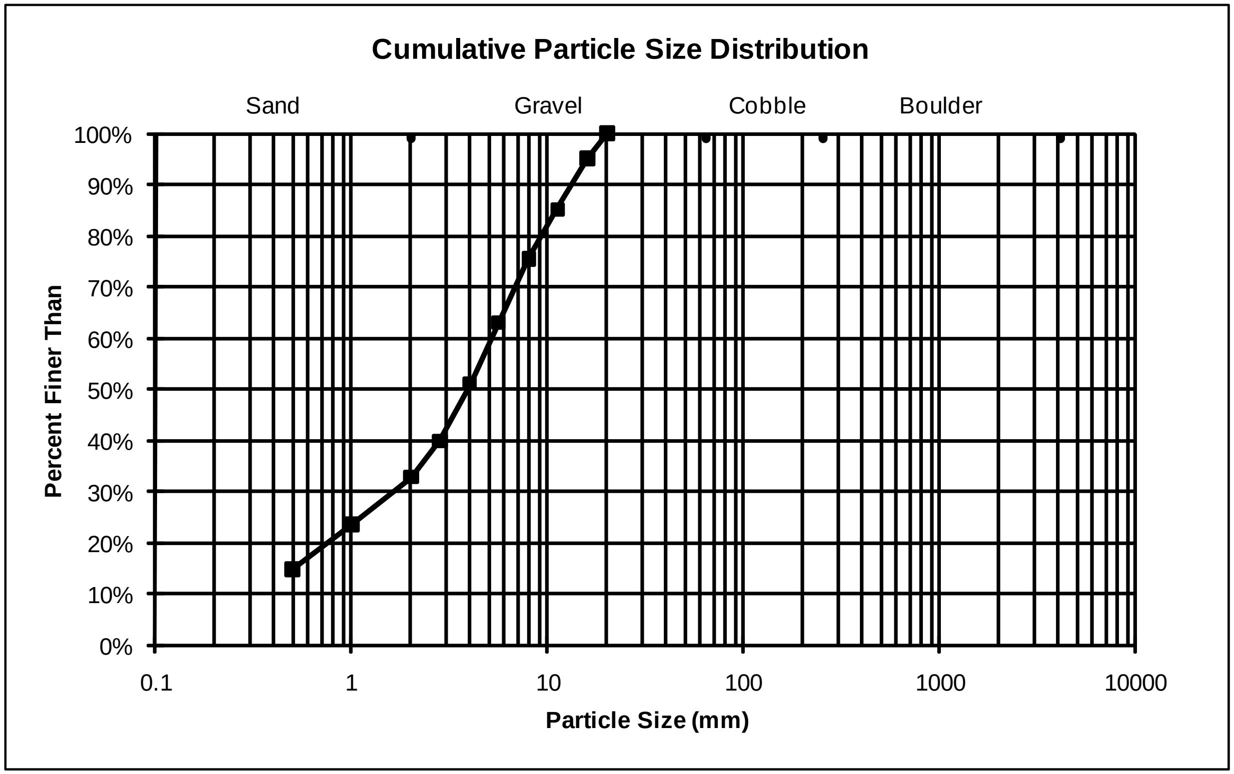
Size Finer Than (mm)	Wt. on Sieve	% of Total	% Finer Than
Pan	115.10	14.8%	
0.5	66.70	8.6%	14.8%
1.0	72.60	9.4%	23.4%
2.0	54.90	7.1%	32.8%
2.8	86.40	11.1%	39.9%
4.0	93.00	12.0%	51.0%
5.6	96.80	12.5%	63.0%
8.0	74.90	9.7%	75.5%
11.2	77.10	9.9%	85.1%
16.0	38.20	4.9%	95.1%
20.0	*		100.0%
32.0			-
45.0			
64.0			
90			
128			
181			
256			
362			
512			
1024			
2048			
4096			
Total	775.70		

*Measured value of the largest particle in the sample and not a sieve weight

COMMENTS: Bar Sample taken between Cross Section B and C

SITE NAME: Pike's Peak Highway - West Fork Beaver Creek Reach 2
ID NUMBER: WBVR2
DATE: 8/1/2009
CREW: Derengowski, VonLoh

Particle Size Distribution (mm)	D15	D35	D50	D84	D95	Lpart
	0.507	2.221	3.872	10.765	15.957	20.0



Appendix Q

Riparian Vegetation Summary

2009

Riparian Vegetation Summary Pikes Peak, 2009

Site ID	Date	Camera	Cross Section and Pin to Pin Distance in Feet	Bar Sample	Bank	Bank Distance from LPIN (ft)	Camera Distance from LPIN (ft)	Percent Cover	Comments
BHMR1	8/30/2009	Olympus Stylus 400	A (24.36)	Downstream from XSE	Left	11.2	14.0	50	moss, grass, sedge, forb
BHMR1		Olympus Stylus 400	A		Right	13.4	10.5	60	grass, sedge, forb
BHMR1		Olympus Stylus 400	B (31.95)		Left	6.5	10.8	40	grass, forb
BHMR1		Olympus Stylus 400	B		Right	9.9	5.8	70	grass, forb
BHMR1		Olympus Stylus 400	C (16.81)		Left	8.2	13.0	40	grass, forb
BHMR1		Olympus Stylus 400	C		Right	11.8	7.5	40	moss, grass, sedge, forb
BHMR1		Olympus Stylus 400	D (20.28)		Left	7.4	11.0	35	grass, sedge, forb
BHMR1		Olympus Stylus 400	D		Right	11.2	7.0	60	grass, sedge, forb
BHMR1		Olympus Stylus 400	E (34.42)		Left	21.8	27.0	50	grass, sedge, forb
BHMR1		Olympus Stylus 400	E		Right	27.6	22.3	35	grass, sedge, forb
BHMR2	8/29/2009	Olympus Stylus 400	A (25.43)	18' upstream from XSB	Left	6.0	11.0	15	grass, forb
BHMR2		Olympus Stylus 400	A		Right	10.6	6.0	75	grass, sedge, forb
BHMR2		Olympus Stylus 400	B (17.59)		Left	6.9	10.0	10	grass, sedge, forb
BHMR2		Olympus Stylus 400	B		Right	10.0	6.0	20	grass, sedge, forb
BHMR2		Olympus Stylus 400	C (18.46)		Left	6.0	10.0	70	grass, sedge, forb
BHMR2		Olympus Stylus 400	C		Right	10.3	6.0	30	sedge, forb
BHMR2		Olympus Stylus 400	D (30.44)		Left	15.5	19.0	25	grass, sedge, forb
BHMR2		Olympus Stylus 400	D		Right	18.6	15.0	40	sedge
BHMR2		Olympus Stylus 400	E (43.02)		Left	11.0	16.0	40	grass, sedge
BHMR2		Olympus Stylus 400	E		Right	16.1	11.5	80	sedge
EBVR1	8/30/2009	Olympus Stylus 400	A (20.70)	2' downstream from XSB left bank	Left	1.3	5.0	5	moss

Site ID	Date	Camera	Cross Section and Pin to Pin Distance in Feet	Bar Sample	Bank	Bank Distance from LPIN (ft)	Camera Distance from LPIN (ft)	Percent Cover	Comments
EBVR1		Olympus Stylus 400	A		Right	17.1	13.6	20	moss, grass, sedge, forb
EBVR1		Olympus Stylus 400	B (24.53)		Left	3.0	5.0	40	moss, sedge, shrub
EBVR1		Olympus Stylus 400	B		Right	13.5	9.0	30	sedge, forb, shrub
EBVR1		Olympus Stylus 400	C (29.05)		Left	6.8	11.0	30	sedge, forb, shrub
EBVR1		Olympus Stylus 400	C		Right	17.0	12.0	15	moss, forb, shrub
EBVR1		Olympus Stylus 400	D (12.77)		Left	1.9	6.5	20	sedge, forb, shrub
EBVR1		Olympus Stylus 400	D		Right	10.1	5.0	5	forb
EBVR1		Olympus Stylus 400	E (18.48)		Left	8.3	11.0	20	sedge, forb, shrub
EBVR1		Olympus Stylus 400	E		Right	14.2	10.0	65	moss, shrub
EBVR2	8/30/2009	Olympus Stylus 400	A (37.63)	6' upstream from XSE	Left	14.3	19.0	25	sedge, forb
EBVR2		Olympus Stylus 400	A		Right	20.0	16.0	50	sedge
EBVR2		Olympus Stylus 400	B (21.24)		Left	9.2	15.0	10	grass, sedge, forb
EBVR2		Olympus Stylus 400	B		Right	14.3	11.0	35	grass, sedge
EBVR2		Olympus Stylus 400	C (20.46)		Left	9.2	13.0	15	grass, sedge, forb
EBVR2		Olympus Stylus 400	C		Right	13.4	11.0	30	grass, sedge, forb
EBVR2		Olympus Stylus 400	D (17.45)		Left	7.7	12.5	20	sedge
EBVR2		Olympus Stylus 400	D		Right	13.2	10.0	40	grass, sedge, forb
EBVR2		Olympus Stylus 400	E (19.66)		Left	9.8	14.0	35	grass, sedge, forb
EBVR2		Olympus Stylus 400	E		Right	14.6	11.0	30	sedge, forb
GLEN1	8/23/2009	Olympus Stylus 400	A (20.03)	At XSE	Left	9.5	12.9	15	grass, sedge, forb, shrub
GLEN1		Olympus Stylus 400	A		Right	13.0	8.5	50	moss, sedge, forb, shrub, tree
GLEN1		Olympus Stylus 400	B(16.57)		Left	6.3	9.5	5	grass, shrub
GLEN1		Olympus Stylus 400	B		Right	9.0	5.7	30	grass, sedge, forb, shrub
GLEN1		Olympus Stylus 400	C (17.31)		Left	5.9	9.9	15	sedge, shrub
GLEN1		Olympus Stylus 400	C		Right	9.3	5.0	20	sedge, forb
GLEN1		Olympus Stylus 400	D (49.99)		Left	15.1	19.9	5	sedge, forb

Site ID	Date	Camera	Cross Section and Pin to Pin Distance in Feet	Bar Sample	Bank	Bank Distance from LPIN (ft)	Camera Distance from LPIN (ft)	Percent Cover	Comments
GLEN1		Olympus Stylus 400	D		Right	31.1	27.2	15	tree
GLEN1		Olympus Stylus 400	E (24.29)		Left	8.0	15.5	10	sedge, forb, shrub
GLEN1		Olympus Stylus 400	E		Right	19.7	16.0	10	sedge, forb
NCAT1	8/16/2009	Olympus Stylus 400	A (57.53)	XSB <> XSC right bank	Left	12.5	17.0	5	grass, sedge, forb, shrub
NCAT1		Olympus Stylus 400	A		Right	16.5	12.0	35	grass, sedge, forb
NCAT1		Olympus Stylus 400	B (58.83)		Left	46.0	50.0	35	grass, sedge
NCAT1		Olympus Stylus 400	B		Right	50.5	47.0	20	sedge
NCAT1		Olympus Stylus 400	C (38.85)		Left	16.7	21.5	10	grass, sedge, shrub
NCAT1		Olympus Stylus 400	C		Right	30.3	26.0	5	sedge
NCAT1		Olympus Stylus 400	D (44.77)		Left	26.0	30.0	20	sedge, forb, shrub
NCAT1		Olympus Stylus 400	D		Right	32.5	29.3	15	sedge
NCAT1		Olympus Stylus 400	E (60.78)		Left	42.8	47.0	20	sedge, shrub
NCAT1		Olympus Stylus 400	E		Right	45.1	41.0	5	sedge, forb
NCAT2	8/16/2009	Olympus Stylus 400	A (29.17)	3' downstream from XSB	Left	12.0	16.5	15	grass, sedge, forb
NCAT2		Olympus Stylus 400	A		Right	16.2	12.0	10	sedge, grass, forb, shrub
NCAT2		Olympus Stylus 400	B (40.59)		Left	8.8	13.0	15	grass, sedge, forb
NCAT2		Olympus Stylus 400	B		Right	11.8	8.0	20	grass, sedge, forb, shrub
NCAT2		Olympus Stylus 400	C (42.34)		Left	12.4	17.0	15	grass, sedge, shrub
NCAT2		Olympus Stylus 400	C		Right	17.2	11.5	10	grass, sedge, forb
NCAT2		Olympus Stylus 400	D (29.78)		Left	6.4	10.5	15	sedge, forb, shrub
NCAT2		Olympus Stylus 400	D		Right	9.7	5.0	20	grass, sedge, forb, shrub
NCAT2		Olympus Stylus 400	E (34.25)		Left	10.5	14.0	10	sedge, shrub
NCAT2		Olympus Stylus 400	E		Right	13.1	9.5	20	grass, sedge, forb
NCRY1	9/20/2009	Olympus Stylus 400	A (54.53)	At XSA left bank	Left	31.7	35.0	5	grass, sedge, forb
NCRY1		Olympus Stylus 400	A		Right	38.8	36.0	5	sedge

Site ID	Date	Camera	Cross Section and Pin to Pin Distance in Feet	Bar Sample	Bank	Bank Distance from LPIN (ft)	Camera Distance from LPIN (ft)	Percent Cover	Comments
NCRY1		Olympus Stylus 400	B (51.31)		Left	39.2	42.0	5	sedge, forb, tree
NCRY1		Olympus Stylus 400	B		Right	41.5	38.0	5	grass, sedge
NCRY1		Olympus Stylus 400	C (43.61)		Left	26.7	29.0	60	moss, grass, tree
NCRY1		Olympus Stylus 400	C		Right	28.7	25.0	15	moss, forb
NCRY1		Olympus Stylus 400	D (41.53)		Left	30.0	32.8	5	grass, sedge
NCRY1		Olympus Stylus 400	D		Right	31.5	29.5	5	sedge
NCRY1		Olympus Stylus 400	E (37.98)		Left	30.0	33.7	10	sedge
NCRY1		Olympus Stylus 400	E		Right	34.3	31.0	20	moss, grass, forb
NCRY2	9/20/2009	Olympus Stylus 400	A (24.23)	Upstream from XSE	Left	11.0	15.5	5	moss, shrub
NCRY2		Olympus Stylus 400	A		Right	20.6	15.0	15	moss, grass, forb
NCRY2		Olympus Stylus 400	B (35.00)		Left	21.4	25.0	10	grass, forb, shrub, tree
NCRY2		Olympus Stylus 400	B		Right	30.5	26.0	5	grass, forb
NCRY2		Olympus Stylus 400	C (33.82)		Left	19.3	24.0	25	moss, grass, shrub
NCRY2		Olympus Stylus 400	C		Right	27.4	23.0	20	moss, grass, sedge
NCRY2		Olympus Stylus 400	D (28.71)		Left	14.5	18.3	5	moss, grass
NCRY2		Olympus Stylus 400	D		Right	22.9	19.3	0	
NCRY2		Olympus Stylus 400	E (34.35)		Left	5.3	7.1	5	moss, grass
NCRY2		Olympus Stylus 400	E		Right	18.4	15.6	65	moss
OILC1	9/5/2009	Olympus Stylus 400	A (43.95)	4' downstream from XSA	Left	7.2	9.0	35	sedge, forb, shrub
OILC1		Olympus Stylus 400	A		Right	11.7	8.5	25	sedge, shrub
OILC1		Olympus Stylus 400	B (41.34)		Left	8.5	9.8	20	grass, sedge, shrub
OILC1		Olympus Stylus 400	B		Right	16.6	15.6	15	sedge, forb, shrub
OILC1		Olympus Stylus 400	C (32.67)		Left	14.5	15.7	25	grass, sedge
OILC1		Olympus Stylus 400	C		Right	22.2	20.7	65	grass, sedge, shrub

Site ID	Date	Camera	Cross Section and Pin to Pin Distance in Feet	Bar Sample	Bank	Bank Distance from LPIN (ft)	Camera Distance from LPIN (ft)	Percent Cover	Comments
OILC1		Olympus Stylus 400	D (33.98)		Left	11.0	12.6	40	grass, sedge, forb, shrub
OILC1		Olympus Stylus 400	D		Right	22.5	21.0	30	grass, sedge, forb, shrub
OILC1		Olympus Stylus 400	E (38.35)		Left	7.0	8.9	15	grass, sedge, forb
OILC1		Olympus Stylus 400	E		Right	18.5	16.7	25	grass, sedge, shrub
SVRY1	9/27/2009	Olympus Stylus 400	A (13.70)	At XSA	Left	2.0	3.0	40	sedge, forb
SVRY1		Olympus Stylus 400	A		Right	7.8	4.0	40	grass, sedge, shrub
SVRY1		Olympus Stylus 400	B (11.83)		Left	5.0	8.0	35	sedge, shrub
SVRY1		Olympus Stylus 400	B		Right	8.9	7.0	25	sedge, shrub
SVRY1		Olympus Stylus 400	C (14.82)		Left	4.9	8.0	15	sedge, forb, shrub
SVRY1		Olympus Stylus 400	C		Right	7.8	5.0	15	sedge, forb, shrub
SVRY1		Olympus Stylus 400	D (12.09)		Left	4.6	8.0	10	grass, sedge, shrub
SVRY1		Olympus Stylus 400	D		Right	8.6	4.0	65	moss, forb, shrub
SVRY1		Olympus Stylus 400	E (9.57)		Left	2.7	7.0	25	sedge, shrub
SVRY1		Olympus Stylus 400	E		Right	6.6	3.0	25	moss, sedge, shrub
SVRY2	9/27/2009	Olympus Stylus 400	A (95.72)	Downstream from XSE	Left	20.2	28.0	0	
SVRY2		Olympus Stylus 400	A		Right	44.3	37.0	0	
SVRY2		Olympus Stylus 400	B (116.96)		Left	32.0	35.0	0	
SVRY2		Olympus Stylus 400	B		Right	46.3	41.0	0	
SVRY2		Olympus Stylus 400	C (158.61)		Left	59.2	65.0	0	
SVRY2		Olympus Stylus 400	C		Right	78.3	73.0	0	
SVRY2		Olympus Stylus 400	D (156.58)		Left	74.8	79.0	0	
SVRY2		Olympus Stylus 400	D		Right	90.1	87.0	0	
SVRY2		Olympus Stylus 400	E (211.52)		Left	71.4	80.0	0	
SVRY2		Olympus Stylus 400	E		Right	78.2	71.0	0	
SVRY2	9/27/2009	Olympus Stylus 400	A (95.72)	Downstream from XSE	Left	20.2	28.0	0	

Site ID	Date	Camera	Cross Section and Pin to Pin Distance in Feet	Bar Sample	Bank	Bank Distance from LPIN (ft)	Camera Distance from LPIN (ft)	Percent Cover	Comments
SKIC1	8/16/2009	Olympus Stylus 400	A (15.04)	10' downstream from XSD	Left	6.2	8.0	15	moss, grass, forb
SKIC1		Olympus Stylus 400	A		Right	11.1	8.5	10	moss, grass, forb
SKIC1		Olympus Stylus 400	B (14.15)		Left	4.9	7.0	5	moss, forb, tree
SKIC1		Olympus Stylus 400	B		Right	10.5	7.5	10	moss, grass, forb
SKIC1		Olympus Stylus 400	C (16.60)		Left	4.1	7.0	15	moss, grass, sedge, forb
SKIC1		Olympus Stylus 400	C		Right	12.2	9.0	10	grass, sedge, forb
SKIC1		Olympus Stylus 400	D (33.57)		Left	16.0	19.5	10	grass, forb
SKIC1		Olympus Stylus 400	D		Right	23.2	19.5	5	grass, forb
SKIC1		Olympus Stylus 400	E (21.78)		Left	14.5	17.5	25	grass, sedge, forb, tree
SKIC1		Olympus Stylus 400	E		Right	19.2	15.0	25	moss, grass, forb
SKIC2	7/25/2009	Olympus Stylus 400	A (50.70)	6' upstream from XSB	Left	32.8	36.0	5	moss, grass, forb
SKIC2		Olympus Stylus 400	A		Right	40.7	35.0	15	grass, forb, shrub, tree
SKIC2		Olympus Stylus 400	B (46.73)		Left	29.4	35.5	0	
SKIC2		Olympus Stylus 400	B		Right	35.1	32.5	5	moss, forb
SKIC2		Olympus Stylus 400	C (29.76)		Left	2.6	6.0	20	grass, sedge
SKIC2		Olympus Stylus 400	C		Right	10.6	7.0	0	
SKIC2		Olympus Stylus 400	D (28.31)		Left	4.3	11.0	10	moss, forb
SKIC2		Olympus Stylus 400	D		Right	12.5	8.0	0	
SKIC2		Olympus Stylus 400	E (41.90)		Left	24.9	31.0	5	moss, forb
SKIC2		Olympus Stylus 400	E		Right	31.1	26.0	5	grass, forb
SCAT1	9/20/2009	Olympus Stylus 400	A (22.96)	40' downstream from XSA	Left	6.4	11.5	10	grass, sedge, forb
SCAT1		Olympus Stylus 400	A		Right	11.7	8.9	75	moss, sedge, forb, shrub
SCAT1		Olympus Stylus 400	B (20.83)		Left	10.5	14.0	30	moss, grass, sedge, forb
SCAT1		Olympus Stylus 400	B		Right	18.3	14.0	35	moss, grass, forb

Site ID	Date	Camera	Cross Section and Pin to Pin Distance in Feet	Bar Sample	Bank	Bank Distance from LPIN (ft)	Camera Distance from LPIN (ft)	Percent Cover	Comments
SCAT1		Olympus Stylus 400	C (21.86)		Left	4.8	10.0	5	grass, forb, tree
SCAT1		Olympus Stylus 400	C		Right	13.7	9.6	15	grass, forb
SCAT1		Olympus Stylus 400	D (18.12)		Left	5.5	12.0	15	sedge, forb
SCAT1		Olympus Stylus 400	D		Right	11.7	6.0	20	grass, sedge, forb
SCAT1		Olympus Stylus 400	E (24.02)		Left	8.8	16.0	45	moss, grass, sedge, forb
SCAT1		Olympus Stylus 400	E		Right	15.5	10.0	30	moss, grass, forb
SCAT2	8/23/2009	Olympus Stylus 400	A (28.57)	10' upstream from XSE left bank	Left	3.9	9.0	5	grass, forb
SCAT2		Olympus Stylus 400	A		Right	15.0	9.5	5	moss, forb, tree
SCAT2		Olympus Stylus 400	B (17.05)		Left	3.0	7.0	5	grass, forb
SCAT2		Olympus Stylus 400	B		Right	11.3	7.0	15	moss, grass, forb
SCAT2		Olympus Stylus 400	C (19.81)		Left	2.2	6.0	15	grass, sedge, forb
SCAT2		Olympus Stylus 400	C		Right	13.2	9.0	10	moss, grass, forb
SCAT2		Olympus Stylus 400	D (38.50)		Left	7.6	11.0	25	moss, grass, forb
SCAT2		Olympus Stylus 400	D		Right	15.4	12.7	5	grass, forb
SCAT2		Olympus Stylus 400	E (18.95)		Left	3.8	7.0	45	moss, grass, sedge, forb
SCAT2		Olympus Stylus 400	E		Right	11.2	8.0	60	moss, grass, forb
SCAT3	8/23/2009	Olympus Stylus 400	A (44.32)	10' downstream from XSD right bank	Left	26.0	29.4	5	sedge
SCAT3		Olympus Stylus 400	A		Right	29.2	25.2	15	sedge, forb
SCAT3		Olympus Stylus 400	B (32.19)		Left	12.1	16.0	5	sedge, forb
SCAT3		Olympus Stylus 400	B		Right	15.5	12.7	10	grass, sedge
SCAT3		Olympus Stylus 400	C (15.79)		Left	2.8	6.8	5	sedge, forb
SCAT3		Olympus Stylus 400	C		Right	6.8	3.1	10	grass, sedge, forb
SCAT3		Olympus Stylus 400	D (19.60)		Left	8.2	11.6	5	sedge
SCAT3		Olympus Stylus 400	D		Right	10.8	8.1	5	sedge

Site ID	Date	Camera	Cross Section and Pin to Pin Distance in Feet	Bar Sample	Bank	Bank Distance from LPIN (ft)	Camera Distance from LPIN (ft)	Percent Cover	Comments
SCAT3		Olympus Stylus 400	E (18.48)		Left	4.8	8.2	25	sedge, forb, shrub
SCAT3		Olympus Stylus 400	E		Right	6.5	3.8	5	sedge, shrub
WBVR1	9/5/2009	Olympus Stylus 400	A (36.64)	XSD <> XSE	Left	15.9	21.0	10	sedge, forb
WBVR1		Olympus Stylus 400	A		Right	31.0	27.0	10	grass, sedge, forb
WBVR1		Olympus Stylus 400	B (20.98)		Left	4.3	10.0	15	forb, shrub
WBVR1		Olympus Stylus 400	B		Right	15.5	11.0	5	sedge, shrub
WBVR1		Olympus Stylus 400	C (28.83)		Left	4.0	9.0	30	moss, sedge, forb, shrub
WBVR1		Olympus Stylus 400	C		Right	17.0	11.0	10	sedge, shrub
WBVR1		Olympus Stylus 400	D (34.18)		Left	9.7	14.0	0	
WBVR1		Olympus Stylus 400	D		Right	25.0	20.0	20	moss, sedge, shrub
WBVR1		Olympus Stylus 400	E (29.56)		Left	6.0	12.0	5	shrub
WBVR1		Olympus Stylus 400	E		Right	20.0	16.0	20	sedge
WBVR2	8/1/2009	Olympus Stylus 400	A (44.40)	XSB <> XSC left bank	Left	7.5	16.0	5	moss, shrub
WBVR2		Olympus Stylus 400	A		Right	25.0	19.0	0	
WBVR2		Olympus Stylus 400	B (90.60)		Left	14.0	21.0	5	grass, forb
WBVR2		Olympus Stylus 400	B		Right	37.0	31.0	0	
WBVR2		Olympus Stylus 400	C (151.93)		Left	100.5	107.0	0	
WBVR2		Olympus Stylus 400	C		Right	126.0	119.0	10	grass
WBVR2		Olympus Stylus 400	D (149.43)		Left	97.0	108.0	0	
WBVR2		Olympus Stylus 400	D		Right	118.0	114.0	5	grass
WBVR2		Olympus Stylus 400	E (96.25).		Left	33.4	39.0	40	grass, forb, shrub
WBVR2		Olympus Stylus 400	E		Right	48.9	43.0	0	