Report on 2006 Field Season

Monitoring the Effectiveness and Validating Response to the Road Related Mitigation Practices Implemented on the Pike's Peak Highway

Fourth Year

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Executive Summary

Monitoring the Effectiveness and Validating Response to the Road Related Mitigation Practices Implemented on the Pike's Peak Highway

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This report describes the fourth year's monitoring effort to determine effectiveness and validate response to road related mitigation practices implemented on the Pike's 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. Venneman, Civil Action No. 98-M-662 (D. Colo.). The effectiveness-monitoring plan has been designed to determine how well the mitigation practices implemented contribute to meeting their objectives and focuses on the 14 mile-long, 300 foot-wide highway corridor (150 feet each side of highway centerline) starting at mile marker 7 and continuing to the summit. Validation monitoring documents how the properly implemented intervention practices affect the riparian, wetland and aquatic system of catchments within the influence of the Pike's Peak highway.

The objectives for the fourth year of monitoring were to re-measure the various features surveyed the first three years and to continue to locate, identify, and establish baseline surveys for sites not previously surveyed. Highway improvements continued in 2006 with less than one mile of highway being paved starting just below the switchbacks and ending above them near our site 115CC. This year, very little roadbase was added to the unimproved highway sections while most of the mitigation work focused on the paving through the switchbacks. There was an attempt to install rock weirs in this new section but these structures washed away and no new waypoints were added to the monitoring study.

Precipitation measurements at all gauges continued in 2006 and was the second full year for the Glen Cove snotel site. Seasonal precipitation totals for the period May through September were: 075RG = 9.61 inches, 076RG = 18.78 inches, 077RG = 15.54 inches with 21.6 inches recorded at the Glen snotel site. There appeared to be some tampering with 075RG early in the season which could explain the relatively low recorded total for the 2006 season.

Thirteen cut slope and 30 fill slopes sites were monitored in 2006. Each week, the silt fences were visited to determine if they needed cleaning, repair, or replacement. Sixty four times cut and fill slope silt fences required cleaning in 2006.

Re-surveys of the eleven road cross section sites were made in 2006. The survey of 156RX was made after that area was prepped for paving. Since it is now paved, this will be the last survey made at 156RX.

Re-surveys of nineteen drainage ditches were made in 2006. Site 092DD was paved in 2005 and was not re-surveyed this year. The survey of 107DD was made after that area was prepped for paving. Since it is now shot-creted, this will be the last survey made at 107DD.

There are 115 conveyance channels that have been identified and surveyed during the first 3 years of this monitoring effort. This year 29 of those conveyance channels have been resurveyed. These include conveyance channels below all rock weirs, seven channels that have been treated, and 6 channels that won't be treated until the last phases of the road construction. The idea behind surveying these treated and untreated channels this year is to continuously monitor a sub-sample of conveyance channels rather than trying to continuously survey all 115.

Twenty one rock weirs were monitored in the 2006 to determine their effectiveness in trapping sediment both from winter and summer runoff. Early heavy snowfall prevented the September survey of 5 weirs, 181RW, 233RW, 234RW, 236RW, and 237RW. In the future, fall surveys of these features should start at the higher elevation structures and work downward. The large sediment ponds in Basin 2 and 3 (199RW and 237RW, respectively) were re-surveyed in the spring and fall to determine winter/summer contributions.

This year we selected to re-survey North Catamount Creek, North Fork Crystal Creek, and Severy Creek. While it's probably not necessary to survey every stream every year, it is reasonable to survey at least one control and one impacted stream each year. We also chose to survey North Fork Crystal Creek because of the work the Rocky Mountain Field Institute was doing in the conveyance channels above both stream reaches.

Changes have been made in the reporting requirements for this document. Beyond reducing the data to a "usable" form, this report merely summarizes what was done in 2006 and makes no attempt to analyze or compare the data. Any individual utilizing these data bears the sole responsibility for its accuracy and conclusions drawn.

Included with this report are two data DVD's containing all survey data (field and post processing) plus digital photographs (recommended viewing) for all sites.

Acknowledgements

Many thanks go out to all the people and agencies that cooperated in this effort, and there were quite a few.

Special thanks go out to the US Forest Service's Pike's Peak Ranger District, Rocky Mountain Research Station and Manitou Experimental Forest personnel for all the logistical, technical, laboratory and financial assistance. Also, to the City of Colorado Springs and the Pike's Peak Highway crew who shared their invaluable knowledge of the highway and their time.

My personal thanks go to METI Inc., the US Forest Service Inventory and Monitoring Institute, Black Creek Hydrology, LLC, Levi Howell and Brenda Waddell for a successful fourth year.

Introduction

This report describes the fourth year's monitoring effort to determine effectiveness of road restoration practices and to validate response to road related mitigation practices implemented on the Pike's 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. Venneman, Civil Action No. 98-M-662 (D. Colo.). The five major objectives of the road mitigation work are to:

- 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.

The effectiveness-monitoring plan was designed to determine how well the implemented mitigation practices contribute to meeting these objectives and focuses on the 14 mile-long, 300 foot-wide highway corridor (150 feet each side of the highway centerline) starting at mile marker seven and continuing to the summit. Validation monitoring documents how the properly implemented intervention practices affect the riparian, wetland and aquatic system of catchments within the influence of the Pike's Peak highway.

The objectives in the fourth year of monitoring were to re-measure sites established in prior years. The monitoring plan calls for replicating "like" conditions for each feature measured, whether they're treated or untreated, control or impacted. Comparisons made, over time, of the relative change observed within a particular treatment type or control, against the relative change observed between treatment types will allow for separation of natural (expected) change from change observed as a result of some disturbance or treatment. What follows in this report is simply a description of the monitoring effort in 2006 and a presentation of the data collected without any comparative analysis.

Site Location and Identification

A proposed 15 year monitoring study not only requires the initial identification of suitable sites, but the ability to relocate them, as well. Location of each cut and fill slope, road cross section, conveyance channel and drainage ditch, rock weir and sediment trap, precipitation gauge, and stream site were identified as a waypoint using a handheld Garmin ETrex Vista Global Positioning unit (GPS) which recorded latitude, longitude, and altitude. Each waypoint was given a unique code to distinguish it in the field as well as provide an easy identifier for post processing convenience. The naming convention used for the effectiveness monitoring was a 5 character alpha-numeric code starting with three digits followed by two letters (e.g. 001RW, 007FS, etc.) where the numbers are sequential and the letters signify feature type (CS = Cut Slope, RX = Road Cross Section, etc.). The validation monitoring sites use a similar five character naming convention except the first four letters identify the stream and the last digit signifies the reach (e.g. OILC1 = Oil Creek, Reach 1; SVRY2 = Severy Creek, Reach 2; etc.). Appendix A has a complete listing of all the sites including Site ID, Latitude, Longitude, Altitude, and Feature Description. It should be noted that while GPS technology is very good, accuracy is still dependent upon the available satellite constellation at the specific time of need and these coordinates should get one reasonably close to the desired feature but not necessarily to within one foot of a control point.

Every site has at least three Temporary Bench Marks (TBM's) or control points for use as relative reference points in order to repeatedly complete spatially similar three dimensional surveys. The TBM's consist of three 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 TBM's. Sites close in proximity may share TBM's so that every site may not have three unique control points, but every site has at least three points with which to register the survey. We began to establish a highway control point map that spatially ties all of the effectiveness monitoring sites into the Knight-Piesold highway survey. As of September 2005, we had completed the traverse of the highway in the subalpine zone. Coordinates for all sites are self contained within each survey job however, some of the sites have been adjusted to the Knight-Piesold survey coordinates while others still contain arbitrary coordinates. This does not affect the accuracy of any survey.

Data

Data loggers and digital cameras make it easy to collect large quantities of data in a relatively short amount of time. It is not the intent of this report to produce hardcopy reproductions of every piece of data or image collected to date. Instead, pertinent and/or interesting examples will be presented in the body of this report while all relevant figures, tables, and charts will be contained in an appendix. All the data is available on 2 DVD's so that interested parties might have access to it.

Data on the DVD's is organized in hierarchical directories by monitoring type (effective or validation), by site or feature type, and by photo or survey type. File types encountered in the survey data include MS Excel 2002, Trimble Geomatics Office (TGO) 1.63, AutoDesks AutoCad 2004, and text files. Precipitation data was collected with a HOBO data logger and converted to MS Excel 2002 files. The TGO software is based on MS Access 2000 with surveying applications built in so if you have MS Access (or MS Excel) you do not need TGO to be able to read the raw survey data files. All photos are formatted as .jpg files and can be read by most operating systems.

Photograph location is defined by the directory it is located in (e.g. 102CS_06292005 contains photos of cut slope ID number 102CS taken on June 29, 2005.). Please note that cross section photos in the validation monitoring section have a photo board in them identifying cross section and bank (e.g. AL on the photo board denotes Cross Section A, Left Bank; BR denotes Cross Section B, Right Bank; etc.).

Effectiveness Monitoring

The objective of effectiveness monitoring is to assess the effectiveness of the intervention techniques in meeting their intended purpose. By installing silt fences on cut and fill slopes, permanent cross sections on drainage ditches, conveyance channels, and road surfaces and establishing baseline surveys of sediment traps, we hope to document , over time, the direct effects of the various mitigation practices implemented to stabilize those features.

Precipitation Gauges

Three Onset tipping bucket rain gauges with HOBO event data loggers were installed at approximate elevations of 10,000, 11,500, and 13,000 feet a.s.l. to index precipitation over the elevational range of the highway. Each gauge was mounted on top of a pressure treated six foot 4”x 4” post buried two feet into the ground. Hose clamps and silicone caulk were used to secure the gauges to the post, plumb and level. Rain gauge 075RG was located just uphill from the Halfway Picnic point near mile marker ten which is at the upper end of Priority Basin 2, in the subalpine zone. Rain gauge 076RG was located near the Severy Creek trailhead at the transition between the subalpine and the alpine zones. Rain gauge 077RG was located near the Devil’s Playground well into the alpine. Table 1 contains the specific coordinates and precipitation totals for each gauge plus the totals for the NRCS Snotel site at Glenn Cove (data for Glen Cove site can be obtained from:

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

The Snotel site is spatially located between rain gauges 075RG and 076RG.

Table 1. Location, precipitation accumulation, and dates of operation for 3 rain gauges.

Gauge ID	Latitude (hddd°mm.mmm)	Longitude (hddd°mm.mmm)	Altitude (ft)	Total (in)	Dates of Operation - 2005
075RG	N38 53.797	W105 03.890	10,109	9.61	5/01 – 9/27
05L11s	N38.87583	W105.073667	11,460	21.60	5/01 – 9/30
076RG	N38 52.582	W105 03.970	11,810	18.78	5/01 – 9/27
077RG	N38 51.783	W105 03.999	13,069	15.54	5/01 – 9/27

The 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 storm event can be determined. These data can be found on the accompanying data DVD’s and have been converted to MS Excel format for ease of access.

Cut and Fill Slopes

Stability on cut and fill slopes, and erosion reduction, may be achieved by reestablishing natural vegetation or through the use of geo-synthetic erosion control netting to “armor” the slopes, or by installing various types of structures to keep storm drainage off the slopes entirely. The best monitoring approach is to determine the effectiveness of these practices in reducing cut and fill slope erosion and subsequent sediment transport. Silt fencing installed at the base of the cut or fill slope captures the sediment eroded from the slope. Comparing the rate of eroded material being trapped, over time, at the base of treated and untreated cut and fill slopes is the best measure of the effectiveness of the mitigation practice in reducing erosion.

In 2006, thirteen cut slope and 29 fill slope sites were monitored for stability using silt fences to capture eroding material as described by Nankervis (2004). In 2005, we began using graduated buckets to measure volume of material captured by the silt fences. This reduces field surveying time and eliminates the need for data reduction in the office as material is measured directly as it is excavated (Figure 1). An added benefit of this technique is that it can potentially increase sampling frequency as small amounts of material can be measured more efficiently with the bucket than with the survey method. Once again, for the most part, all the silt fences remained intact and functional and only required minimal maintenance or repair. Photographs of all sites are on the data DVD's.

Figure 1. Graduated buckets used to measure excavated material from silt fence sites.

Cut Slopes

A summary of the 2006 cut slope monitoring site survey dates and sediment accumulation is presented in Appendix B. No cut slope sites are located in the section of highway treated in 2006. Initial visits of the cut slope sites occurred from May through June where fences were excavated and repaired or replaced as needed. For the remainder of the field season, cut slope sites were visited on a weekly basis and excavated when sediment accumulated.

Fill Slopes

A summary of the 2006 fill slope monitoring site survey dates and sediment accumulation is presented in Appendix C. One fill slope site, 101FS, is located in the section of highway treated in 2006 and now has road pavement and a shot-crete ditch above it. Initial visits of the fill slope sites occurred from May through June where fences were excavated and repaired or replaced as needed. For the remainder of the field season, fill slope sites were visited on a weekly basis and excavated when sediment accumulated.

Highway Surface Stabilization

Initially, this phase of the monitoring plan was going to look at the effectiveness of several different kinds of treatments with respect to stabilizing the road surface. Since road stabilization has been narrowed down to one option (paving with asphalt) there was little need to implement a study design matrix containing one treatment. However, we did measure several sites in unpaved reaches of the road and stratified these reaches by slope; less than 10% and greater than 10% road slope. Table 2 lists the sites, Priority Basins and survey dates of all road cross section measured in 2006. Note that 154RX was surveyed after being prepared for paving, and was eventually paved in 2006, so this will be the last survey of this site. The amount of road base applied to the highway in 2006 has not been reported yet but Jack Glavan (Capital Improvements Manager Pikes Peak Highway for the City of Colorado Springs, personal communication) indicated that very little road base was applied to the highway sections not paved in 2006.

Table 2. Summary of road cross section monitoring sites measured in 2006.

Site ID	Basin	Slope Category	Slope	Survey Date
044RX	7	Class 1	0.0751	June 15
047RX	7	Class 2	0.1007	June 15
050RX	7	Class 2	0.1038	June 22
056RX	7	Class 2	0.1049	June 22
060RX*	7	Class 2	0.1006	June 14
062RX	7	Class 1	0.0971	June 14
072RX	7	Class 1	0.0966	June 28
154RX**	3	Class 2	0.1032	June 28
156RX	6	Class 2	0.1022	June 21
158RX	6	Class 1	0.0483	June 21
160RX	6	Class 1	0.0268	June 28

*Only road reach without a corresponding drainage ditch survey
**Surveyed post-paving preparation. This cross section was paved in 2006.

Five cross sections (labeled A-E) were resurveyed for each road reach. Like all other sites in this study, we used a resection to locate the survey instrument relative to the previously established permanent monuments to insure measuring the same cross section as in the prior survey. The same protocol is used to measure all cross sections, regardless of monitoring site, in this study. A tape stretched between end points guides the surveyor as they measure cross section topography moving left to right (facing down slope). Each road cross section was measured from the edge of the drainage ditch to the edge of the fill slope.

All cross sections surveyed with a total station in this monitoring study have a correction applied to the coordinates to align all points in the cross section to the left pin-right pin vector (i.e. cross section end points). Even though we use a tag line between the end points to guide the cross section survey, directly positioning the prism over the tape for each and every shot is impossible and so by correcting the northing and easting coordinates of each internal cross section shot to match the vector between the left and right end pins, we get a true measure of distance. This correction typically is very small but is necessary when comparing measurements over time. With the arbitrary end point elevations and vector corrections, graphs of all road cross sections were made. Appendix D contains graphs for each reach of the surveys done this year. Photographs and survey data for all sites are on the data DVD's.

Armoring Drainage Channels

The effectiveness monitoring for this phase focuses on measuring cross sections in roadside drainage ditches and conveyance channels to determine if the implemented mitigation practices reduce erosion and deposition in these features. The current mitigation treatments differ from what was initially planned. For example, instead of armoring drainage ditches, all reaches except those meeting the criteria stated in the latest Forest Service Design Review (Burke 2002) will be lined with shot-crete, which in Basins 2 and 3 is virtually the entire length of the road. We would expect little deposition and no erosion in ditches lined with shot-crete, so post-construction monitoring will be limited to ditches lined with erosion control fabric or ditches left untreated. Instead of relying solely on energy dissipating devices for erosion control in conveyance channels, where possible, completely removing the energy from the conveyance channels, as in Basin 2, is preferred.

Drainage Ditches

A summary of the 19 drainage ditch monitoring sites surveyed in 2006 are listed in Table 3. Sixteen of the sites were established in 2003 and 4 more sites in Basin 2 were established in 2004. Ten of the sites are associated with some treatment; the six ditches in Basins 1 and 2 are lined with erosion control blankets and are the only drainage ditches in these basins not lined with shot-crete. Three ditches in Basin 7 are adjacent to road surfaces paved with recycled asphalt but have no other treatment applied to the ditch. A fourth ditch, 092DD, was shot-creted as part of the 1.8 miles of highway improvement in 2005. For 107DD, the 2006 survey was done after the ditch was graded and prepped for shot-crete. This will be the last survey for 107DD. The ditches in Basin 7 will provide the longest measure of erosion as Basin 7 is currently the last basin scheduled for construction (USDA Forest Service 2000).

Similar to the road cross section surveys, there are five cross sections (labeled A-E) per drainage ditch monitoring site. The cross section end points are monumented on the cut slope side with rebar and on the road side with either a temporary or permanent marker.

Table 3. Summary of drainage ditch monitoring sites surveyed in 2006.

Site ID	Basin #	Year Treated	Treatment Type	Survey Date
005DD*	1	2001	Erosion Control Fabric	May 2
010DD*	1	2001	Erosion Control Fabric	June 13
042DD	7	N/A	N/A	June 15
046DD	7	N/A	N/A	June 15
051DD	7	N/A	N/A	June 22
057DD	7	N/A	N/A	June 22
061DD	7	N/A	N/A	June 14
071DD	7	N/A	N/A	June 28
080DD*	7	?	Recycled Asphalt	June 22
082DD*	7	?	Recycled Asphalt	June 21
085DD*	7	?	Recycled Asphalt	June 22
092DD	3	2005	Shot-crete	N/A
107DD**	3	2006	Shot-crete	June 28
155DD	6	N/A	N/A	June 21
157DD	6	N/A	N/A	June 21
159DD	6	N/A	N/A	June 28
182DD	2	2003	Erosion Control Fabric	June 13
188DD	2	2003	Erosion Control Fabric	June 15
195DD	2	2003	Erosion Control Fabric	June 13
205DD	2	2003	Erosion Control Fabric	June 15

*Drainage ditch sites not associated with road cross section surveys
**Surveyed after graded and prepped for shot-crete

The procedure for surveying and relocating these cross sections is the same as for the road cross section sites. Using a tape stretched across the cross section as a guide, we survey as many verticals as needed to define the shape of the ditch. The procedure for post processing drainage ditch cross section data is identical to the road cross section procedure. Appendix E contains graphs of each cross section. Photographs and survey data for all drainage ditch sites are on the data DVD's.

Conveyance Channels

There are 115 conveyance channels that have been identified and surveyed during the first 3 years of this monitoring effort. This year 30 of those conveyance channels have been resurveyed. These include conveyance channels below all rock weirs, seven channels that have been treated, and 6 channels that won't be treated until the last phases of the road construction. The idea behind surveying these treated and untreated channels this year is to continuously monitor a subsample of conveyance channels rather than trying to continuously survey all 115, which would be prohibitive. Table 4 has a summary of the conveyance channels surveyed in 2006 and identifies sites to be subsampled annually. Each channel had a series of three cross sections (labeled A-C) located within the 150 foot boundary of the highway corridor. Left and right cross section end points were monumented with rebar, providing a minimum of 6 fixed points by which to relocate future surveys. A tape stretched between the left and right end points was used as a tag line to guide the cross section survey and enough verticals were taken to describe the features of the channel. Post processing was similar to that of the drainage ditches where all points in the cross section were corrected to the left-right end point vector. Photographs and survey data for all conveyance channels surveyed in 2006 are on the data DVD's. Appendix F contains tabulations of all channel geometry calculations and graphs of each cross section.

Table 4. Summary of conveyance channel monitoring sites visited in 2006.

Site ID	Basin #	Year Treated	Sub-Sample	Treatment Type	Survey Date
016CC	2	2003	Treated	Culvert Plugged	August 9
021CC	2	2003	Treated	Shot Crete Ditch	August 9
030CC	2	2003	Treated	Fabric	July 13
031CC	2	2003		Fabric	July 13
035CC	2	N/A		N/A	August 10
037CC	3	N/A	Untreated	N/A	August 16
040CC	1	2001	Treated	Curb	August 9
058CC	7	N/A	Untreated	N/A	August 16
063CC	7	N/A	Untreated	N/A	August 16
070CC	7	N/A	Untreated	N/A	August 17
089CC	7	2005		Rock Weir	July 19
094CC	7	2005	Treated	Culvert Plugged	August 10
104CC	6	N/A	Untreated	N/A	August 24
127CC	6	N/A	Untreated	N/A	August 24
175CC	1	2003	Treated	Curb	August 10
184CC	2	2003		Rock Weir	May 31
211CC	2	2003	Treated	Shot Crete Ditch	August 9
216CC	1	2001		Curb, Rock Weir	July 19
217CC	1	2001		Curb, Rock Weir	July 19
220CC	1	2001		Rock Weir	July 6
221CC	1	2001		Rock Weir	June 28
222CC	1	2001		Rock Weir	June 28
223CC	1	2001		Rock Weir	July 6
224CC	2	2003	Treated	Rock Weir, Asphalt Ditch	July 12
225CC	2	2003		Rock Weir, Fabric	July 12
226CC	2	2003		Rock Weir, Curb	July 19
228CC	2	2003		Rock Weir	July 20
229CC	2	2003		Rock Weir	July 13
230CC	2	2003		Rock Weir	July 13
235CC	5	2005		Rock Weir	July 26

Individual conveyance channels contribute varying quantities of sediment down slope to the streams and reservoir below. Some of these channels likely have been in existence since the road was created and some have developed more recently. Some conveyance channel sites below rock weirs surveyed in 2006 are not "channels" yet but potentially could become channels in the future. Another site that is not a conveyance channel yet is 232CC, below the snotel site at Glen Cove. This potential channel parallels Glen Cove Creek and may be the result of a spring that has emerged, possibly from the diverted flow from Ski Creek. This site encompasses Glen Cove Creek and contains five cross sections instead of three and was not surveyed in 2006. It may be a worthwhile addition to the annual subsample group.

Sediment Ponds and Traps

In May and September of 2006, rock weirs in Basins 1, 2, and 3 were surveyed to determine their effectiveness in trapping sediment derived from winter snowmelt and summer rain events. The highway mitigation crew attempted to install two or three rock weirs in 2006 through the switchbacks (post paving) but the weirs washed away. No waypoints were created. A summary of survey location, dates and sediment volume accumulated in the associated silt fences is presented in Table 5. No weirs were cleaned out in 2006.

Volume of sediment captured by each structure can be determined by comparing two grid surveys of each basin and calculating fill volume differences from the DTM's. Winter accumulation is determined by comparing the May survey volume to the September volume and the summer contribution is determined by comparing the September and May surveys. To determine weir effectiveness in trapping sediment, we installed silt fences below the rock weirs to capture any material that might pass over, under, or through the structure. These fences were surveyed in the same manner as the cut and fill slope silt fences and the results are reported in Table 5 with silt fence survey dates in Appendix G.

Table 5. Summary of sediment trap monitoring sites and associated silt fences in 2006.

Site ID	Basin #	Year Built	Survey Date 2006	Silt Fence Sediment Volume (ft^3)/Date	Silt Fence Sediment Volume (ft^3)/Date
002RW	1	2001	May 26 , Sep 14		
003RW	1	2001	May 10 , Sep 01		
006RW	1	2001	May 02 , Sep 11		
008RW	1	2001	May 06 , Sep 05		
009RA	1	2001	May 06 , Sep 03		
152RW	2	2003	May 10 , Sep 13	2.1/May 08	0.4/Jun 19
153RW	2	2003	May 30 , Sep 14		
161RW	2	2003	May 24 , Sep 13		
162RW	2	2003	May 10 , Sep 06	0.3/May 18	0.5/Sep 20
176RW	2	2003	May 24 , Sep 05	0.9/May 08	
178RW	2	2003	May 24 , Sep 19	0.7/May 08	
179RW	2	2003	May 24 , Sep 11		
180RW	2	2003	May 11 , Sep 06		
181RW*	2	2003	May 11	0.4/May 16	
200RW	2	2003	May 04 , Sep 03	0.1/May 19	
201RW	2	2003	May 23 , Sep 13		
202RW	2	2003	May 24 , Sep 11	0.5/May 08	
233RW*	3	2005	May 26		
234RW*	3	2005	May 31		
236RW*	3	2005	May 31		
237RW*	3	2005	May 31		

*No September survey due to snow cover.

This was the third year the large sediment pond in Basin 2 (199RW) was in operation and the second year for a smaller sediment pond established in Basin 3 just below the Ski Creek diversion wall (237RW). Unlike the rock weirs which drain relatively small sections of road, these ponds collect storm drainage from extended lengths of highway using a network of shot-crete drainage ditches and culverts. The large pond diverts storm runoff from Crystal Creek (North Fork) into the Ski Creek basin. Water entering199RW, is filtered through a gravel-encased perforated standpipe, and discharged through a culvert downstream. The monitoring effort for the pond includes 5 cross sections to estimate volumetric changes in sediment accumulation, suspended sediment samples taken above the pond where the shot-crete conveyance channel ends and at the outlet (pipe) during storm runoff to measure effectiveness in capturing sediment, and 3 cross sections in the channel below the pond outlet (184CC) to measure changes in channel dimension.

Road runoff enters and exits the smaller pond (237RW) via shot-creted drainage ditches that drain from Severy and Ski Creek drainages into Glen Cove Creek. The pond actually is part of Ski Creek just below the diversion wall built in 2004 and water can also be introduced into the pond if it overtops the diversion. A stand pipe at the base of the pond can spill excess water under the highway and into Ski Creek (Figure 2). The monitoring effort for the pond includes 3 cross sections to estimate volumetric changes in sediment accumulation. Graphs of sediment ponds are in Appendix G.

Figure 2. Sediment pond 237RW below Ski Creek diversion wall.

To measure the sediment capturing effectiveness of 199RW, we took 1 suspended sediment grab sample on July 20, 2006. Laboratory results are pending and will be provided in the next report. Photographs and survey data of all sites are contained on the data DVD's.

Validation Monitoring

The objective of validation monitoring is to document the effect road mitigation practices have on the aquatic, wetland, and riparian communities that are within the influence of the Pike's Peak Highway. By monitoring features in both reference (non-highway influenced) and impaired streams, relative (converging or diverging) changes observed in these features over time between the 2 groups would be attributed to the road mitigation practices. The nine streams identified as either impacted or non-impacted by the presence and maintenance of the Pikes Peak Highway by ERO Resources Corporation (1999) are: North Catamount, South Catamount, Oil, and Boehmer Creeks as reference or non-impacted streams; and Ski, Severy, East Fork of Beaver, North Fork of Crystal, and West Fork of Beaver Creek as stream systems impacted by the highway. In 2005, two new 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" reaches on South Catamount Creek. The diversion on Ski Creek will increase the water yield and likely the peaks of both Glen Cove and South Catamount creeks so we established monitoring sites just above the confluence on each of the streams and named them GLEN1 and SCAT3, respectively.

Stream Channel Surveys

Time and budgetary constraints require that we be circumspect with our field season to make the most of our limited time. While it's probably not necessary to survey every stream every year, it is reasonable to survey at least one control and one impacted stream each year. This year we selected Severy Creek as our highway impacted stream and North Catamount Creek as our control. We also chose to survey North Fork Crystal Creek because of the work the Rocky Mountain Field Institute was doing in the conveyance channels above both stream reaches. The same equipment and methodology described by Nankervis (2004) was employed for 2006 surveys.

Cross Sections

Five cross sections per reach were established to document changes in active channel geometry. Cross section end points were monumented with rebar capped with yellow plastic to provide ten permanent reference locations per reach to maintain continuity in monitoring over the course of the study. A tape was stretched between the two cross section endpoints to act as a tagline to align the survey. Post processing stream cross section data is identical to the procedures used for all other types of cross sections surveyed in this study. Graphs of each cross section are presented in Appendix H. Consistently monitoring channel dimensions at the same location provides an excellent measure of both lateral and vertical channel adjustment within each reach. Photographs of left and right bank and upstream and downstream views at each cross section, with photograph ID board, are contained on the data DVD as is all the survey data.

Particle Size Distribution

Pebble Counts

Pebble counts (300 particles) in each reach were done to characterize the bed material of the active channel using the Bevenger and King Pebble Count Procedure (Bevenger and King, 1995). A tabulation of the 15th, 35th, 50th, 84th, and 95th percentile and graphs of the distributions are presented in Appendix I. Comparing the particle size distributions from successive pebble count surveys, to document trends in the percent fines between control and impacted sites, will be useful in defining one aspect of the in-channel impact of the reduction in sediment supply or discharge.

Grab Samples

Grab samples were taken from bars at NCRY1, NCRY2, and SVRY2. No bar sample was taken at SVRY1 because there are no depositional features, and none were taken at North Catamount Creek because stream flow was high from snowmelt. Laboratory analysis is still pending on the three samples taken so the results will be presented in the next report.

Vegetation

Vegetation photo points were established at the top of the left and right banks at each cross section to document changes in species composition and percent cover over time. Vegetation was grouped into general categories of moss, grass, sedge, forb, or shrub to document presence, and percent cover estimated for the top of bank area 1.5 feet on either side of the cross section. A tape stretched between the cross section end pins was used to determine the distance from the left bank pin for the top of bank as well as the camera position. A pocket rod was used to indicate the three foot transect of interest at the top of bank (12-inch metal ruler used as reference on Severy Creek photos) and an ID board was used to indicate cross section and bank ID (AL = Cross Section A, Left Bank; DR = Cross Section D, Right Bank) for the photograph. All photographs were taken with an Olympus Stylus 400 digital camera and our field procedures generally follow those outlined in the Photo Point Monitoring Handbook (Hall 2002). A tabulation of the data recorded and photographs taken at each site is presented in Appendix J. Photographs taken of the same site, from the same location, should provide good documentation of trends in specie composition and percent cover over time. Please note that stream surveys are typically performed in mid to late summer and the riparian vegetation composition reflects that. In 2006, North Fork Crystal Creek was surveyed at the beginning of May so much of the herbaceous vegetation that could be present in the summer may not have been up at the time of this survey.

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Appendix A

Site Locations for
Effectiveness and Validation Monitoring

2006

Site Locations for Effectiveness and Validation Monitoring 2006

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
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

Site Locations for Effectiveness and Validation Monitoring 2006

Site ID	Latitude (hddd°mm.mmm)	Longitude (hddd°mm.mmm)	Altitude (ft)	Feature Description
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
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

Site Locations for Effectiveness and Validation Monitoring 2006

Site ID	Latitude (hddd°mm.mmm)	Longitude (hddd°mm.mmm)	Altitude (ft)	Feature Description
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
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

Site Locations for Effectiveness and Validation Monitoring 2006

Site ID	Latitude (hddd°mm.mmm)	Longitude (hddd°mm.mmm)	Altitude (ft)	Feature Description
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
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

Site Locations for Effectiveness and Validation Monitoring 2006

Site ID	Latitude (hddd°mm.mmm)	Longitude (hddd°mm.mmm)	Altitude (ft)	Feature Description
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	Rock Weir
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
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

Site Locations for Effectiveness and Validation Monitoring 2006

Site ID	Latitude (hddd°mm.mmm)	Longitude (hddd°mm.mmm)	Altitude (ft)	Feature Description
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

* North Fork Crystal Creek 2 (NCRY2) is located 200 ft upstream from NCRY1

Appendix B

Cut Slope
Survey Dates and Sediment Accumulation

2006

Survey Dates of Cut Slope Silt Fences 2006

Site ID	Cut Slope Site Visit Dates 2006										
011CS	5/8/2006	5/18/2006	5/23/2006	6/19/2006	7/5/2006	7/12/2006	7/17/2006	7/27/2006	8/2/2006	8/17/2006	8/27/2006	9/20/2006
045CS	6/1/2006	7/5/2006	7/17/2006	7/26/2006	8/2/2006	8/17/2006	8/27/2006	9/7/2006	9/20/2006			
049CS	6/6/2006	7/5/2006	7/17/2006	7/26/2006	8/2/2006	8/17/2006	8/27/2006	9/7/2006				
059CS	6/7/2006	7/5/2006	7/17/2006	7/26/2006	8/2/2006	8/17/2006						
078CS	6/7/2006	7/5/2006	7/17/2006	7/26/2006	8/2/2006	8/17/2006						
087CS	6/7/2006	7/6/2006	7/26/2006	8/2/2006								
090CS	6/1/2006	7/6/2006	7/26/2006	8/2/2006	8/15/2006							
102CS	6/8/2006	8/2/2006										
123CS	6/8/2006	8/2/2006	8/23/2006									
141CS	6/10/2006	6/21/2006	8/2/2006	8/23/2006								
185CS	5/16/2006	7/5/2006	7/12/2006	7/17/2006	7/27/2006	8/2/2006	8/17/2006	8/27/2006	9/7/2006	9/20/2006		
192CS	5/30/2006	6/26/2006	7/5/2006	7/12/2006	7/17/2006	8/2/2006	8/27/2006	9/7/2006	9/20/2006			
197CS	5/8/2006	5/21/2006	6/26/2006	7/5/2006	7/17/2006	7/27/2006	8/2/2006	8/17/2006	8/27/2006	9/7/2006	9/20/2006	

Sediment Accumulation in Cut Slope Silt Fences 2006

Site ID	Location	Date	Volume (ft^3)	Grab Sample
011CS	Lower Fence	050806	0.9	No
045CS	Lower Fence	060106	1.1	No
045CS	Upper Fence	060106	0.1	No
049CS	Lower Fence	060606	0.1	No
049CS	Lower Fence	072606	0.5	No
059CS	Lower Fence	060706	1.3	No
078CS	Lower Fence	060706	0.7	No
087CS	Lower Fence	060706	1.2	No
123CS	Lower Fence	060806	2.2	No
141CS	Lower Fence	061006	1.1	No
141CS	Lower Fence	082306	0.9	No
141CS	Upper Fence	061006	0.3	No
185CS	Upper Fence	051606	1.5	No
192CS	Lower Fence	092006	0.9	No
192CS	Lower Fence	072707	1.1	No
192CS	Lower Fence	053006	1.1	No
197CS	Lower Fence	050806	0.5	No
197CS	Lower Fence	092006	0.8	No
197CS	Upper Fence	050806	0.2	No

Appendix C

Fill Slope
Survey Dates and Sediment Accumulations

2006

Survey Dates of Fill Slope Silt Fences 2006

Site ID	Fill Slope Site Visit Dates 2006									
001FS	5/19/2006	7/5/2006	7/12/2006	7/17/2006	7/27/2006	8/2/2006	8/17/2006	8/27/2006	9/20/2006		
007FS	5/2/2006	5/21/2006	6/19/2006	7/5/2006	7/12/2006	7/17/2006	7/27/2006	8/2/2006	8/17/2006	8/27/2006	9/20/2006
039FS	5/18/2006	7/5/2006	7/12/2006	7/17/2006	7/27/2006	8/2/2006	8/17/2006	8/27/2006	9/20/2006		
043FS	6/1/2006	7/5/2006	7/17/2006	7/26/2006	8/2/2006	8/17/2006	8/27/2006	9/7/2006	9/20/2006		
048FS	6/6/2006	7/5/2006	7/17/2006	7/26/2006	8/2/2006	8/17/2006	8/27/2006	9/7/2006	9/20/2006		
052FS	6/6/2006	7/5/2006	7/17/2006	7/26/2006	8/2/2006	8/17/2006	8/27/2006	9/7/2006			
055FS	6/6/2006	7/5/2006	7/17/2006	7/26/2006	8/2/2006	8/17/2006	8/27/2006	9/7/2006			
074FS	6/7/2006	7/5/2006	7/17/2006	7/26/2006	8/2/2006	8/24/2006					
079FS	6/7/2006	7/6/2006	7/17/2006	7/26/2006	8/2/2006						
083FS	6/7/2006	7/6/2006	7/17/2006	7/26/2006	8/2/2006						
086FS	6/7/2006	7/6/2006	7/17/2006	7/26/2006	8/2/2006						
088FS	6/1/2006	7/6/2006	7/26/2006	8/2/2006	8/15/2006						
093FS	6/7/2006	7/6/2006	7/26/2006	8/2/2006	8/15/2006						
098FS	6/7/2006	7/6/2006	8/2/2006	8/15/2006							
101FS	7/26/2006	8/2/2006	8/15/2006								
103FS	8/2/2006										
105FS	6/10/2006	8/2/2006									
124FS	6/8/2006	6/10/2006	8/2/2006								
128FS	8/2/2006										
177FS	5/14/2006	5/19/2006	6/19/2006	7/5/2006	7/12/2006	7/17/2006	7/27/2006	8/2/2006	8/17/2006	8/27/2006	9/20/2006
183FS	5/30/2006	7/5/2006	7/12/2006	7/17/2006	7/27/2006	8/2/2006	8/17/2006	8/27/2006	9/20/2006		
186FS	7/5/2006	7/17/2006	7/27/2006	8/2/2006	8/17/2006	8/27/2006	9/7/2006	9/20/2006			
187FS	6/26/2006	7/5/2006	7/17/2006	8/2/2006	8/17/2006	9/20/2006					
193FS	6/26/2006	7/5/2006	7/12/2006	7/17/2006	7/27/2006	8/2/2006	8/17/2006	8/27/2006	9/20/2006		
194FS	5/8/2006	7/5/2006	7/12/2006	7/17/2006	7/27/2006	8/2/2006	8/17/2006	8/27/2006	9/20/2006		
196FS	5/23/2006	6/19/2006	7/27/2006	8/2/2006	8/17/2006	8/27/2006	9/20/2006				
198FS	6/26/2006	7/5/2006	7/17/2006	7/27/2006	8/2/2006	8/17/2006	8/27/2006	9/7/2006	9/20/2006		
203FS	5/24/2006	7/5/2006	7/12/2006	7/17/2006	7/27/2006	8/2/2006	8/17/2006	8/27/2006	9/20/2006		
204FS	6/26/2006	7/5/2006	7/17/2006	7/27/2006	8/2/2006	8/17/2006	8/27/2006	9/7/2006	9/20/2006		

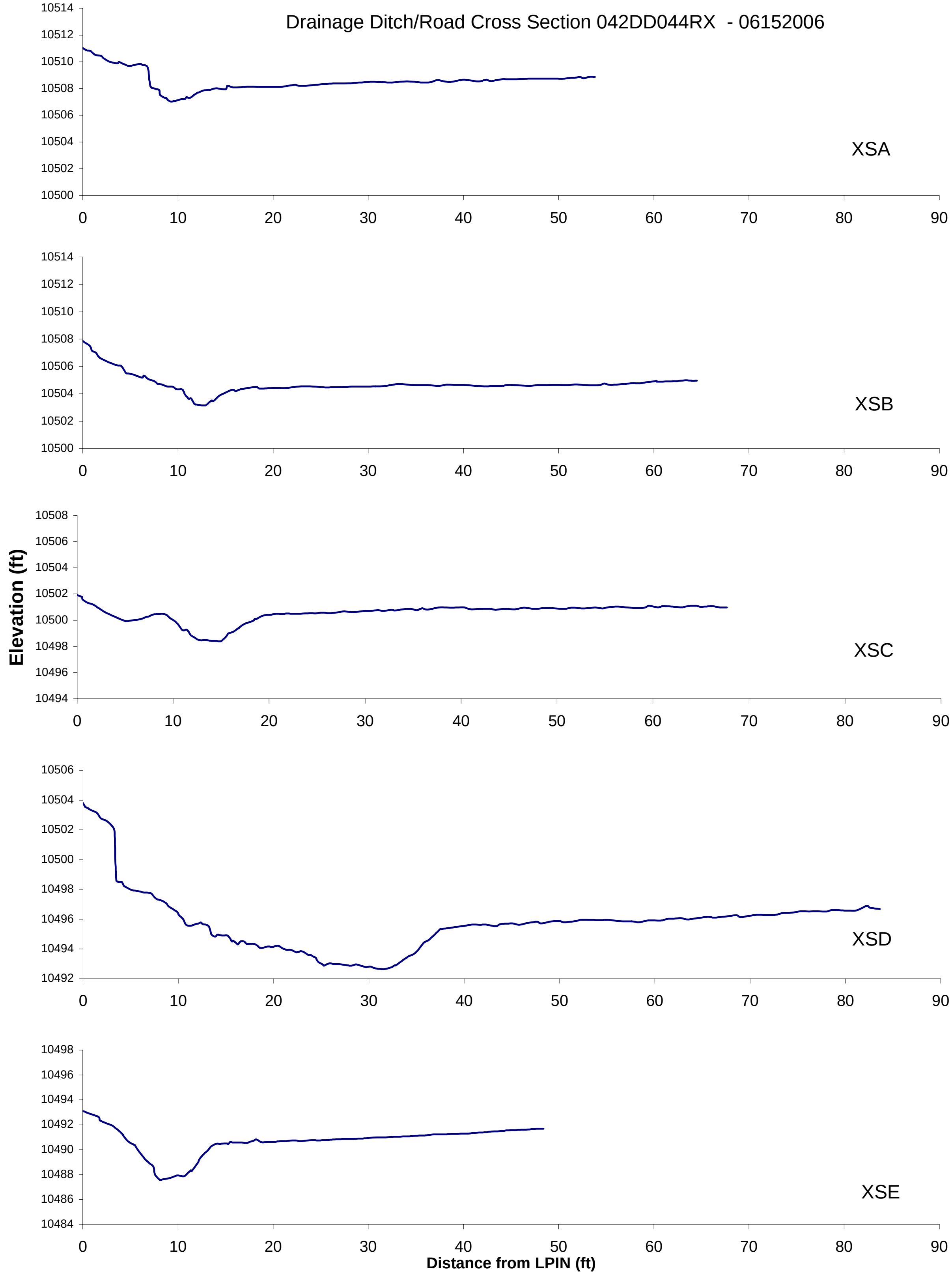
Sediment Accumulation in Fill Slope Silt Fences 2006

Site ID	Location	Date	Volume (ft^3)	Grab Sample
001FS	Upper Fence	051906	1.3	No
001FS	Upper Fence	070506	1.5	No
001FS	Upper Fence	082706	1.4	No
001FS	Upper Fence	092006	0.6	No
007FS	Upper Fence 1	050206	0.8	No
007FS	Upper Fence 2	050206	0.5	No
039FS	Lower Fence 1	051806	0.5	No
039FS	Lower Fence 2	051806	0.8	No
039FS	Upper Fence 1	051806	1.4	No
043FS	Upper Fence	060106	3.2	No
043FS	Upper Fence	072606	3.2	No
048FS	Upper Fence	060606	6.5	No
048FS	Upper Fence	072606	4.0	No
048FS	Upper Fence	082706	0.8	No
052FS	Upper Fence	060606	2.2	No
052FS	Upper Fence	070506	1.1	No
052FS	Upper Fence	072606	1.5	No
052FS	Upper Fence	081706	0.8	No
055FS	Upper Fence	060606	5.9	No
055FS	Upper Fence	072606	6.7	No
055FS	Upper Fence	081706	1.1	No
074FS	Upper Fence	060706	2.0	No
074FS	Upper Fence	082406	3.8	No
079FS	Upper Fence	060706	1.3	No
079FS	Upper Fence	072606	1.9	No
083FS	Upper Fence	060706	1.1	No
083FS	Upper Fence	072606	2.7	No
086FS	Upper Fence	060706	2.2	No
086FS	Upper Fence	072606	1.1	No
088FS	Upper Fence	070606	2.2	No
088FS	Upper Fence	072606	2.8	No
088FS	Upper Fence	081506	11.8	No
089FS	Upper Fence	060106	3.0	No
093FS	Upper Fence	060706	1.0	No
093FS	Upper Fence	070606	1.1	No
093FS	Upper Fence	081506	8.6	No
098FS	Upper Fence	060706	6.3	No
105FS	Upper Fence	061006	3.2	No
177FS	Upper Fence	051406	0.7	No
186FS	Upper Fence	070506	1.4	No
193FS	Upper Fence	052306	1.8	No
194FS	Upper Fence	050806	0.1	No
196FS	Upper Fence	052306	0.8	No
198FS	Upper Fence	070506	0.7	No
203FS	Upper Fence	052406	0.8	No

Appendix D

Road Cross Section Graphs

2006


Drainage Ditch/Road Cross Section 042DD044RX - 06152006
XSA
XSB
XSC
XSD
XSE
Elevation (ft)
Distance from LPIN (ft)
10514
10512
10510
10508
10506
10504
10502
10500
10498
10496
10494
10492
10490
10488
10486
10484
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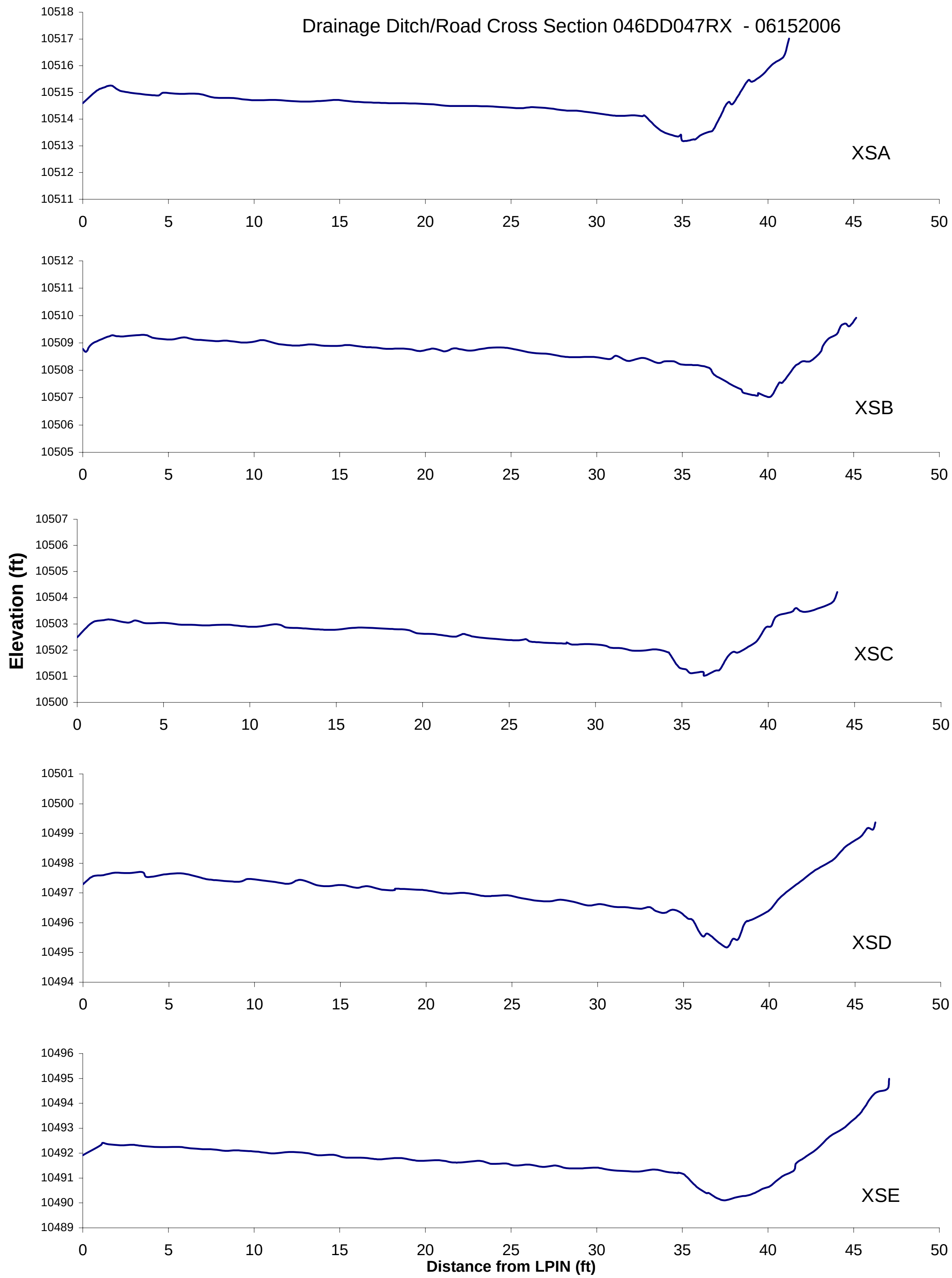
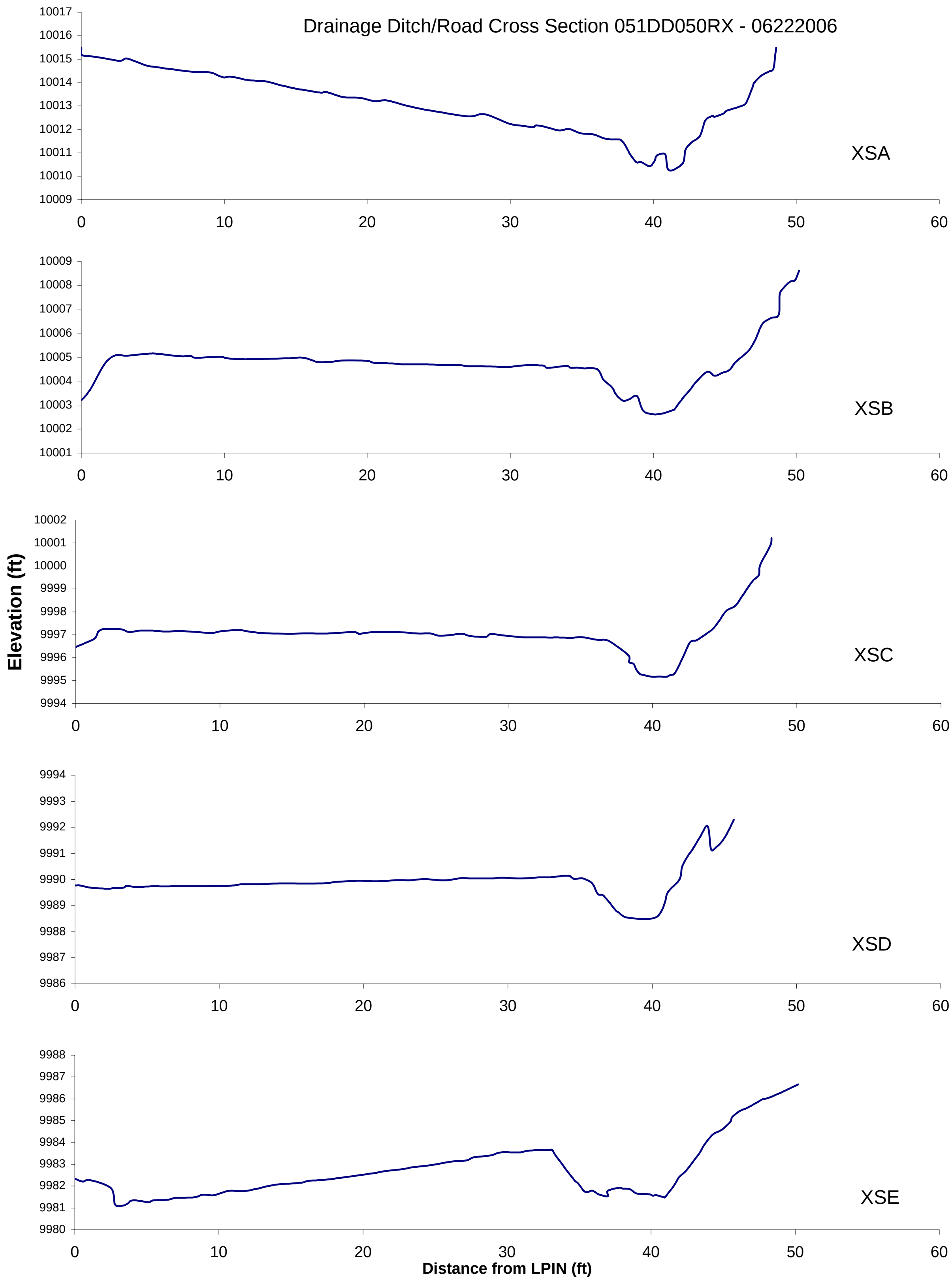
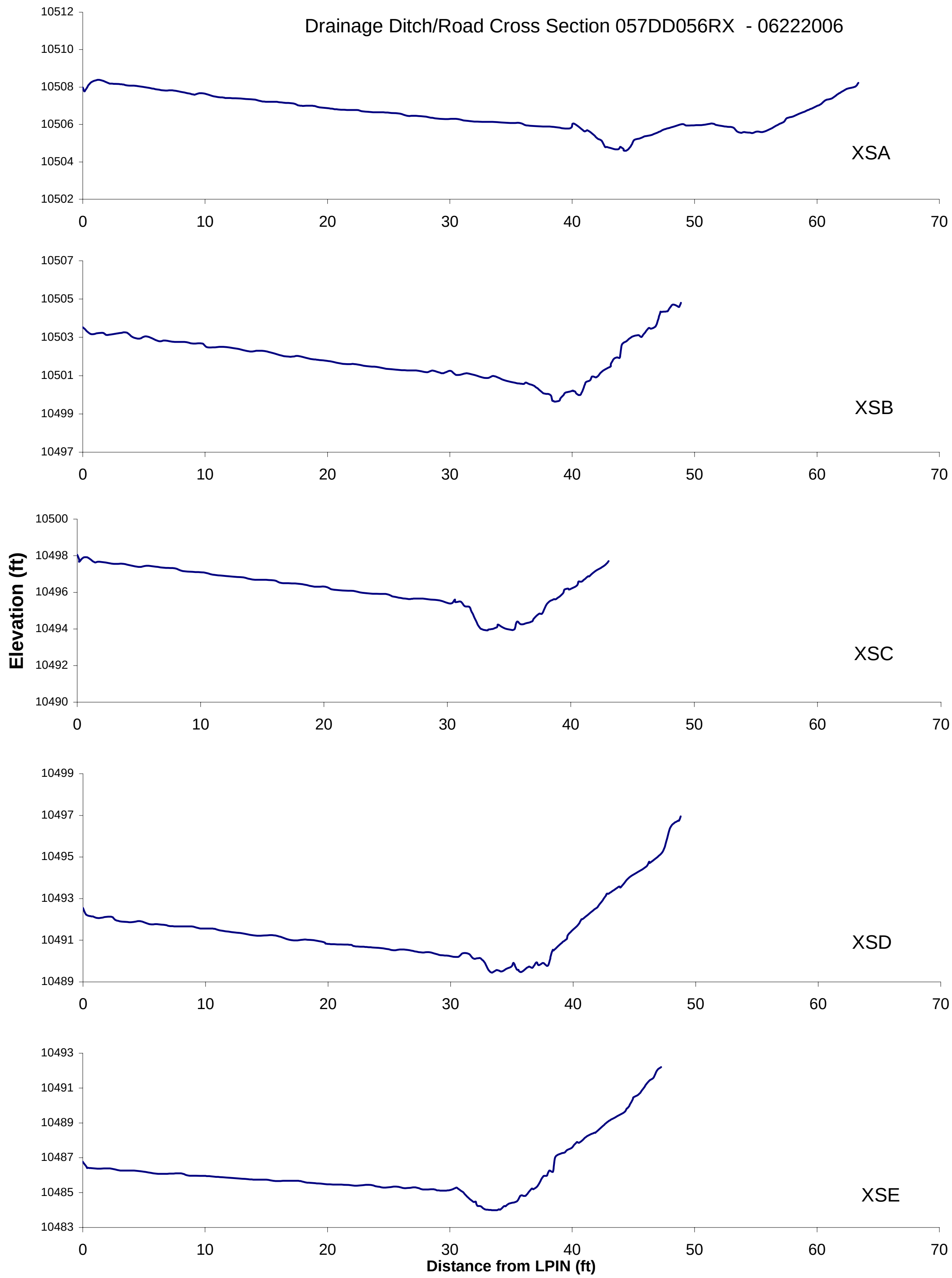
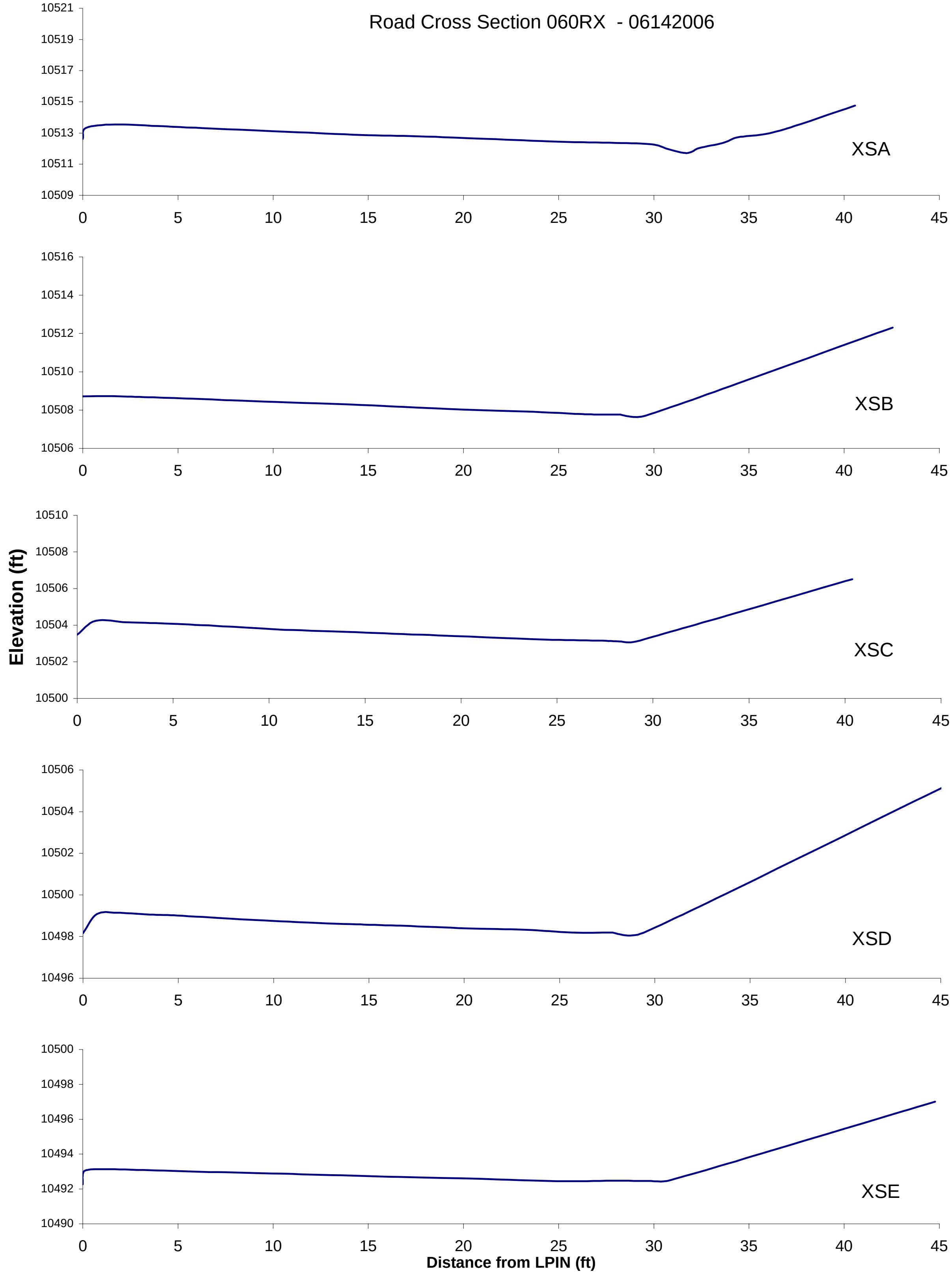
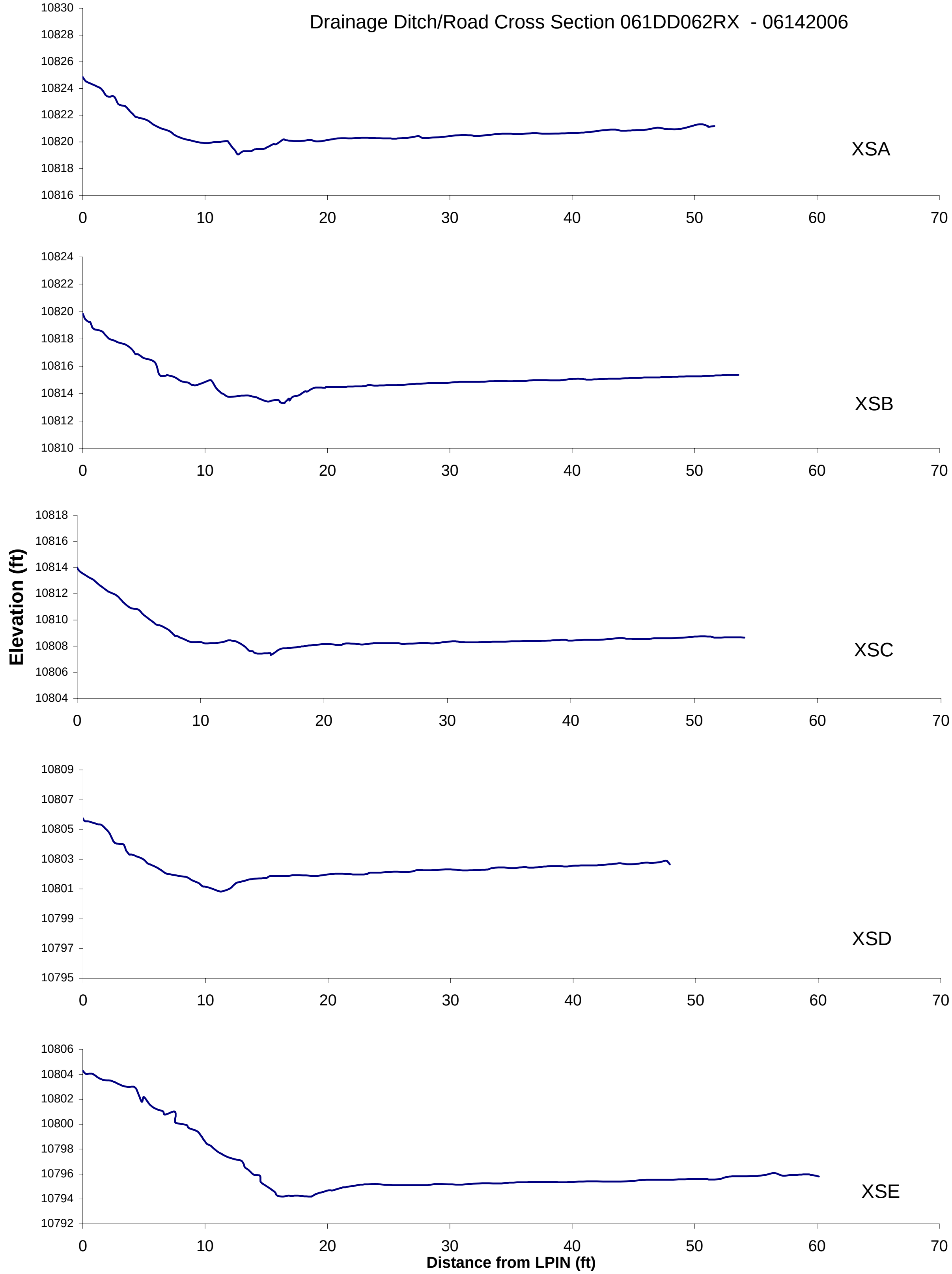
50
60
70
80
90

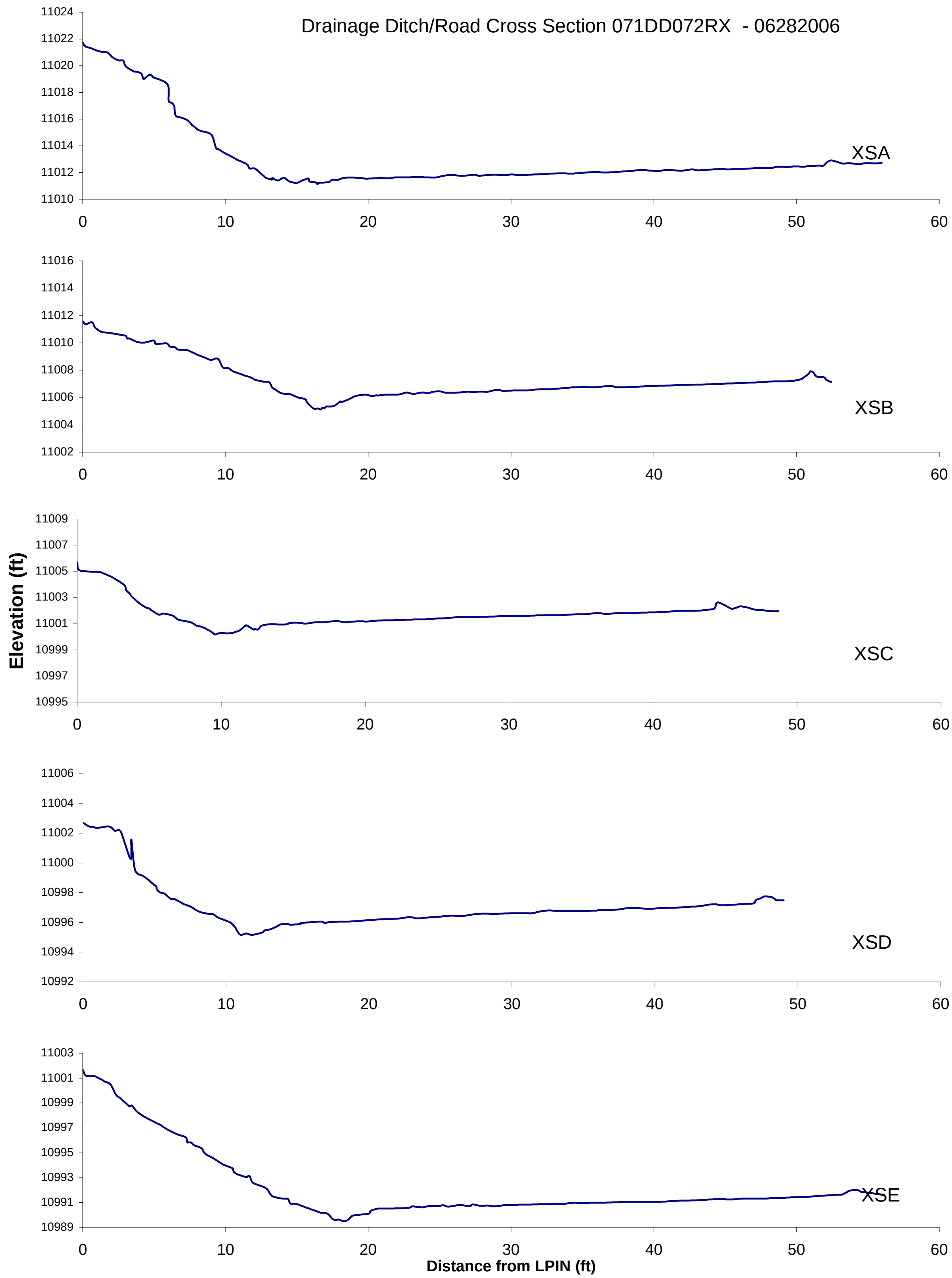

Drainage Ditch/Road Cross Section 046DD047RX - 06152006
XSA
XSB
XSC
XSD
XSE
Elevation (ft)
Distance from LPIN (ft)

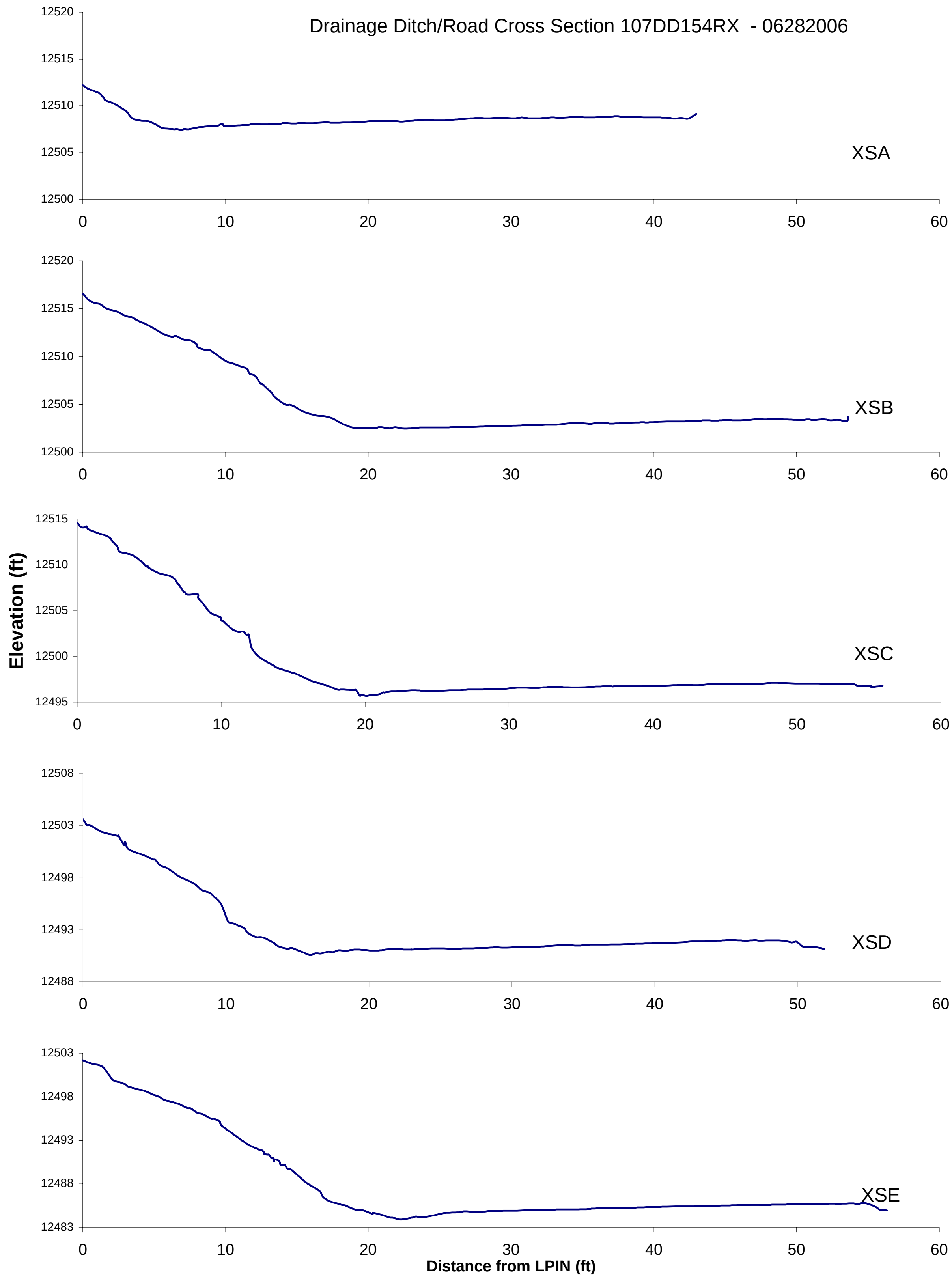

Drainage Ditch/Road Cross Section 051DD050RX - 06222006
Elevation (ft)
Distance from LPIN (ft)
XSA
10009 10010 10011 10012 10013 10014 10015 10016 10017
XSB
10001 10002 10003 10004 10005 10006 10007 10008 10009
XSC
9994 9995 9996 9997 9998 9999 10000 10001 10002
XSD
9986 9987 9988 9989 9990 9991 9992 9993 9994
XSE
9980 9981 9982 9983 9984 9985 9986 9987 9988
0 10 20 30 40 50 60


Drainage Ditch/Road Cross Section 057DD056RX - 06222006
Elevation (ft)
Distance from LPIN (ft)
XSA
XSB
XSC
XSD
XSE
10512
10510
10508
10506
10504
10502
10507
10505
10503
10501
10499
10497
10500
10498
10496
10494
10492
10490
10499
10497
10495
10493
10491
10489
10493
10491
10489
10487
10485
10483
0
10
20
30
40
50
60
70

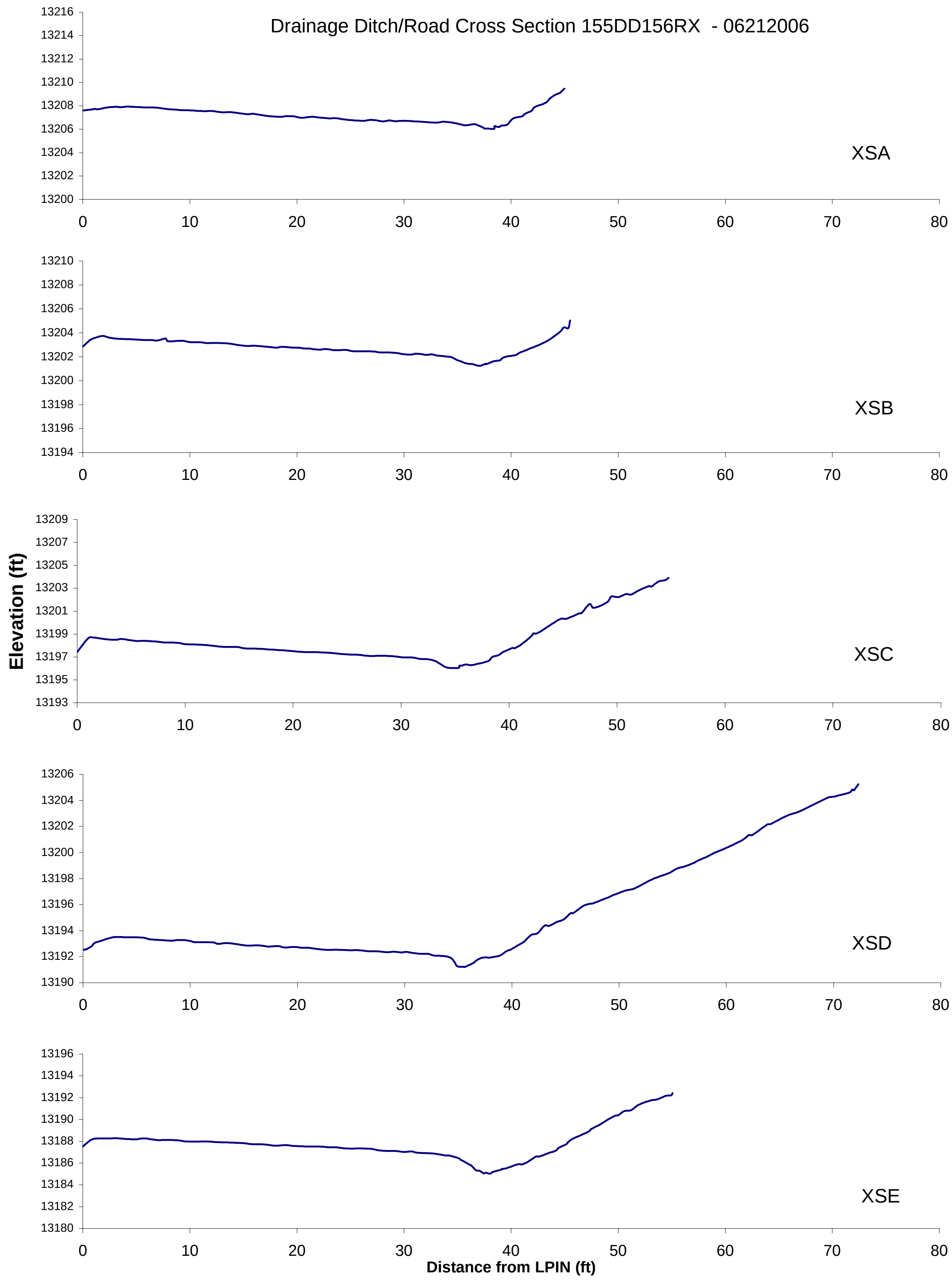

Road Cross Section 060RX - 06142006
XSA
XSB
XSC
XSD
XSE
Elevation (ft)
Distance from LPIN (ft)

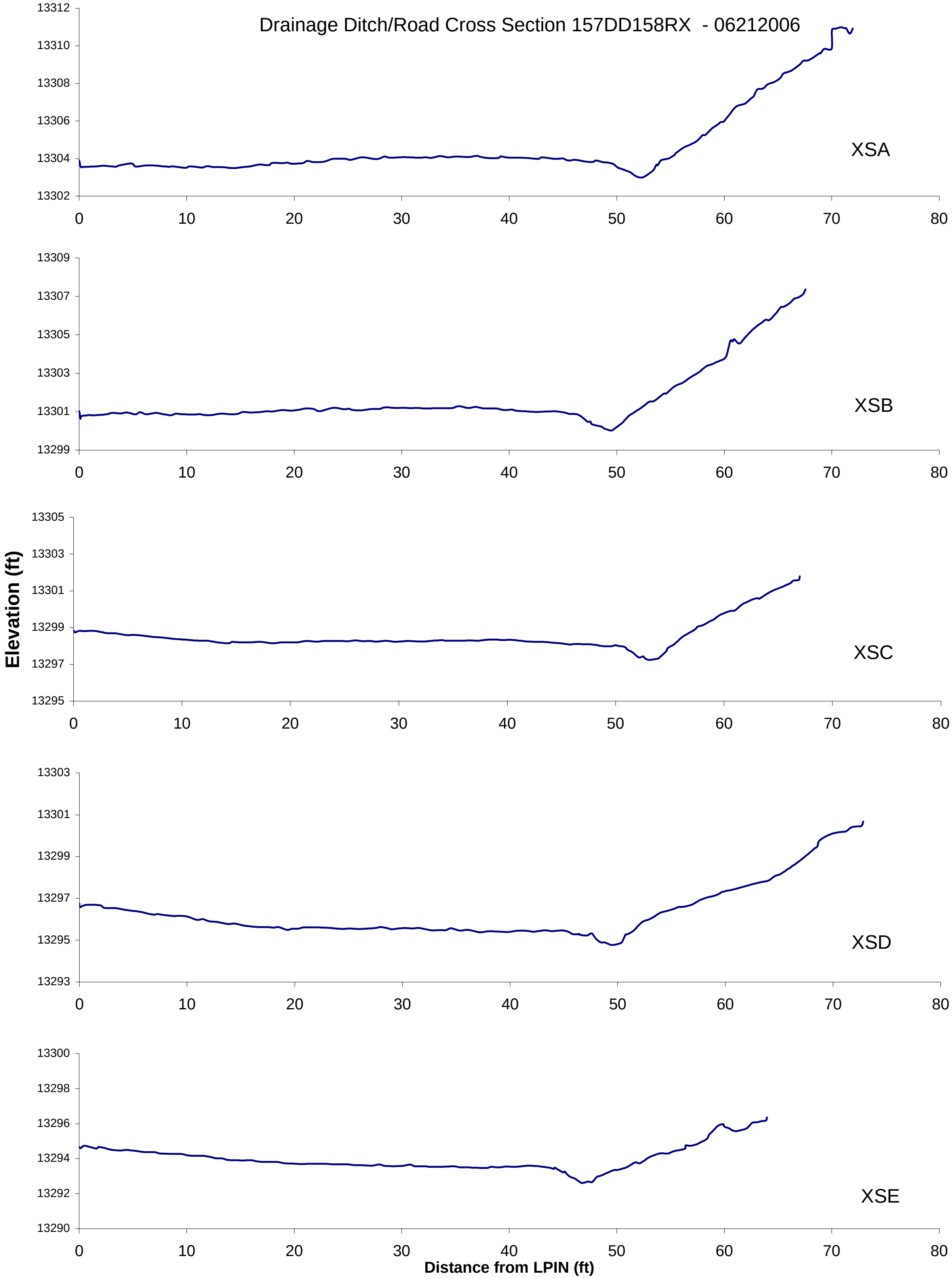

Drainage Ditch/Road Cross Section 061DD062RX - 06142006
Elevation (ft)
Distance from LPIN (ft)
XSA
XSB
XSC
XSD
XSE
10830
10828
10826
10824
10822
10820
10818
10816
10814
10812
10810
10808
10806
10804
10809
10807
10805
10803
10801
10799
10797
10795
10802
10800
10798
10796
10794
10792
0
10
20
30
40
50
60
70

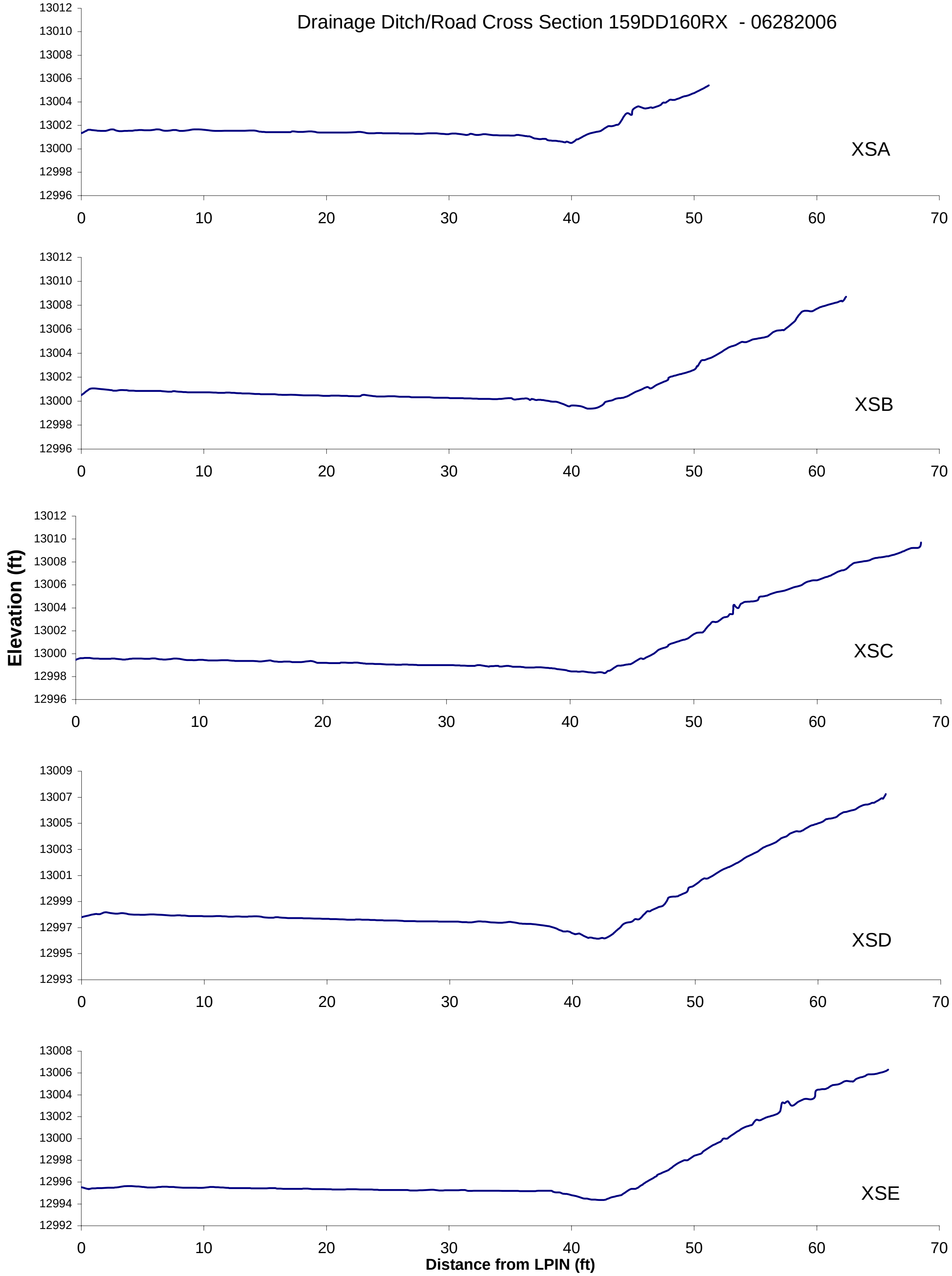

Drainage Ditch/Road Cross Section 071DD072RX - 06282006
Elevation (ft)
XSA
XSB
XSC
XSD
XSE
Distance from LPIN (ft)



Drainage Ditch/Road Cross Section 107DD154RX - 06282006
XSA
XSB
XSC
XSD
XSE
Elevation (ft)
Distance from LPIN (ft)
12520
12515
12510
12505
12500
12495
12508
12503
12498
12493
12488
12483
0
10
20
30
40
50
60


Drainage Ditch/Road Cross Section 155DD156RX - 06212006
XSA
XSB
XSC
XSD
XSE
Elevation (ft)
Distance from LPIN (ft)

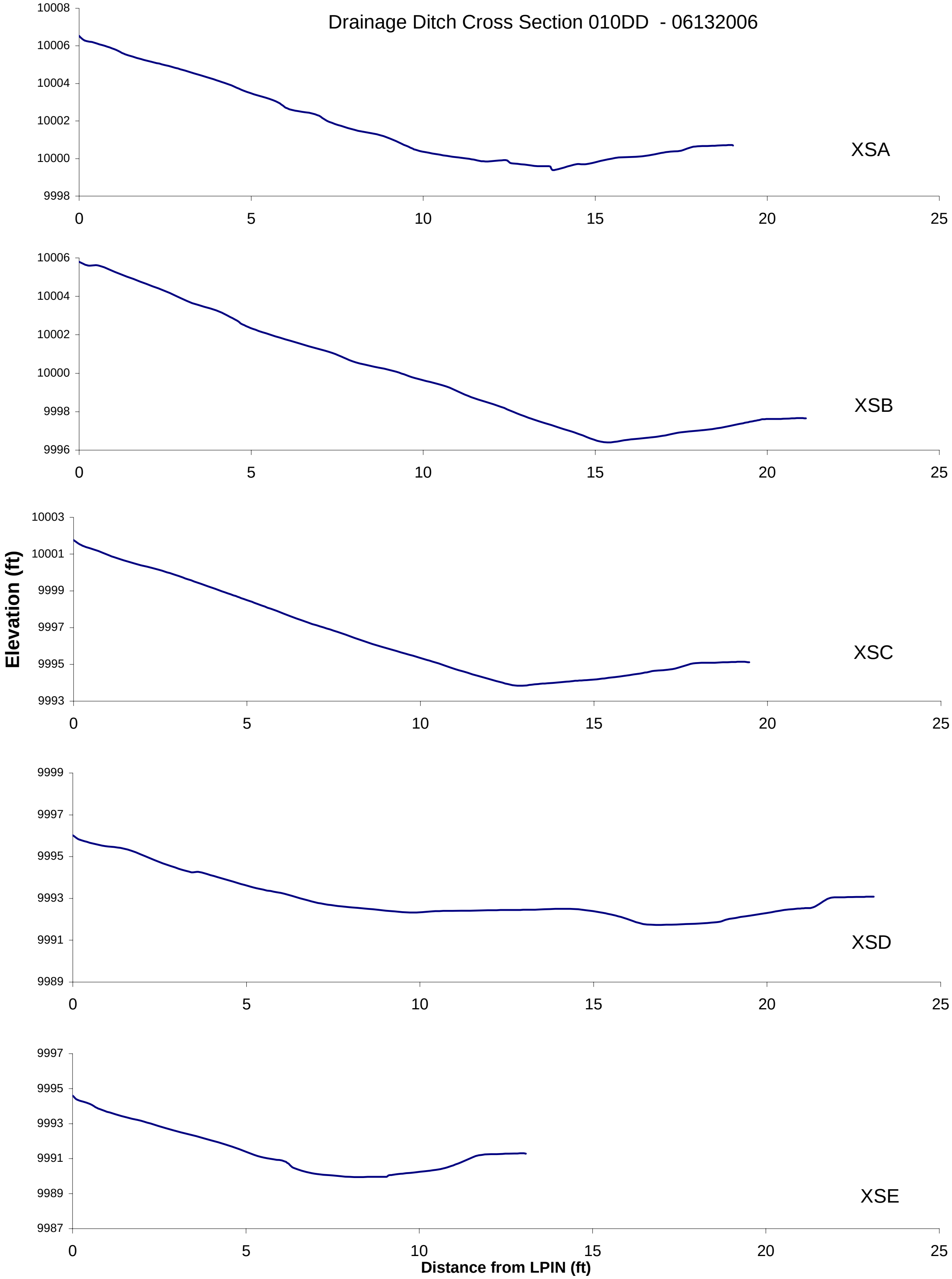

Drainage Ditch/Road Cross Section 157DD158RX - 06212006
13312
13310
13308
13306
13304
13302
0 10 20 30 40 50 60 70 80
XSA
13309
13307
13305
13303
13301
13299
0 10 20 30 40 50 60 70 80
XSB
Elevation (ft)
13305
13303
13301
13299
13297
13295
0 10 20 30 40 50 60 70 80
XSC
13303
13301
13299
13297
13295
13293
0 10 20 30 40 50 60 70 80
XSD
13300
13298
13296
13294
13292
13290
0 10 20 30 40 50 60 70 80
XSE
Distance from LPIN (ft)

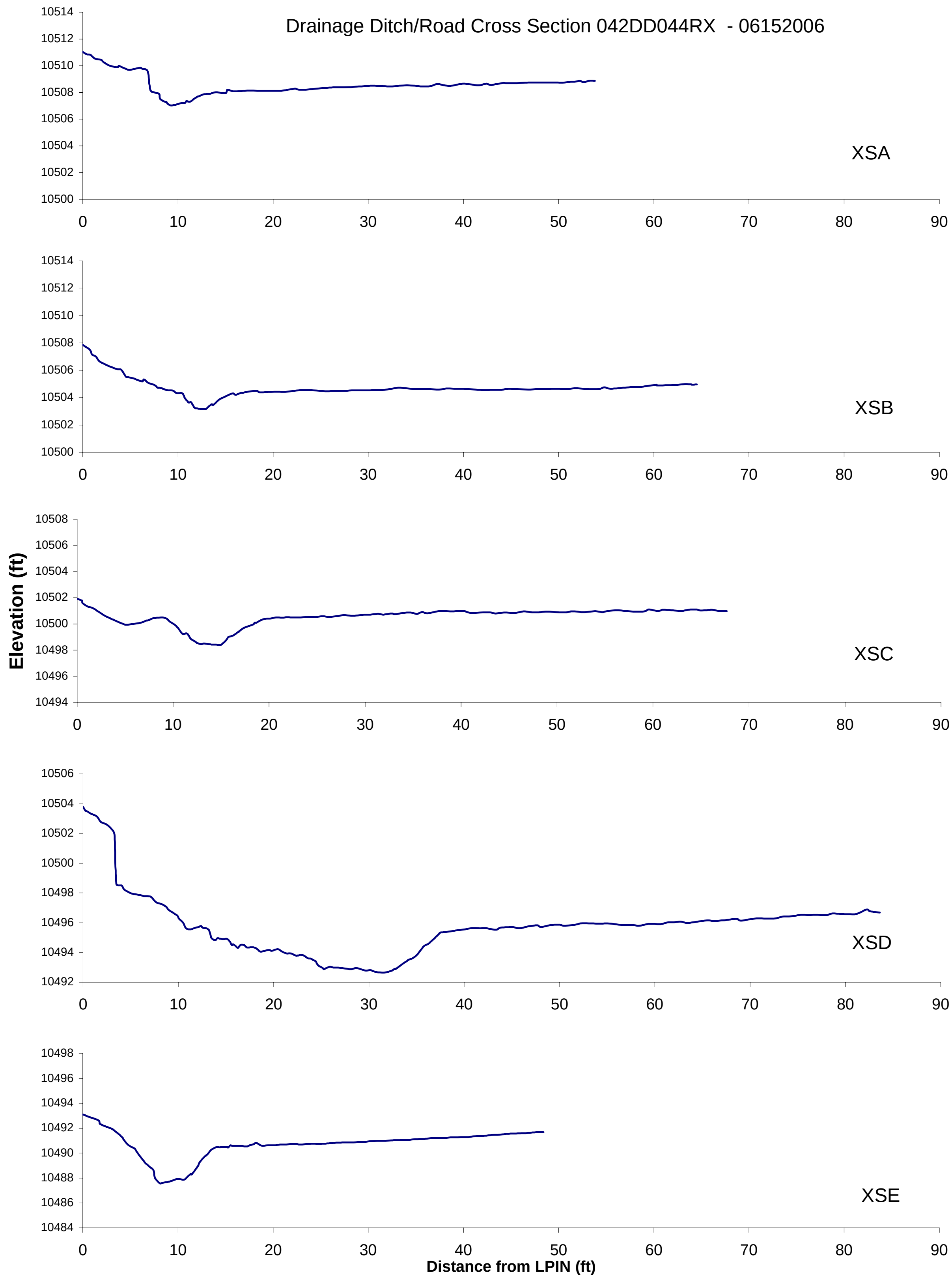

Drainage Ditch/Road Cross Section 159DD160RX - 06282006
XSA
XSB
XSC
XSD
XSE
Elevation (ft)
Distance from LPIN (ft)
13012
13010
13008
13006
13004
13002
13000
12998
12996
13009
13007
13005
13003
13001
12999
12997
12995
12993
12994
12992
0
10
20
30
40
50
60
70

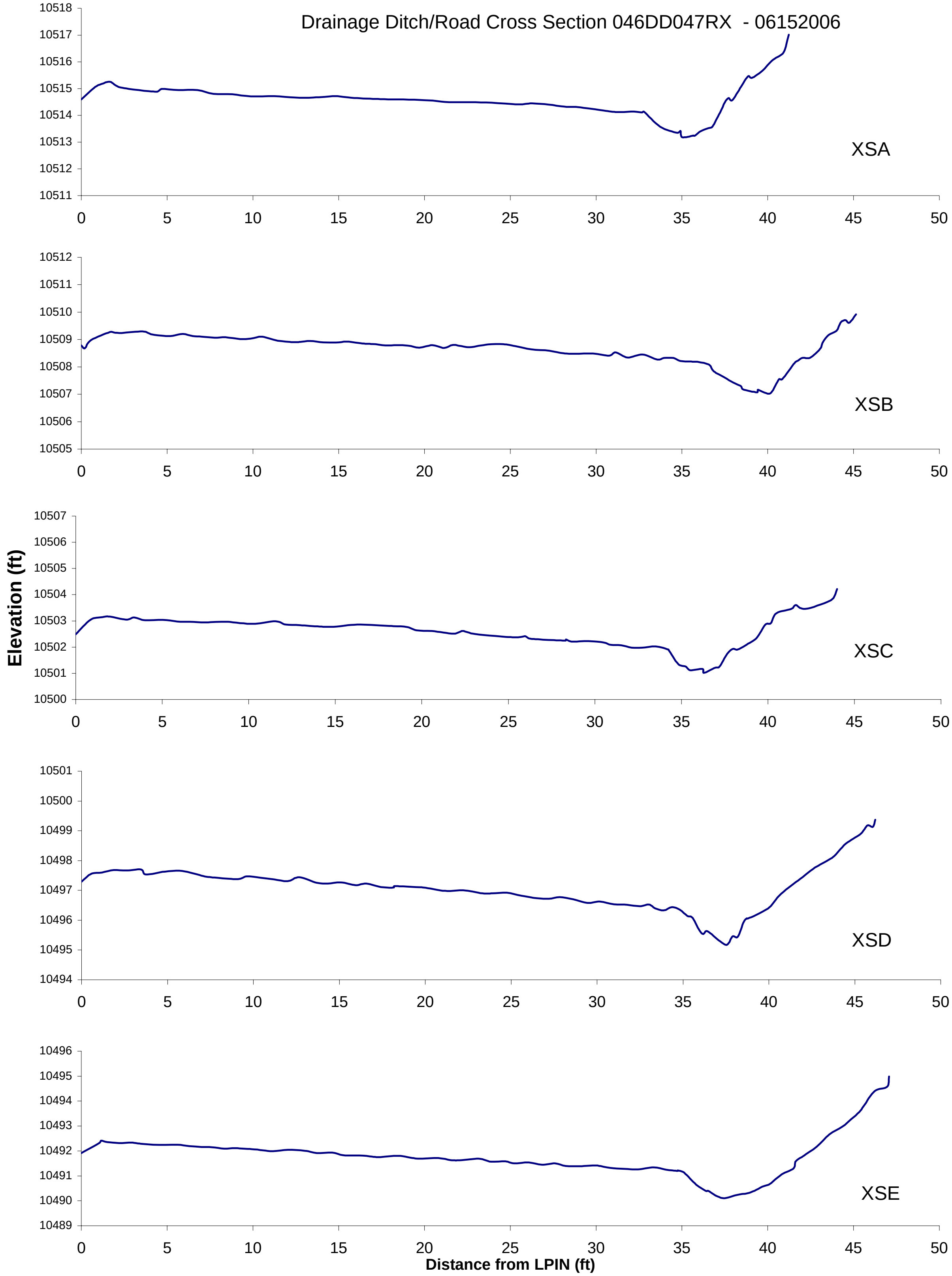
Appendix E

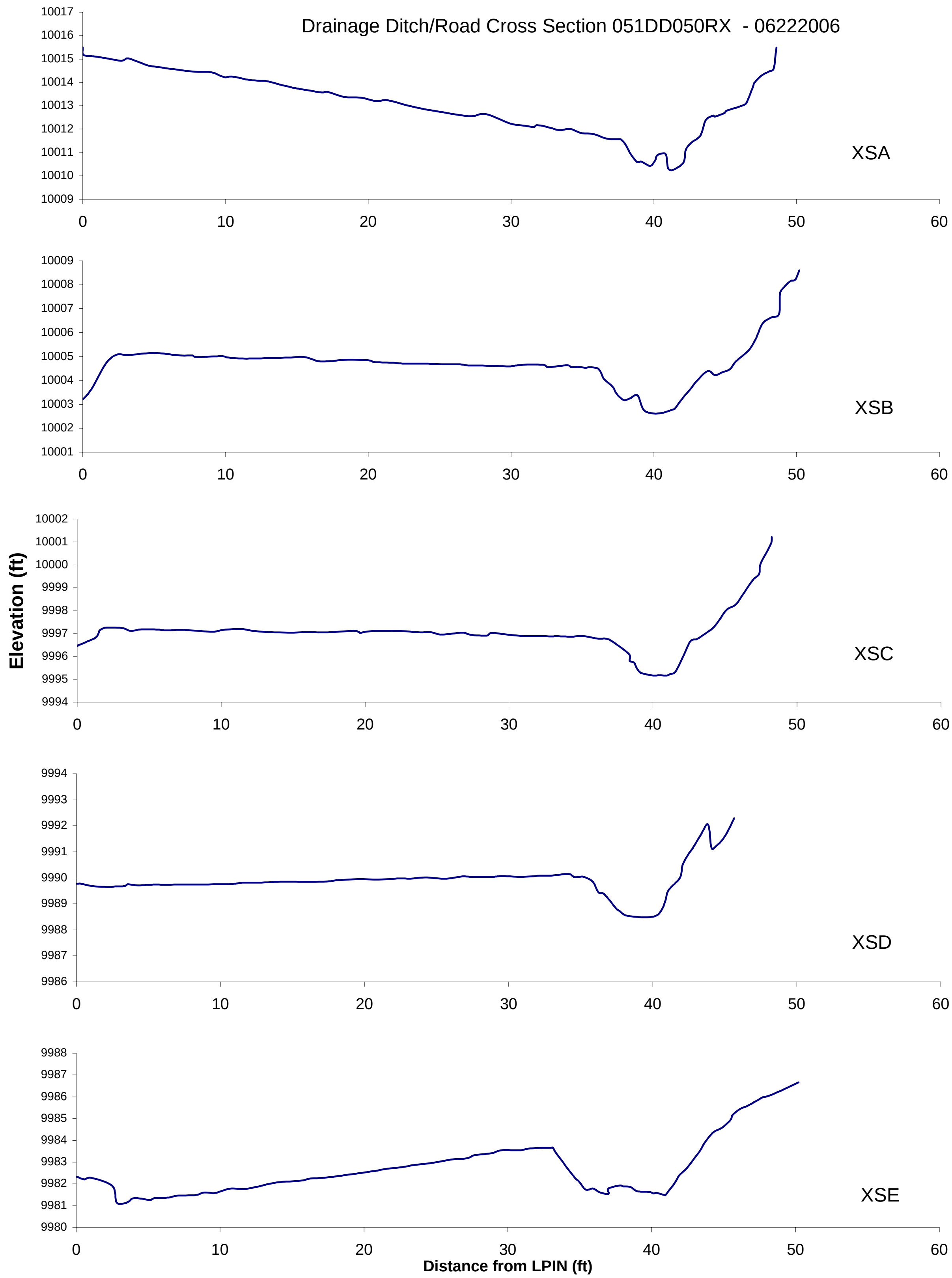
Drainage Ditch
Graphs

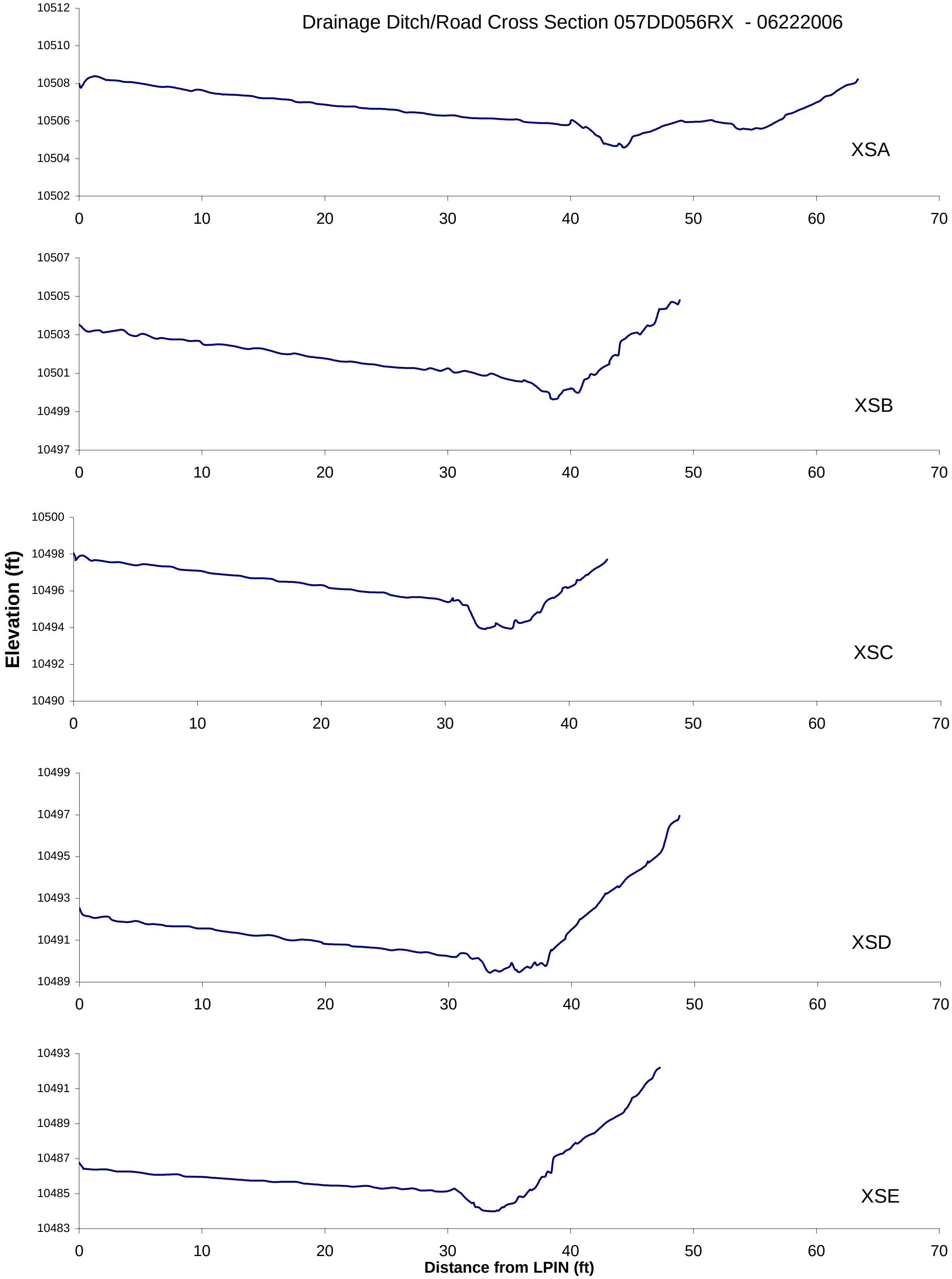
2006


Drainage Ditch Cross Section 010DD - 06132006
10008
10006
10004
10002
10000
9998
0 5 10 15 20 25
XSA
10006
10004
10002
10000
9998
9996
0 5 10 15 20 25
XSB
10003
10001
9999
9997
9995
9993
0 5 10 15 20 25
XSC
Elevation (ft)
9999
9997
9995
9993
9991
9989
0 5 10 15 20 25
XSD
9997
9995
9993
9991
9989
9987
0 5 10 15 20 25
XSE
Distance from LPIN (ft)


Drainage Ditch/Road Cross Section 042DD044RX - 06152006
XSA
XSB
XSC
XSD
XSE
Elevation (ft)
Distance from LPIN (ft)
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


Drainage Ditch/Road Cross Section 046DD047RX - 06152006
XSA
XSB
XSC
XSD
XSE
Elevation (ft)
Distance from LPIN (ft)


Drainage Ditch/Road Cross Section 051DD050RX - 06222006
Elevation (ft)
Distance from LPIN (ft)
XSA
XSB
XSC
XSD
XSE
10017
10016
10015
10014
10013
10012
10011
10010
10009
10008
10007
10006
10005
10004
10003
10002
10001
10000
9999
9998
9997
9996
9995
9994
9993
9992
9991
9990
9989
9988
9987
9986
9985
9984
9983
9982
9981
9980
0
10
20
30
40
50
60



Drainage Ditch/Road Cross Section 057DD056RX - 06222006
XSA
XSB
XSC
XSD
XSE
Elevation (ft)
Distance from LPIN (ft)
10512
10510
10508
10506
10504
10502
10507
10505
10503
10501
10499
10497
10500
10498
10496
10494
10492
10490
10499
10497
10495
10493
10491
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10493
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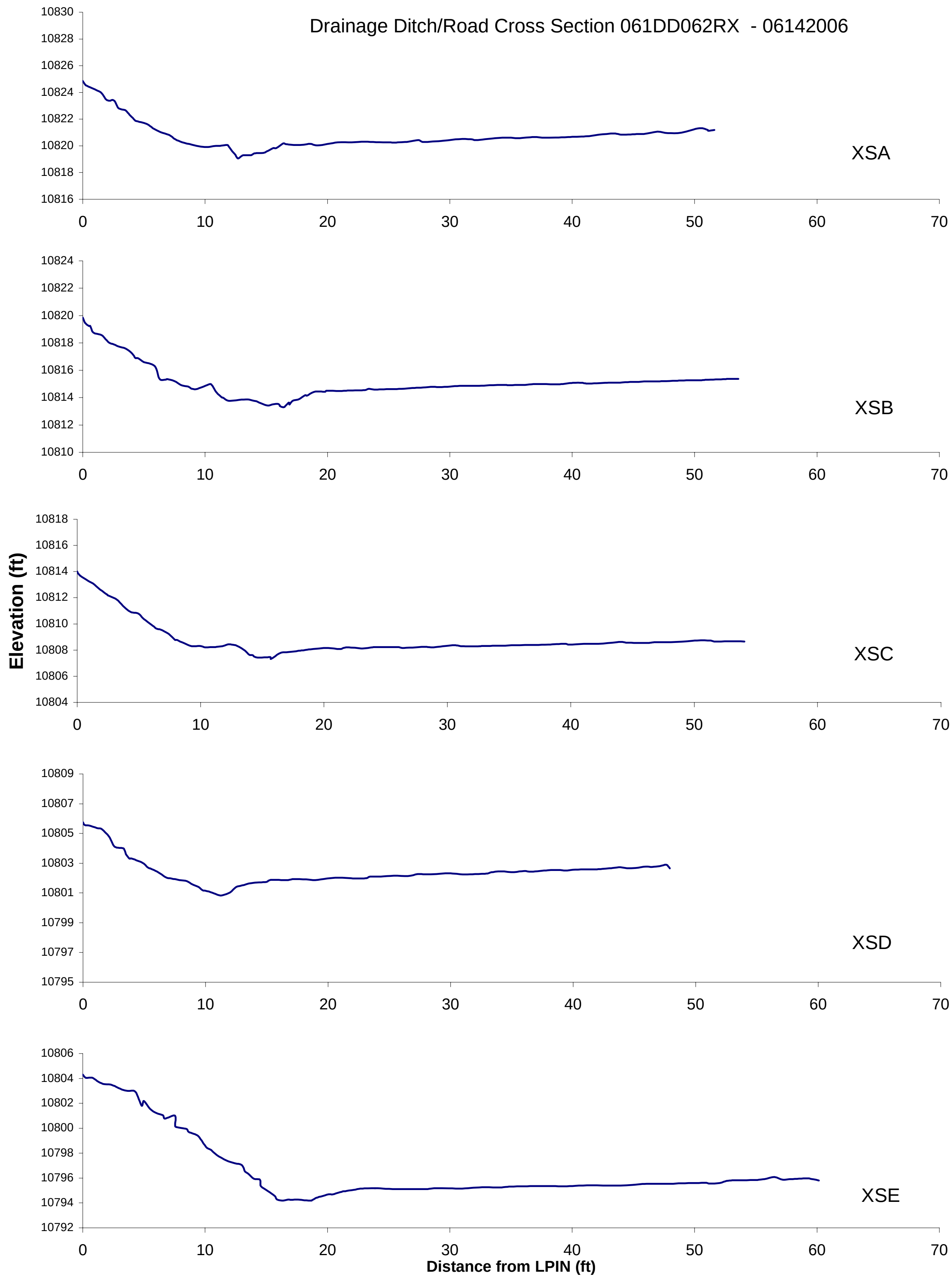
10489
10487
10485
10483
0
10
20
30
40
50
60
70


Drainage Ditch/Road Cross Section 061DD062RX - 06142006
Elevation (ft)
XSA
XSB
XSC
XSD
XSE
Distance from LPIN (ft)
10830
10828
10826
10824
10822
10820
10818
10816
10814
10812
10810
10808
10806
10804
10809
10807
10805
10803
10801
10799
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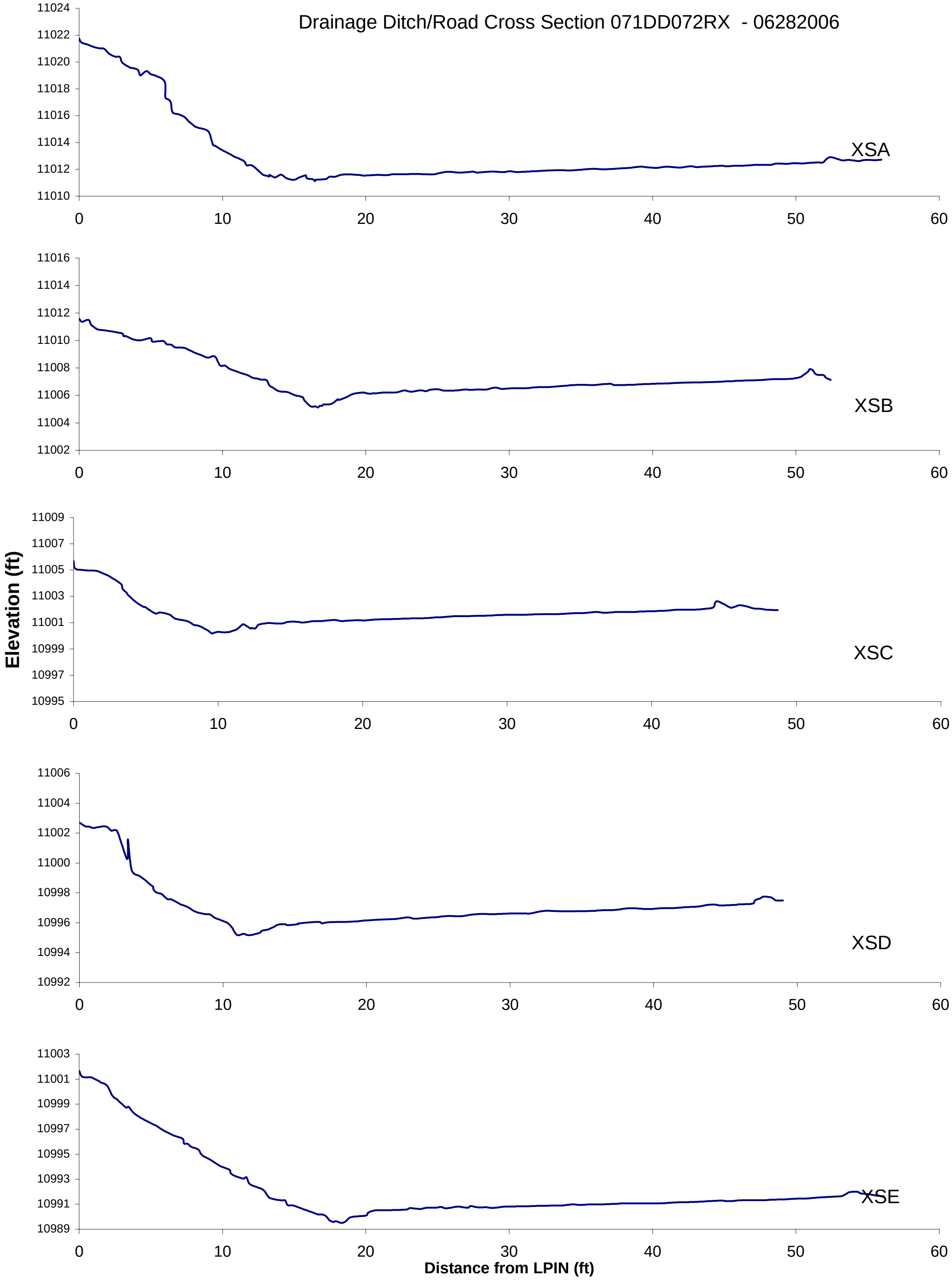
10794
10792
0
10
20
30
40
50
60
70



Drainage Ditch/Road Cross Section 071DD072RX - 06282006
Elevation (ft)
Distance from LPIN (ft)
XSA
XSB
XSC
XSD
XSE
11024
11022
11020
11018
11016
11014
11012
11010
11008
11006
11004
11002
11009
11007
11005
11003
11001
10999
10997
10995
11006
11004
11002
11000
10998
10996
10994
10992
11003
11001
10999
10997
10995
10993
10991
10989
0
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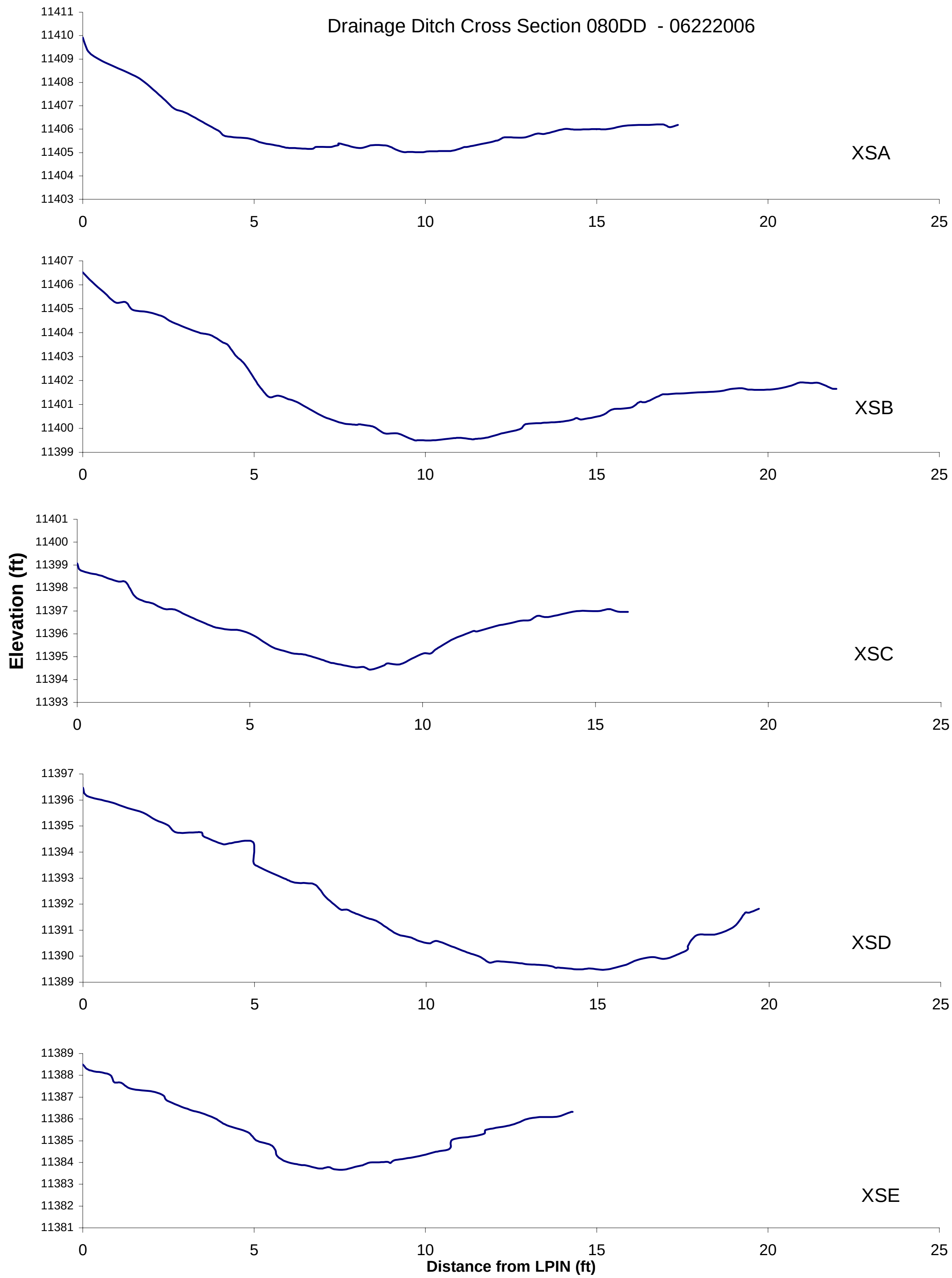
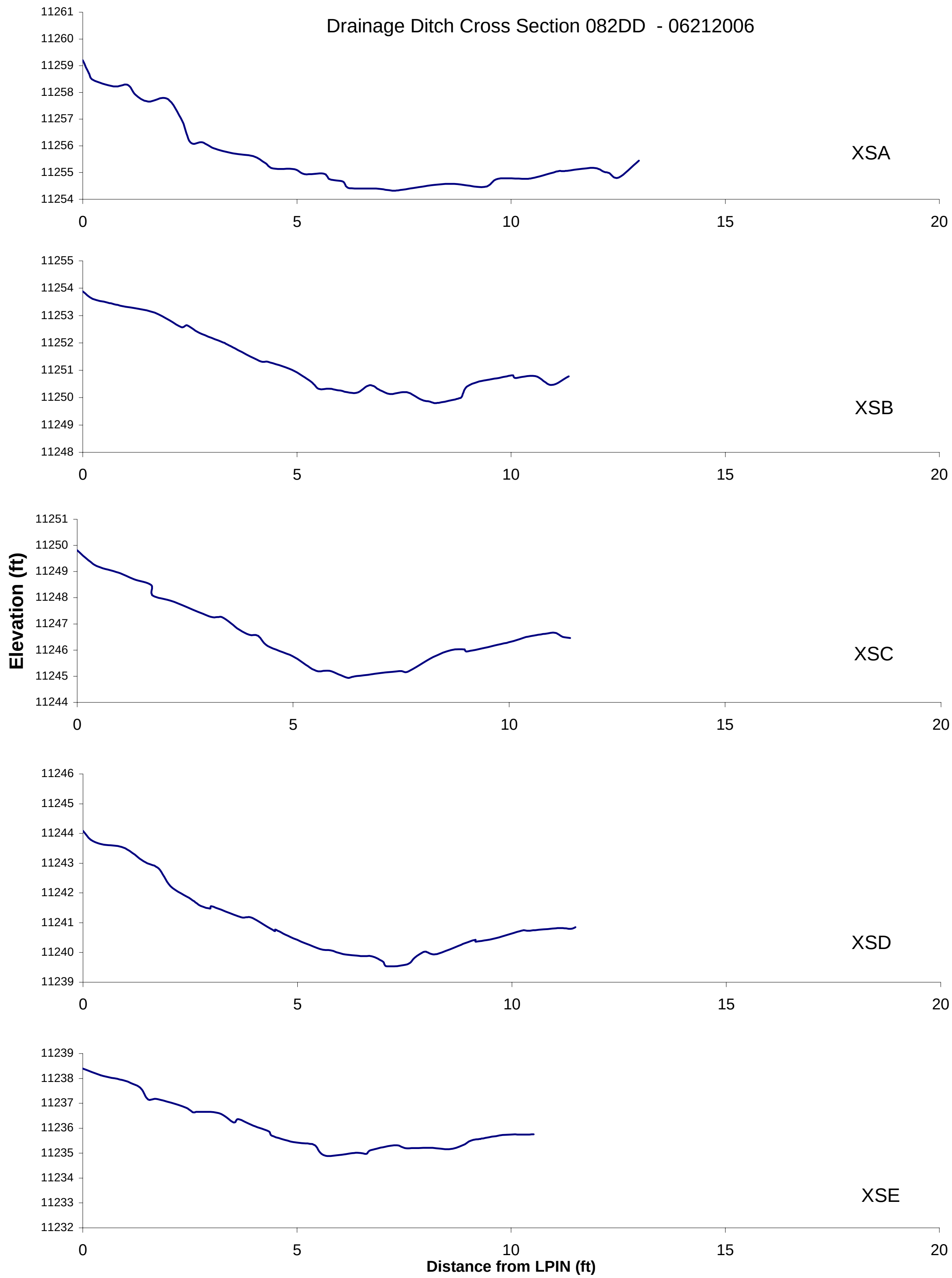
20
30
40
50
60


Drainage Ditch Cross Section 080DD - 06222006
Elevation (ft)
Distance from LPIN (ft)
XSA
XSB
XSC
XSD
XSE
11411
11410
11409
11408
11407
11406
11405
11404
11403
11399
11393
11389
11381
0
5
10
15
20
25


Drainage Ditch Cross Section 082DD - 06212006
XSA
XSB
XSC
XSD
XSE
Elevation (ft)
Distance from LPIN (ft)
11261
11260
11259
11258
11257
11256
11255
11254
11253
11252
11251
11250
11249
11248
11247
11246
11245
11244
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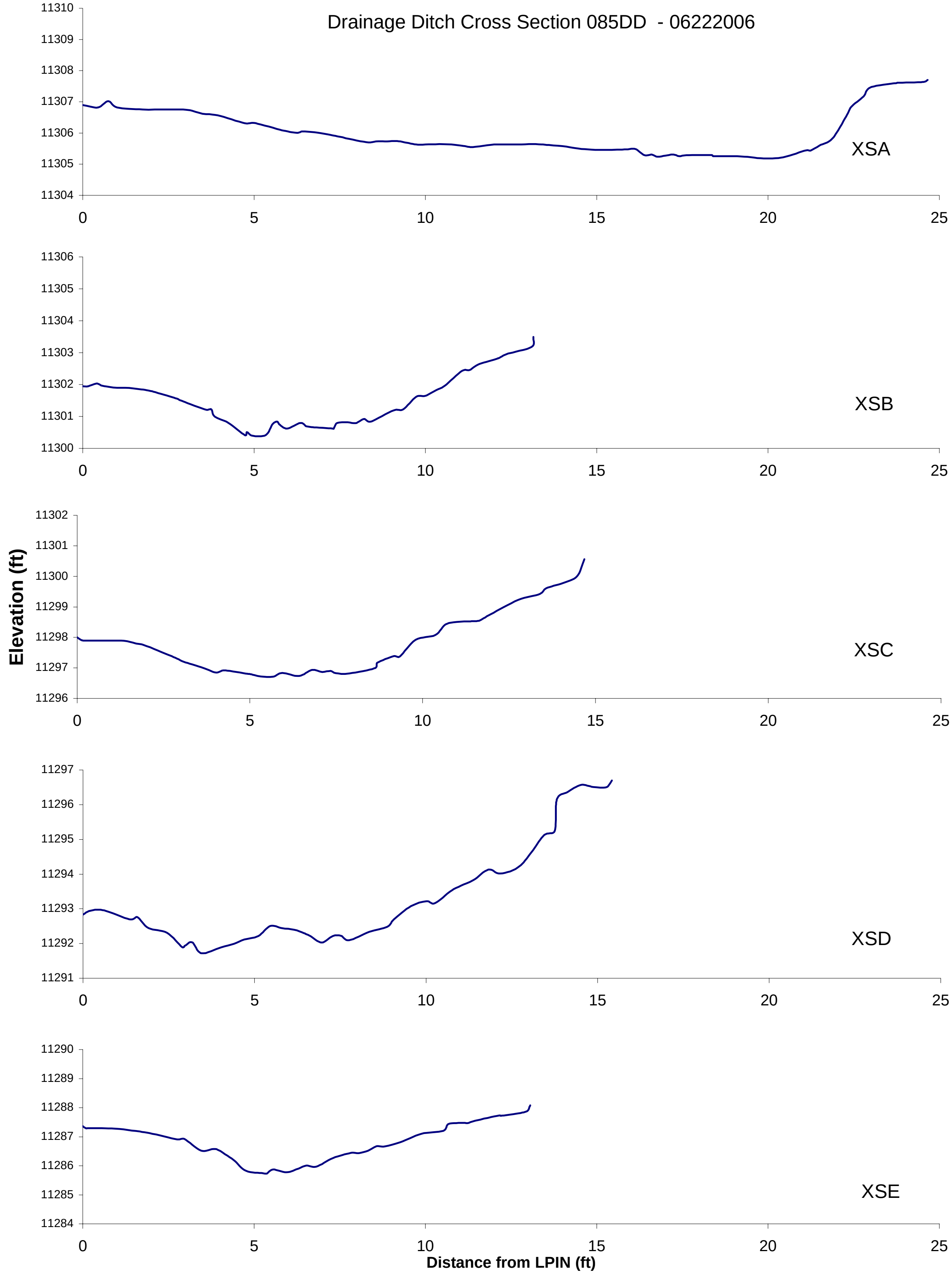
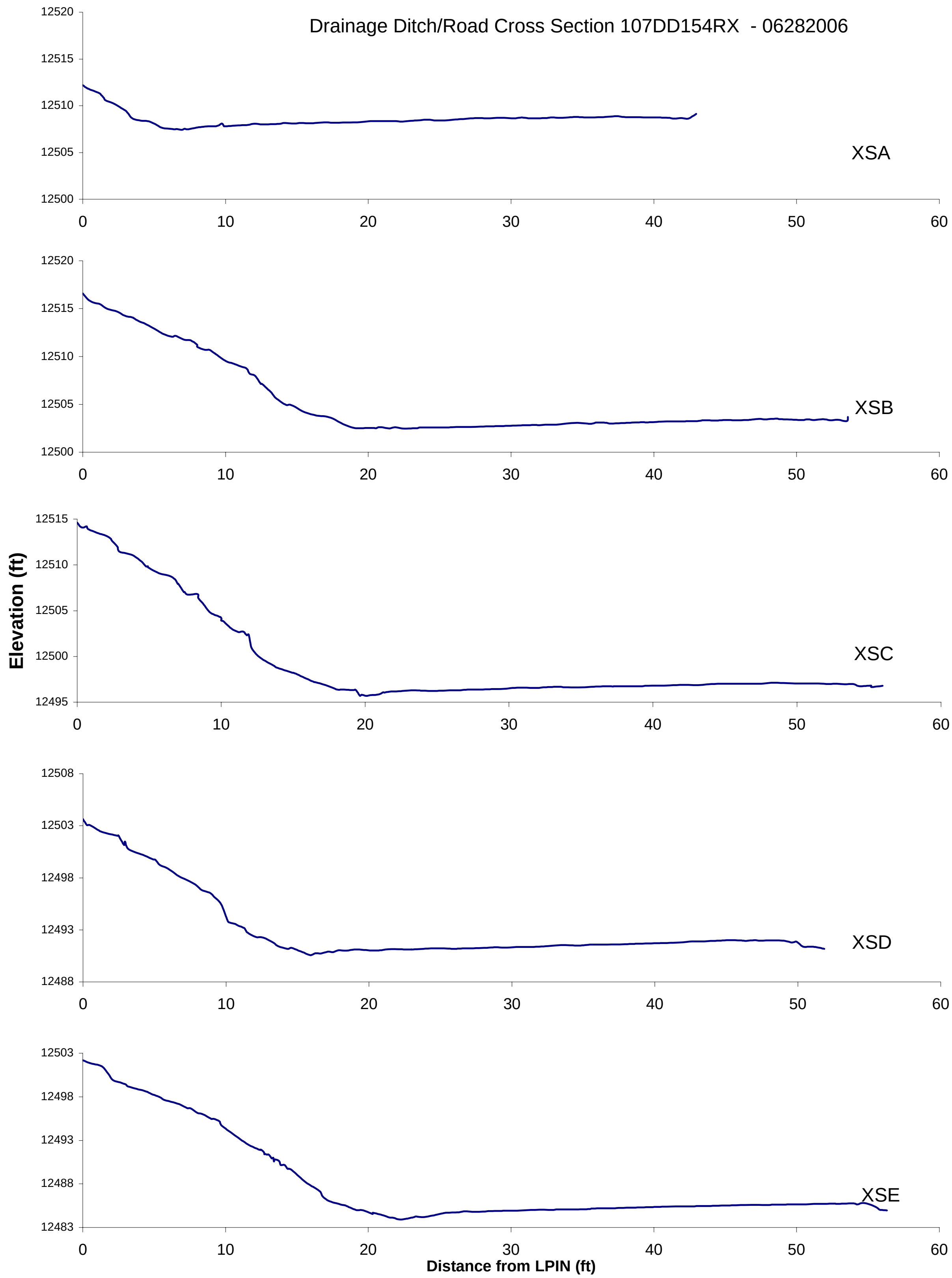
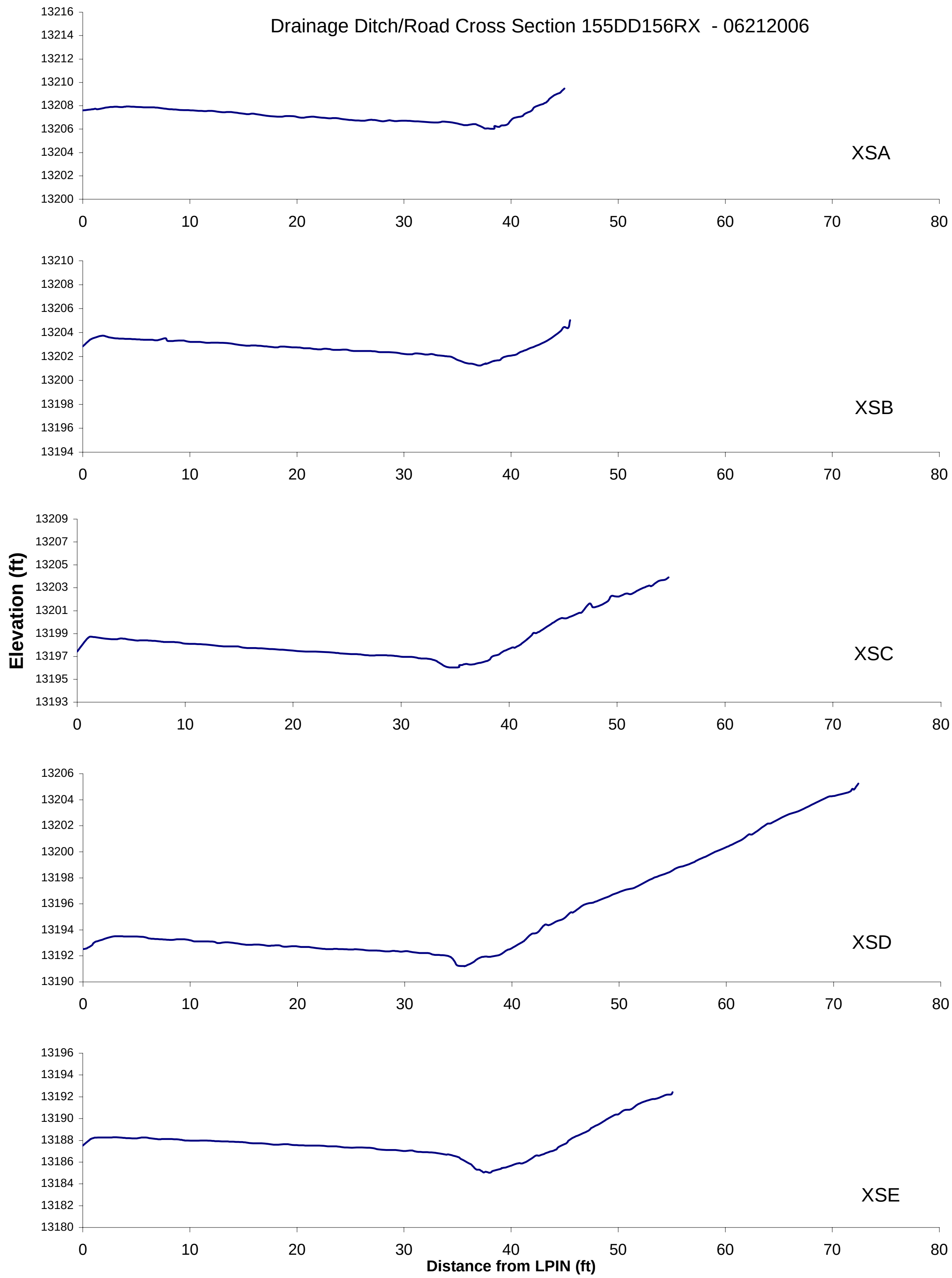
0
5
10
15
20


Drainage Ditch Cross Section 085DD - 06222006
XSA
XSB
XSC
XSD
XSE
Elevation (ft)
Distance from LPIN (ft)
11310
11309
11308
11307
11306
11305
11304
11303
11302
11301
11300
11299
11298
11297
11296
11295
11294
11293
11292
11291
11290
11289
11288
11287
11286
11285
11284
0
5
10
15
20
25



Drainage Ditch/Road Cross Section 107DD154RX - 06282006
XSA
XSB
XSC
XSD
XSE
Elevation (ft)
Distance from LPIN (ft)
12520
12515
12510
12505
12500
12495
12508
12503
12498
12493
12488
12483
0
10
20
30
40
50
60



Drainage Ditch/Road Cross Section 155DD156RX - 06212006
Elevation (ft)
Distance from LPIN (ft)
XSA
XSB
XSC
XSD
XSE
13216
13214
13212
13210
13208
13206
13204
13202
13200
13194
13196
13198
13209
13207
13205
13203
13201
13199
13197
13195
13193
13190
13192
13188
13186
13184
13182
13180
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10
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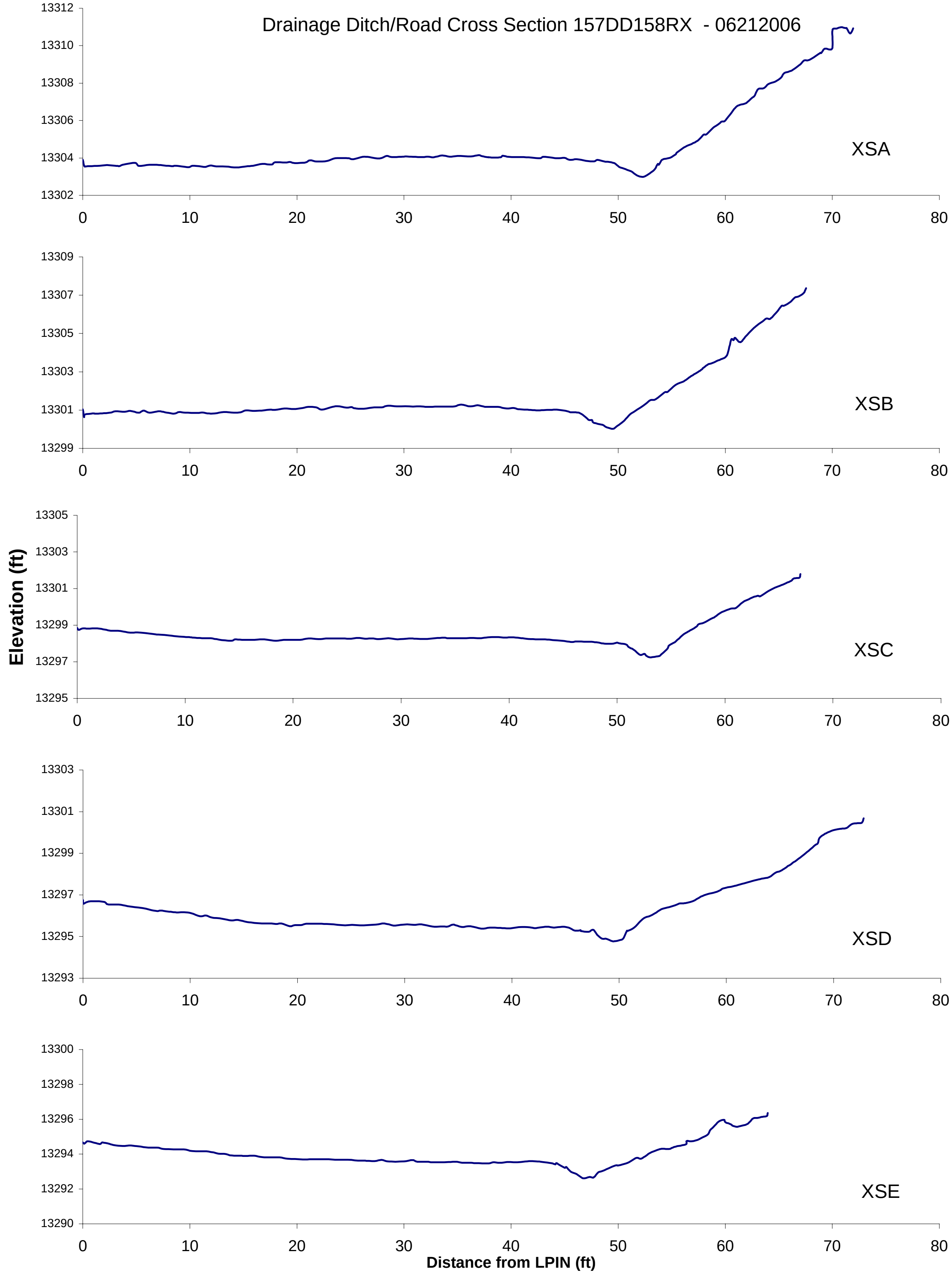
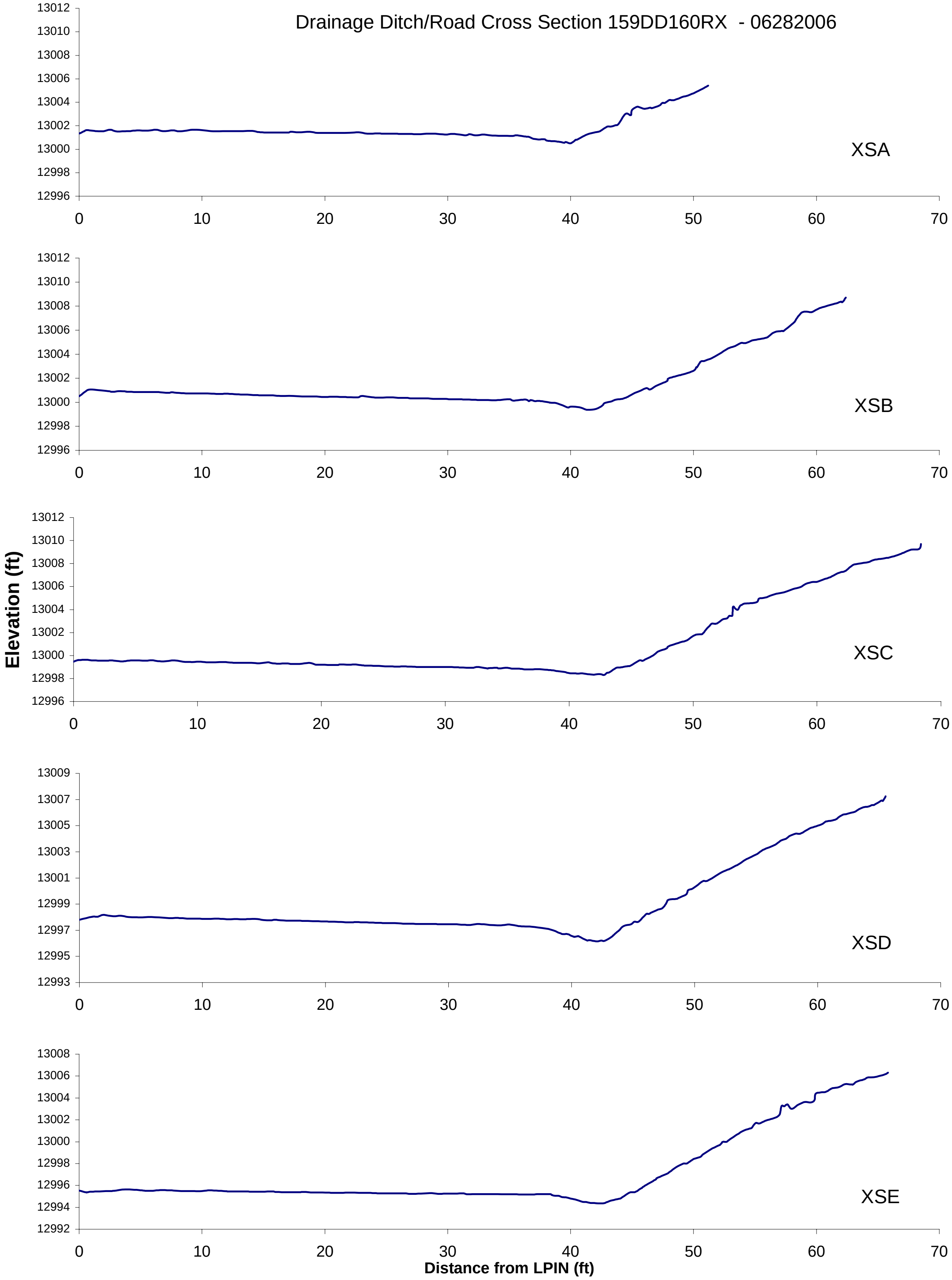
50
60
70
80


Drainage Ditch/Road Cross Section 157DD158RX - 06212006
XSA
XSB
XSC
XSD
XSE
Elevation (ft)
Distance from LPIN (ft)


Drainage Ditch/Road Cross Section 159DD160RX - 06282006
Elevation (ft)
Distance from LPIN (ft)
XSA
XSB
XSC
XSD
XSE
13012
13010
13008
13006
13004
13002
13000
12998
12996
13009
13007
13005
13003
13001
12999
12997
12995
12993
12994
12992
0
10
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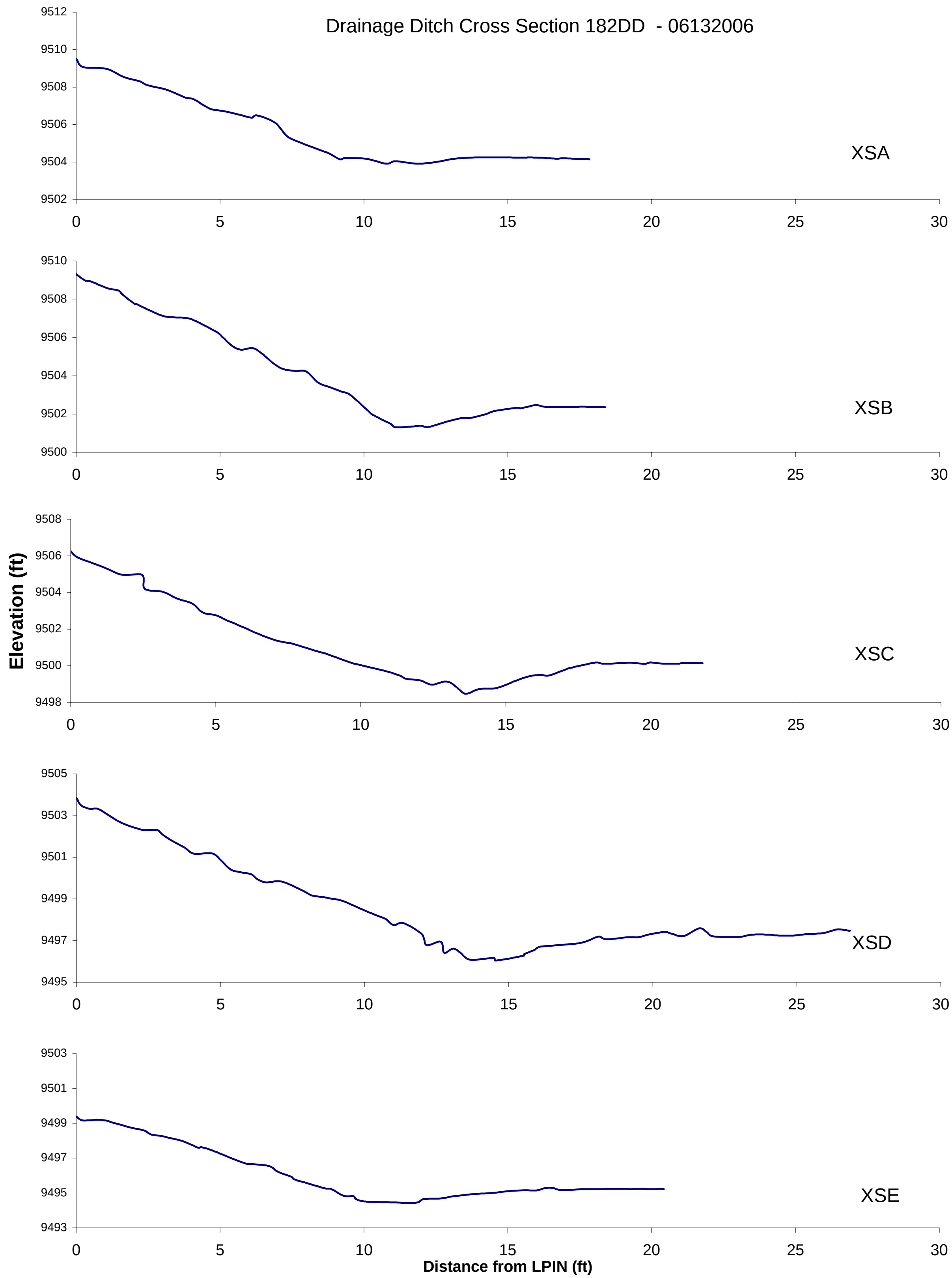
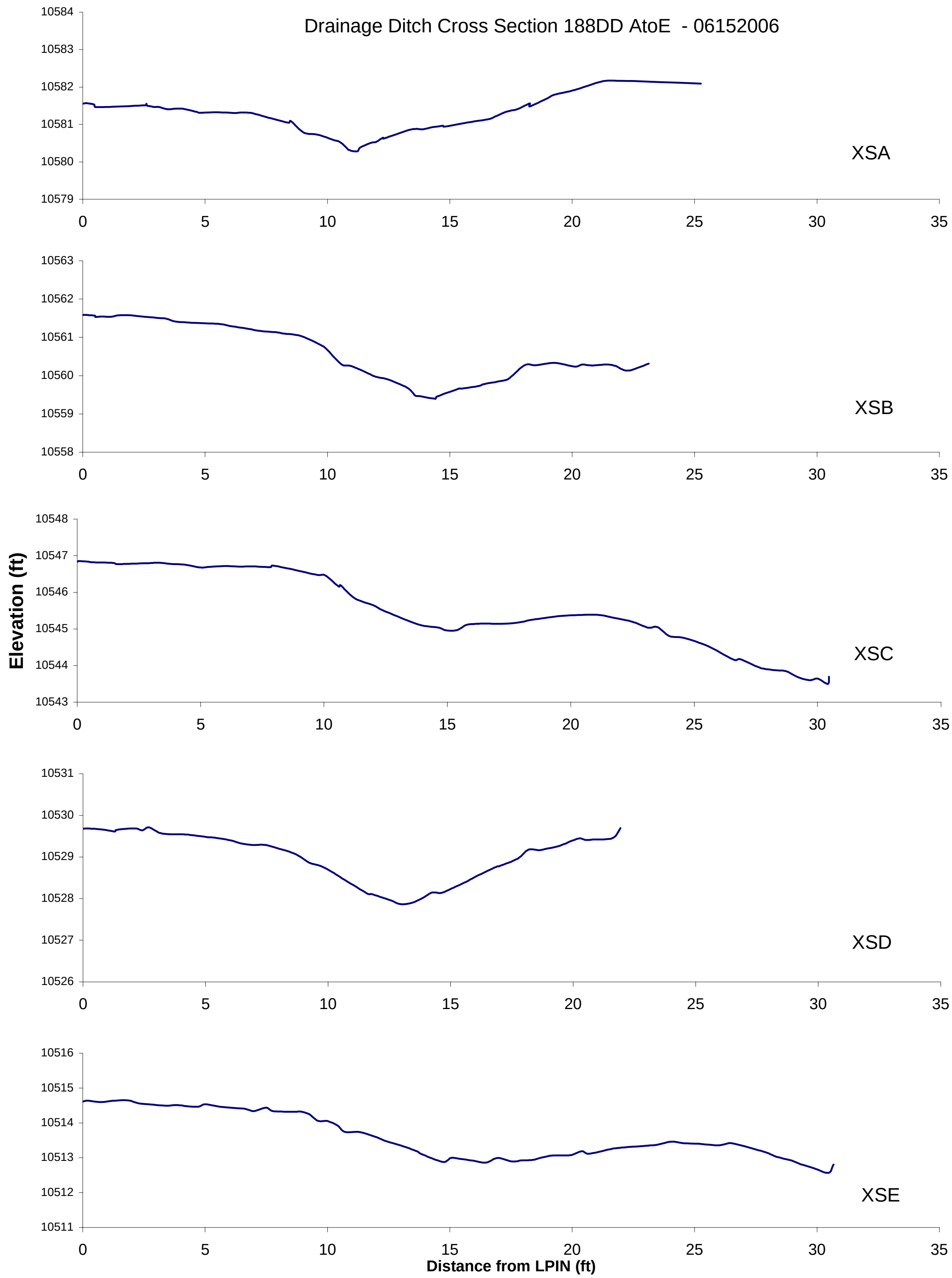
40
50
60
70


Drainage Ditch Cross Section 182DD - 06132006
XSA
XSB
XSC
XSD
XSE
Elevation (ft)
Distance from LPIN (ft)
9512
9510
9508
9506
9504
9502
9500
9498
9505
9503
9501
9499
9497
9495
9493
0
5
10
15
20
25
30


Drainage Ditch Cross Section 188DD AtoE - 06152006
XSA
XSB
XSC
XSD
XSE
Elevation (ft)
Distance from LPIN (ft)
10584
10583
10582
10581
10580
10579
10563
10562
10561
10560
10559
10558
10548
10547
10546
10545
10544
10543
10531
10530
10529
10528
10527
10526
10516
10515
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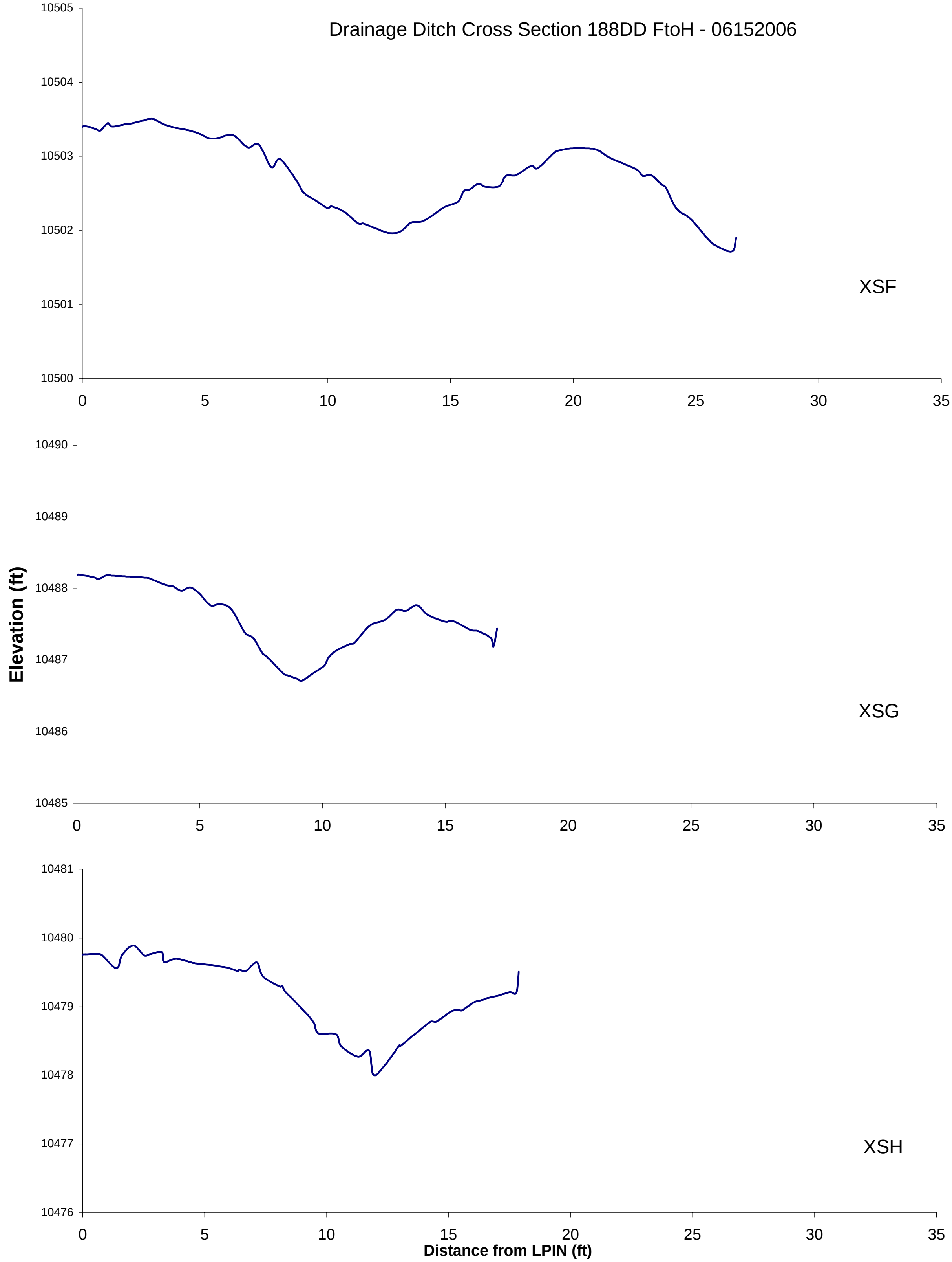
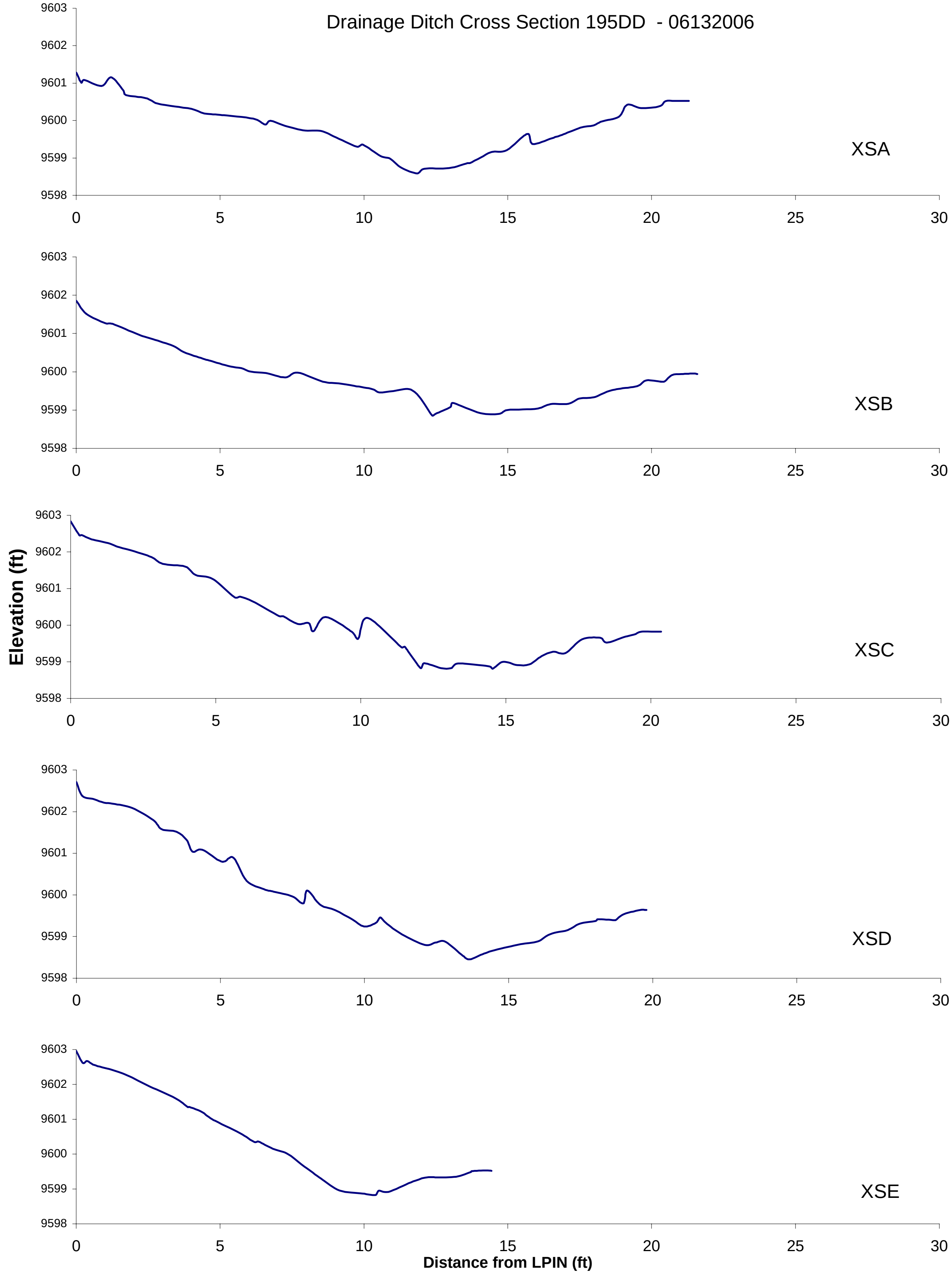
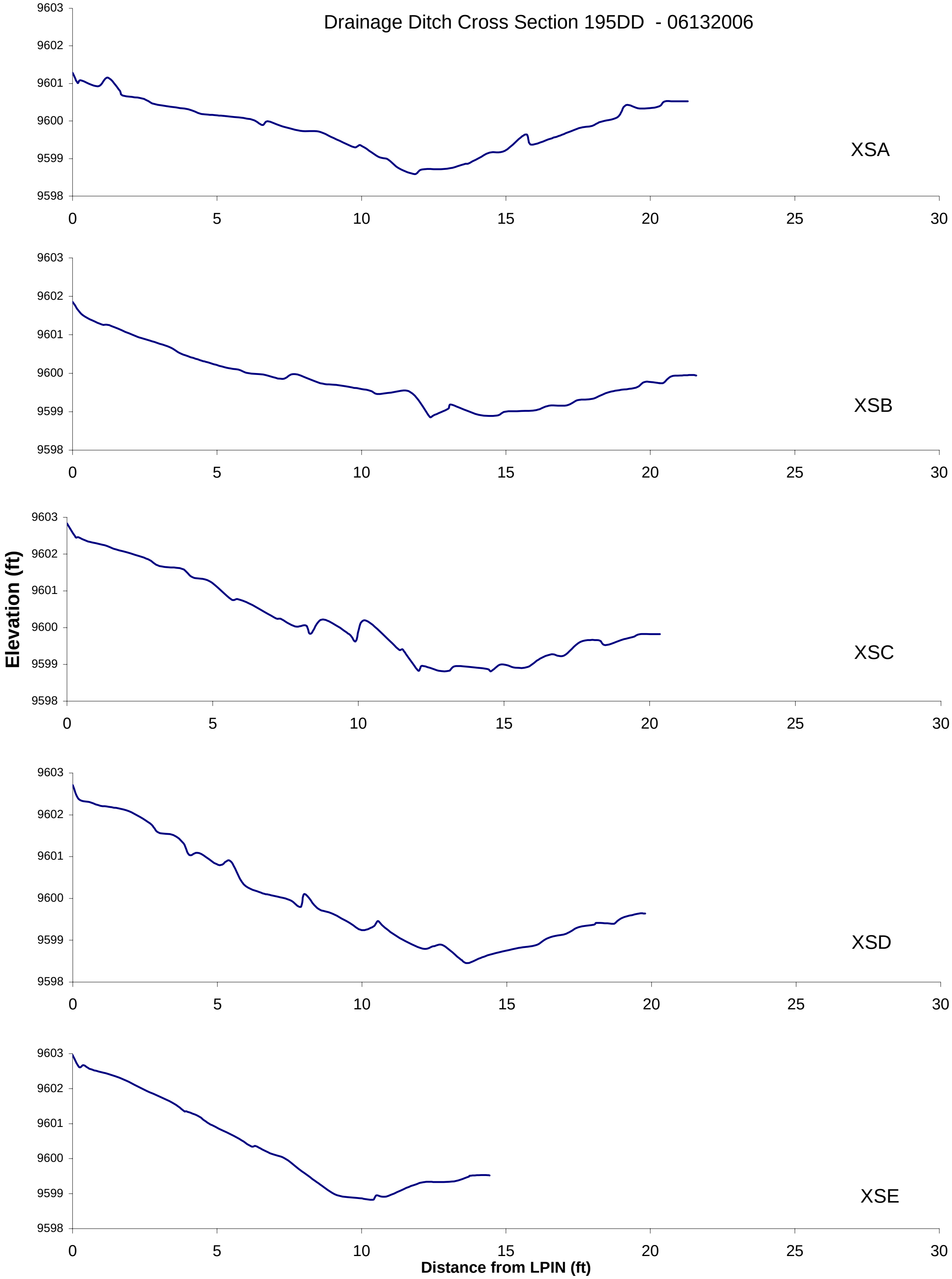
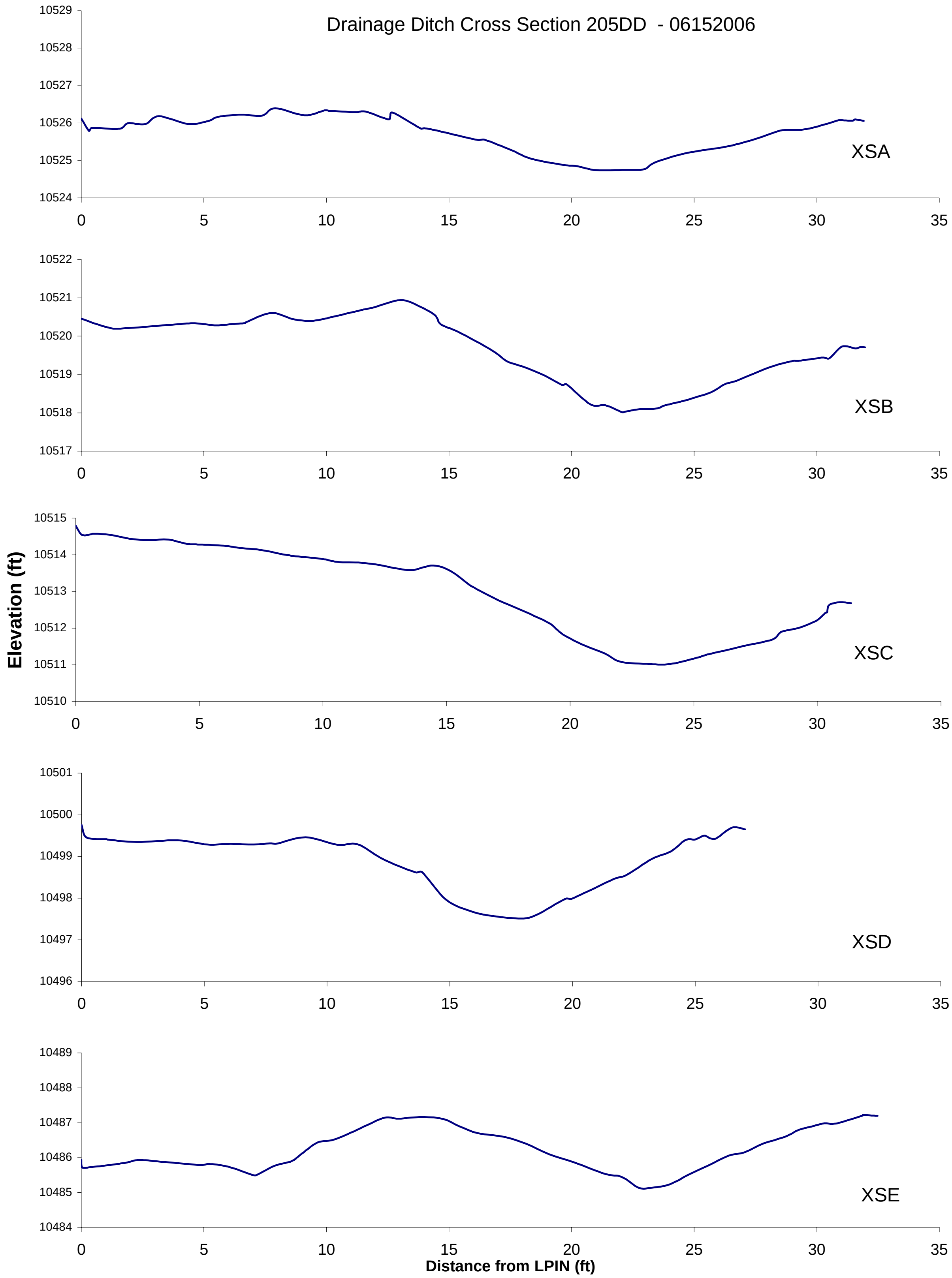
10513
10512
10511
0
5
10
15
20
25
30
35


Drainage Ditch Cross Section 188DD FtoH - 06152006
Elevation (ft)
Distance from LPIN (ft)
XSF
XSG
XSH
10505
10504
10503
10502
10501
10500
10490
10489
10488
10487
10486
10485
10481
10480
10479
10478
10477
10476
0
5
10
15
20
25
30
35


Drainage Ditch Cross Section 195DD - 06132006
XSA
XSB
XSC
XSD
XSE
Elevation (ft)
Distance from LPIN (ft)
9603
9602
9601
9600
9599
9598
0
5
10
15
20
25
30



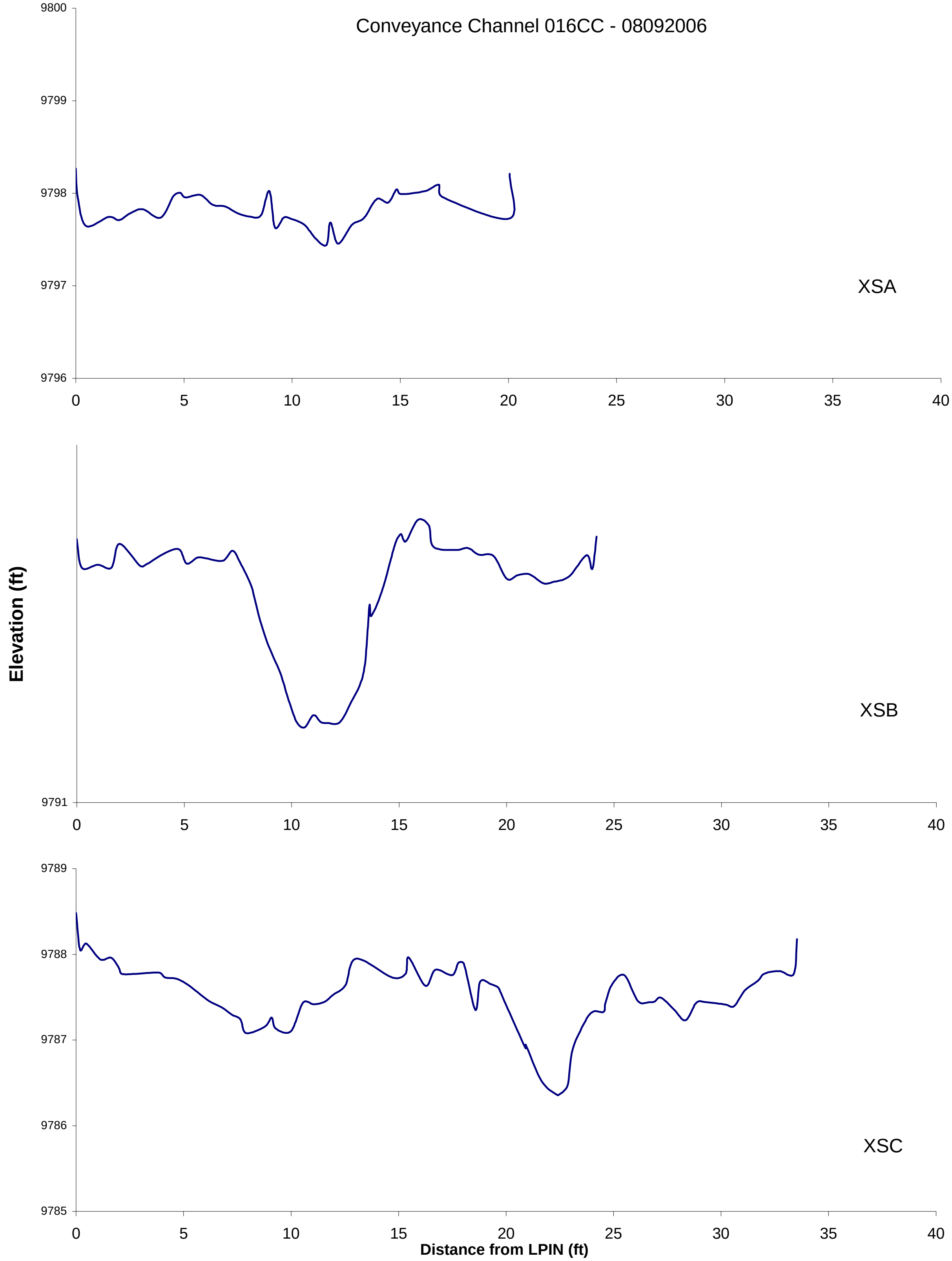
Drainage Ditch Cross Section 195DD - 06132006
Elevation (ft)
Distance from LPIN (ft)
XSA
XSB
XSC
XSD
XSE
9598
9599
9600
9601
9602
9603
0
5
10
15
20
25
30

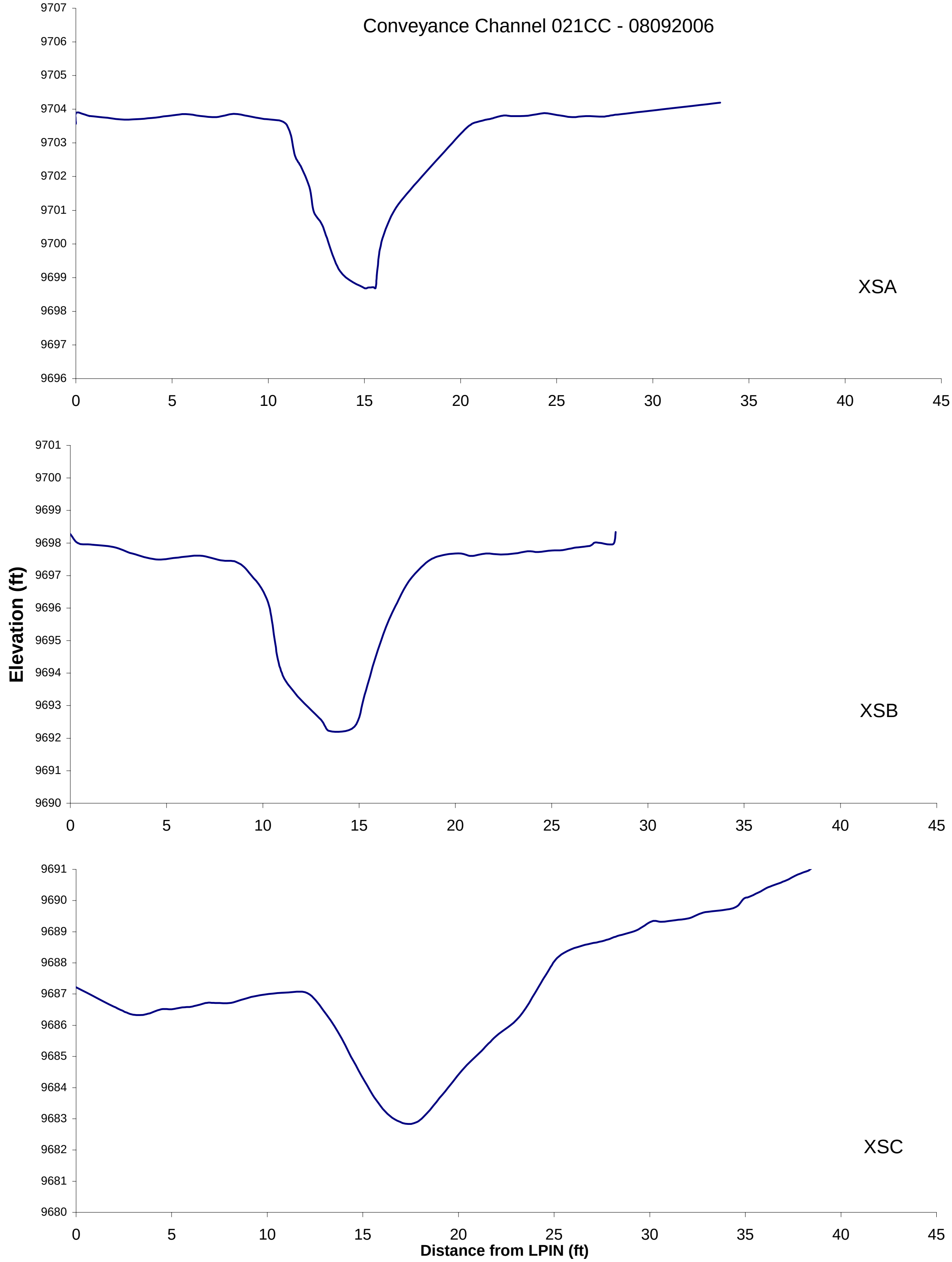

Drainage Ditch Cross Section 205DD - 06152006
Elevation (ft)
Distance from LPIN (ft)
XSA
XSB
XSC
XSD
XSE
10529
10528
10527
10526
10525
10524
10522
10521
10520
10519
10518
10517
10515
10514
10513
10512
10511
10510
10501
10500
10499
10498
10497
10496
10489
10488
10487
10486
10485
10484
0
5
10
15
20
25
30
35

Appendix F

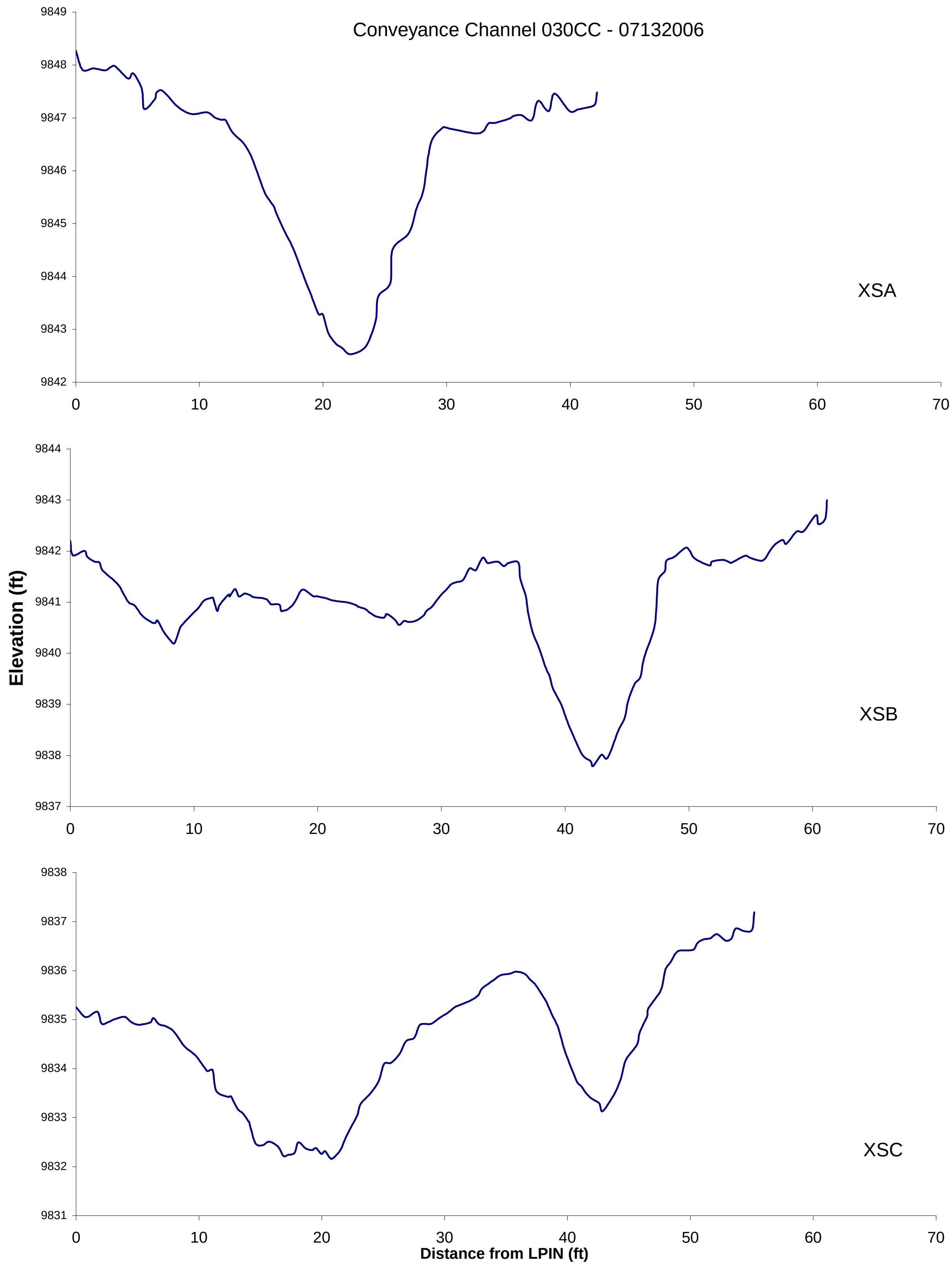
Conveyance Channel
Graphs

2006

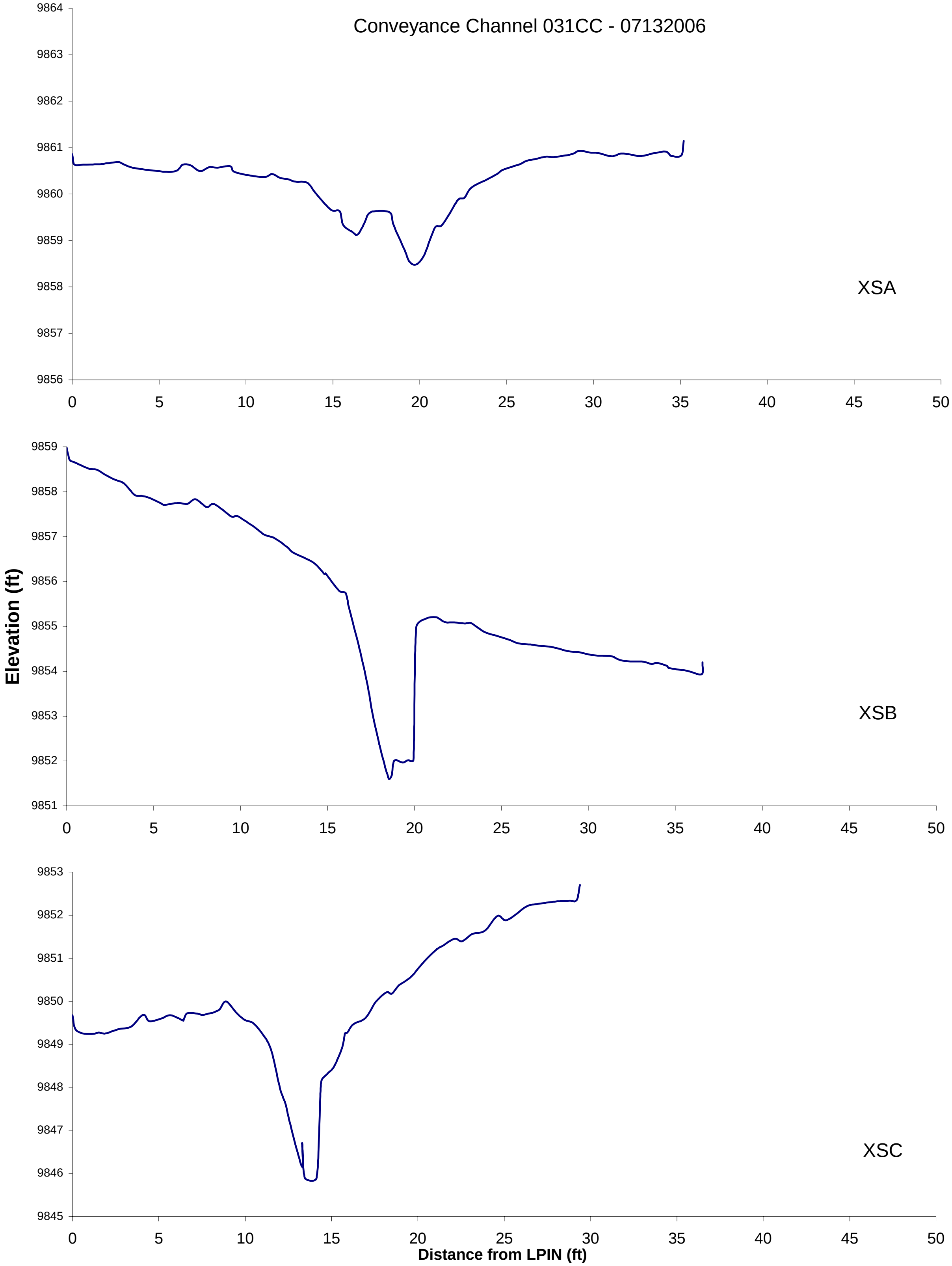

Conveyance Channel 016CC - 08092006
Elevation (ft)
9800
9799
9798
9797
9796
0
5
10
15
20
25
30
35
40
XSA
9791
XSB
9789
9788
9787
9786
9785
XSC
Distance from LPIN (ft)

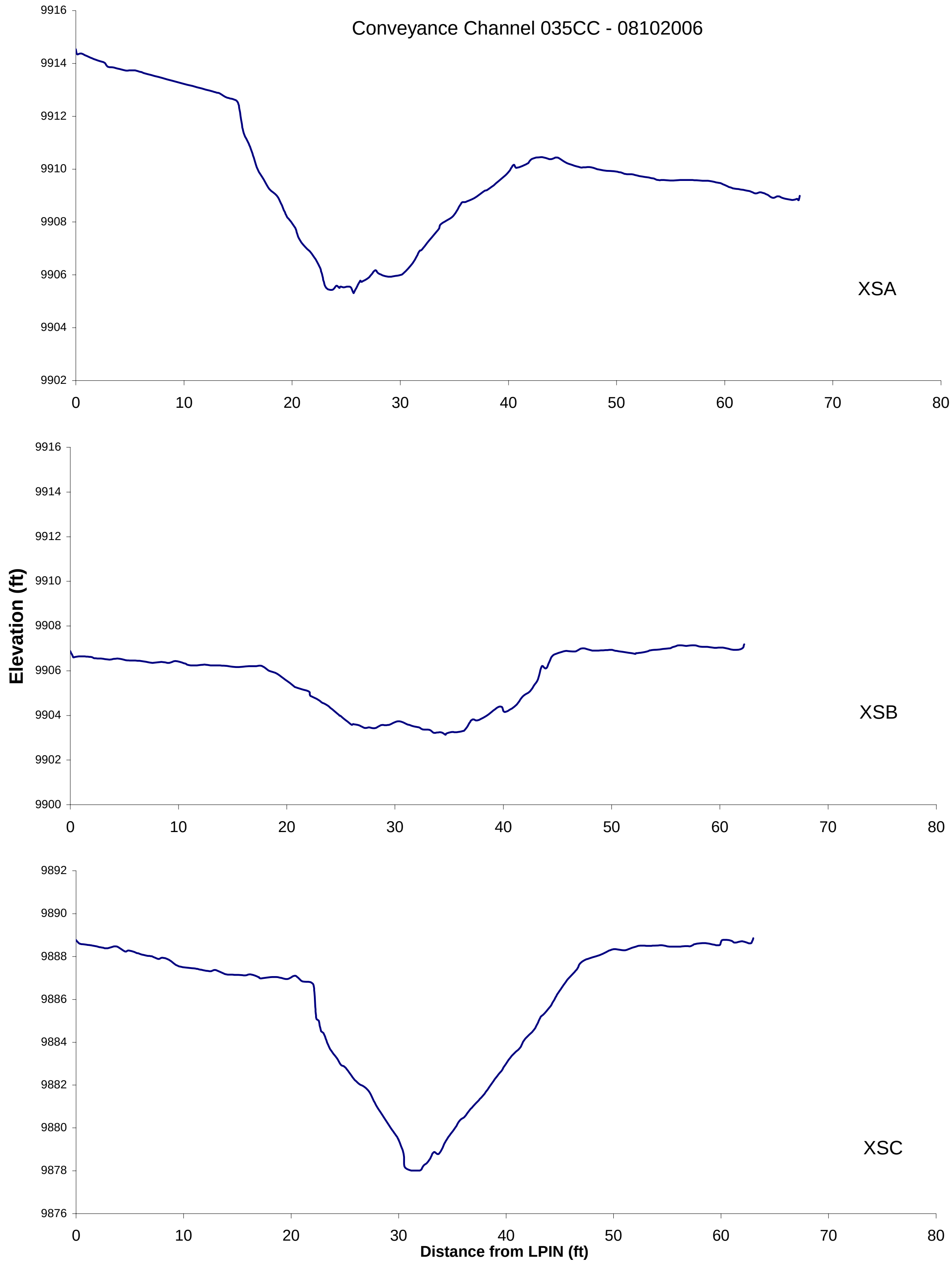


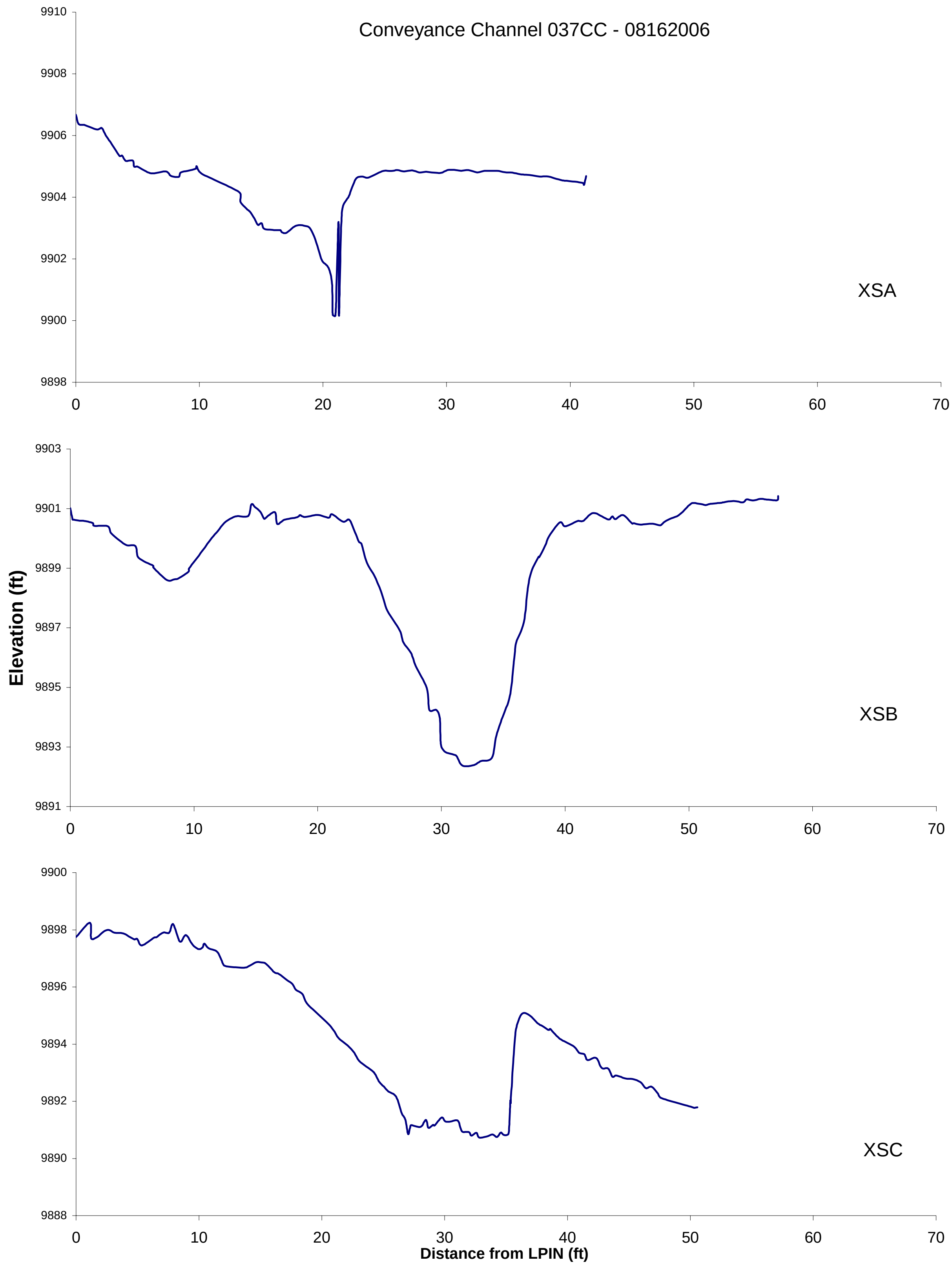
Conveyance Channel 021CC - 08092006
XSA
XSB
XSC
Elevation (ft)
Distance from LPIN (ft)
9707
9706
9705
9704
9703
9702
9701
9700
9699
9698
9697
9696
9701
9700
9699
9698
9697
9696
9695
9694
9693
9692
9691
9690
9691
9690
9689
9688
9687
9686
9685
9684
9683
9682
9681
9680
0
5
10
15
20
25
30
35
40
45

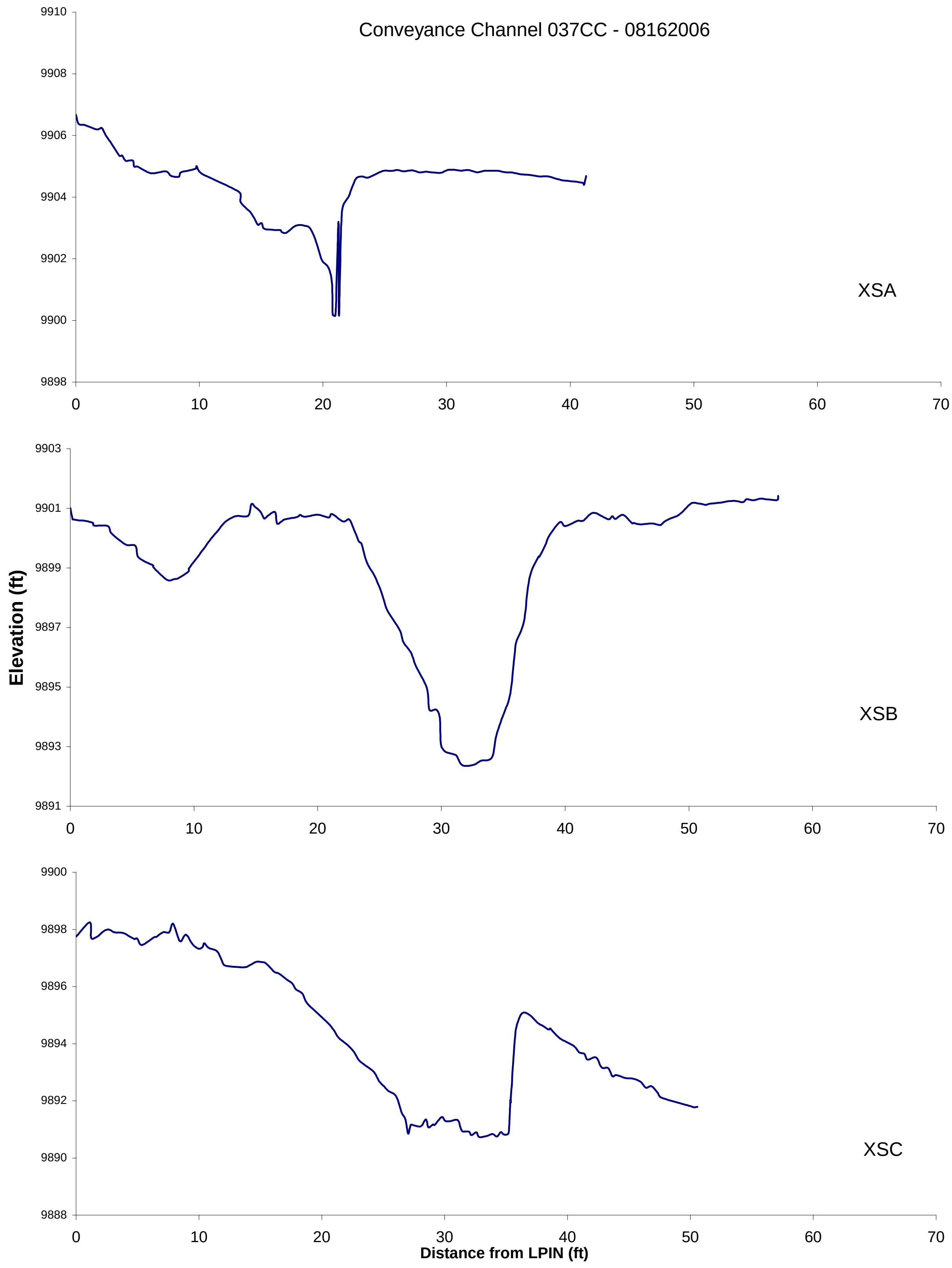


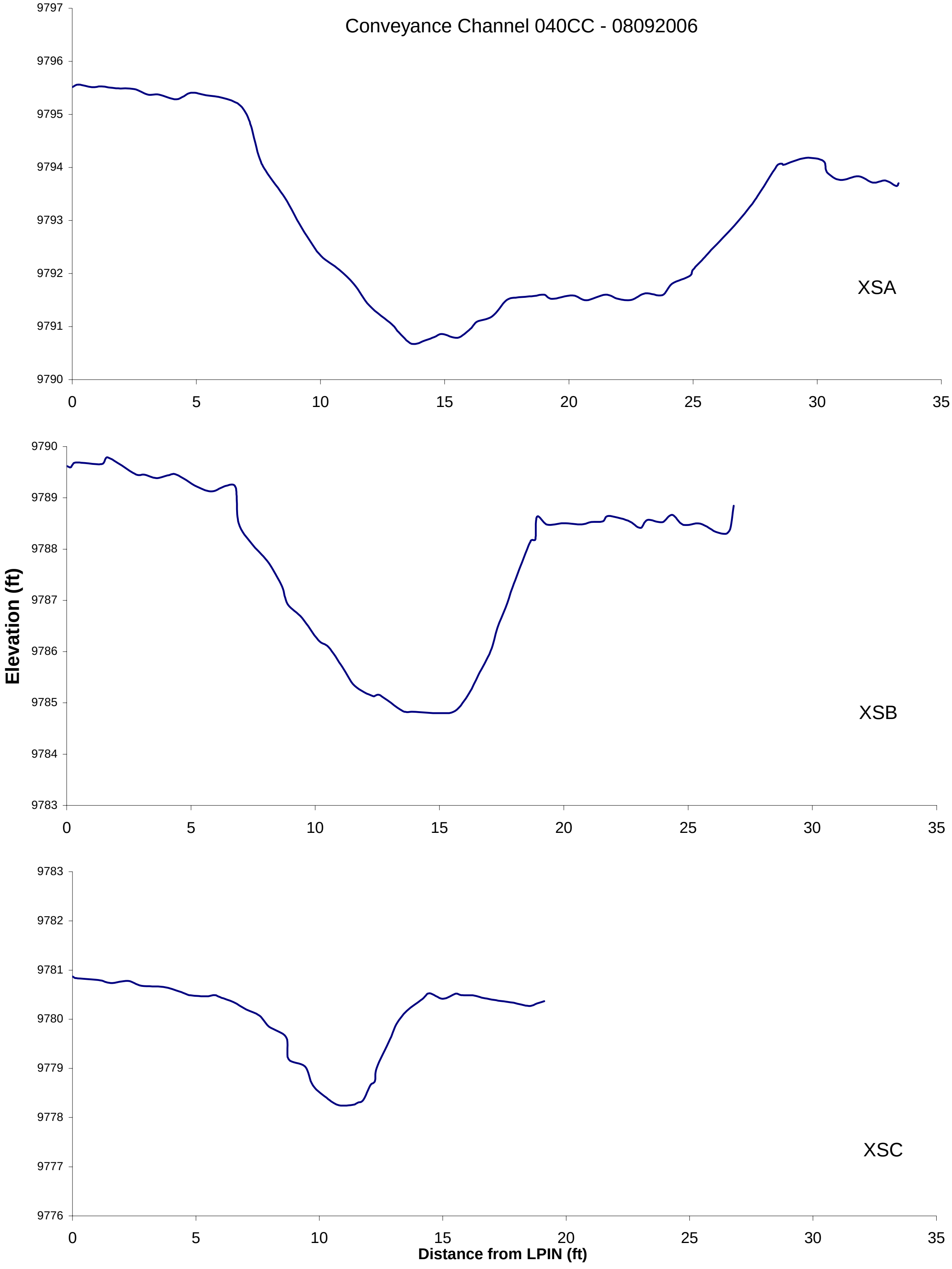
Conveyance Channel 030CC - 07132006
9849
9848
9847
9846
9845
9844
9843
9842
0
10
20
30
40
50
60
70
XSA
9844
9843
9842
9841
9840
9839
9838
9837
XSB
Elevation (ft)
9838
9837
9836
9835
9834
9833
9832
9831
XSC
Distance from LPIN (ft)

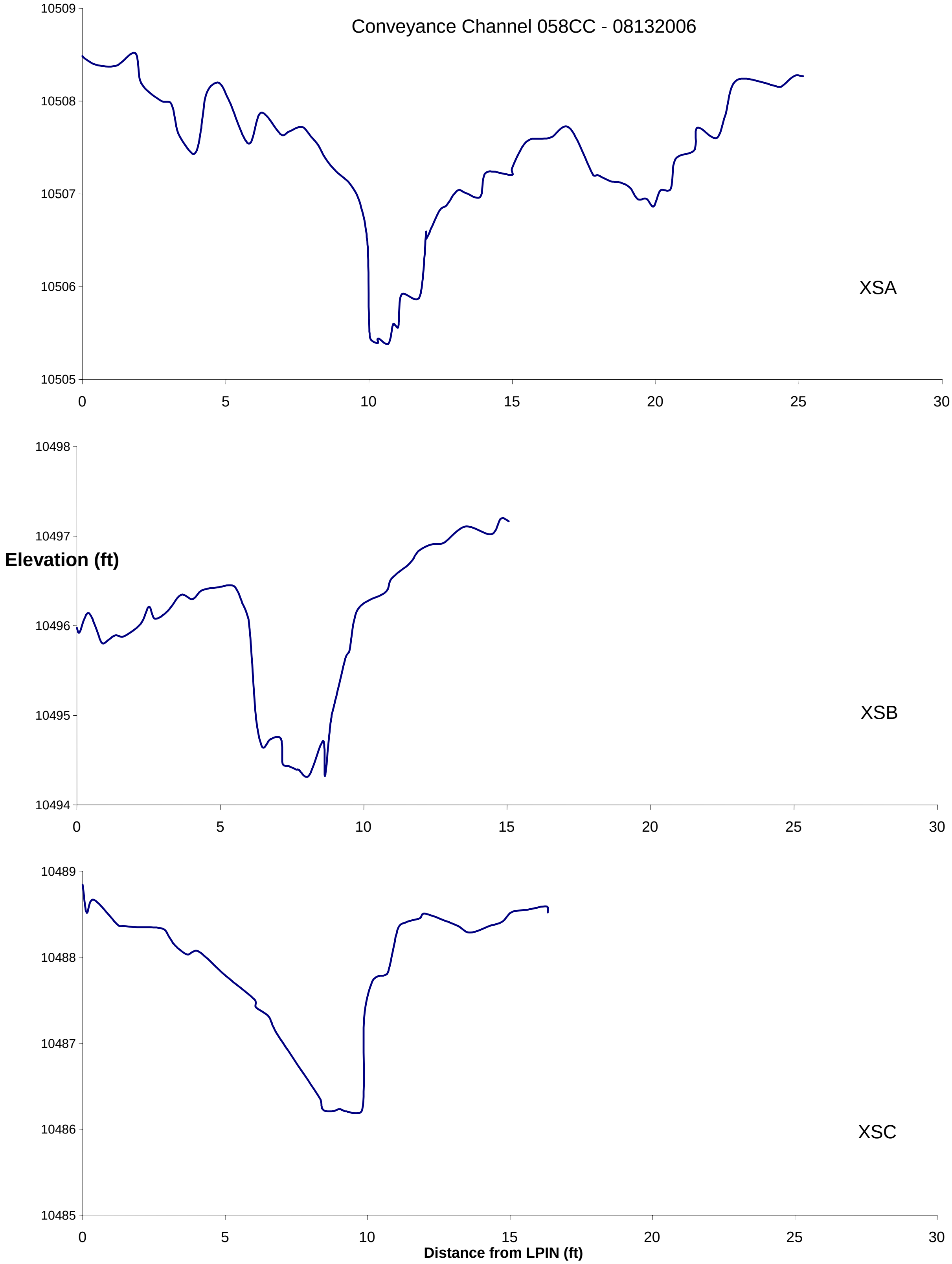

Conveyance Channel 031CC - 07132006
XSA
XSB
XSC
Elevation (ft)
Distance from LPIN (ft)
9864
9863
9862
9861
9860
9859
9858
9857
9856
9855
9854
9853
9852
9851
9850
9849
9848
9847
9846
9845
0
5
10
15
20
25
30
35
40
45
50

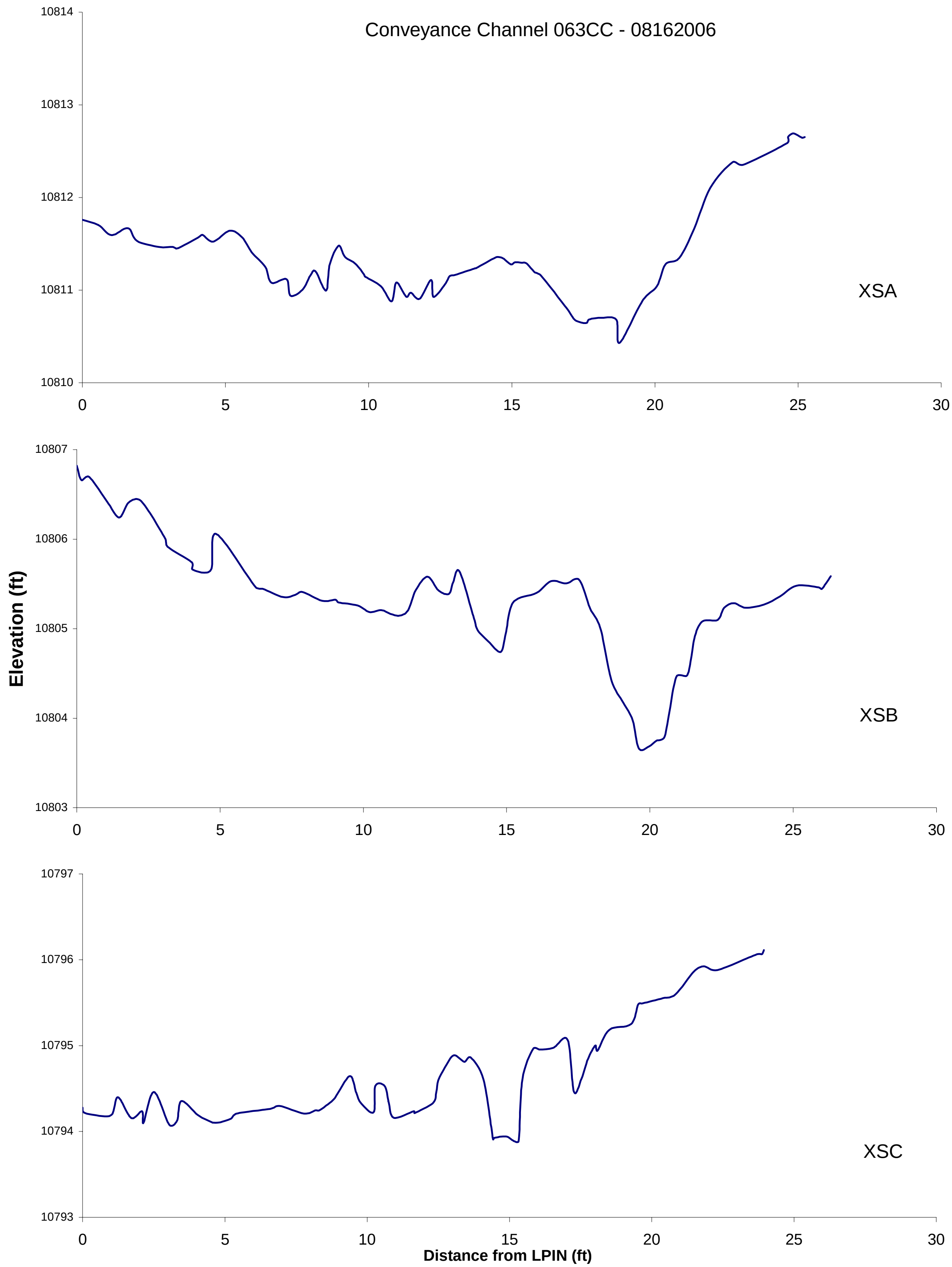

Conveyance Channel 035CC - 08102006
9916
9914
9912
9910
9908
9906
9904
9902
0 10 20 30 40 50 60 70 80
XSA
9916
9914
9912
9910
9908
9906
9904
9902
9900
0 10 20 30 40 50 60 70 80
XSB
Elevation (ft)
9892
9890
9888
9886
9884
9882
9880
9878
9876
0 10 20 30 40 50 60 70 80
XSC
Distance from LPIN (ft)

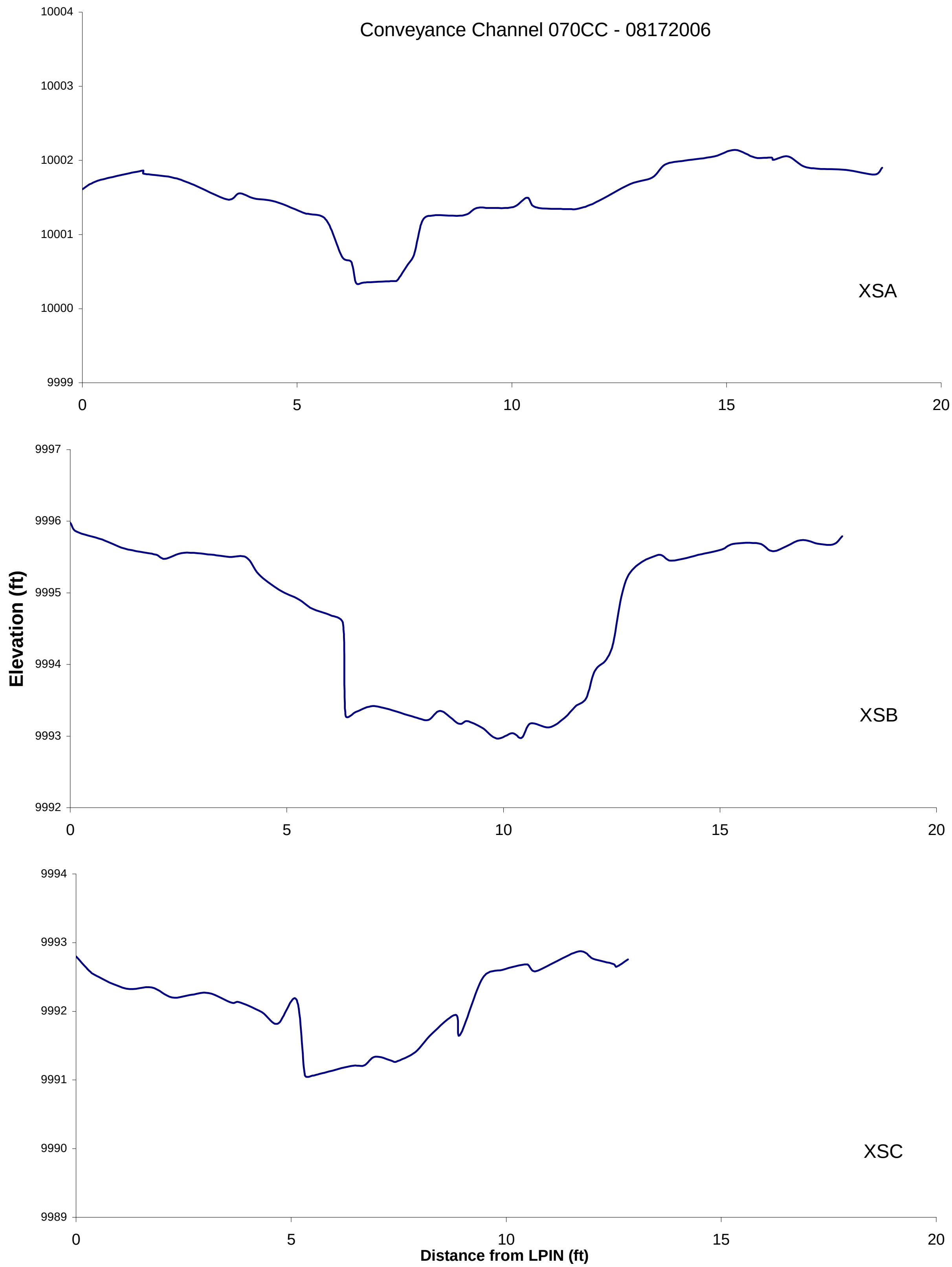

Conveyance Channel 037CC - 08162006
Elevation (ft)
XSA
XSB
XSC
9910
9908
9906
9904
9902
9900
9898
9903
9901
9899
9897
9895
9893
9891
9896
9894
9892
9890
9888
0
10
20
30
40
50
60
70
Distance from LPIN (ft)


Conveyance Channel 037CC - 08162006
Elevation (ft)
9910
9908
9906
9904
9902
9900
9898
XSA
0
10
20
30
40
50
60
70
9903
9901
9899
9897
9895
9893
9891
XSB
0
10
20
30
40
50
60
70
9900
9898
9896
9894
9892
9890
9888
XSC
0
10
20
30
40
50
60
70
Distance from LPIN (ft)

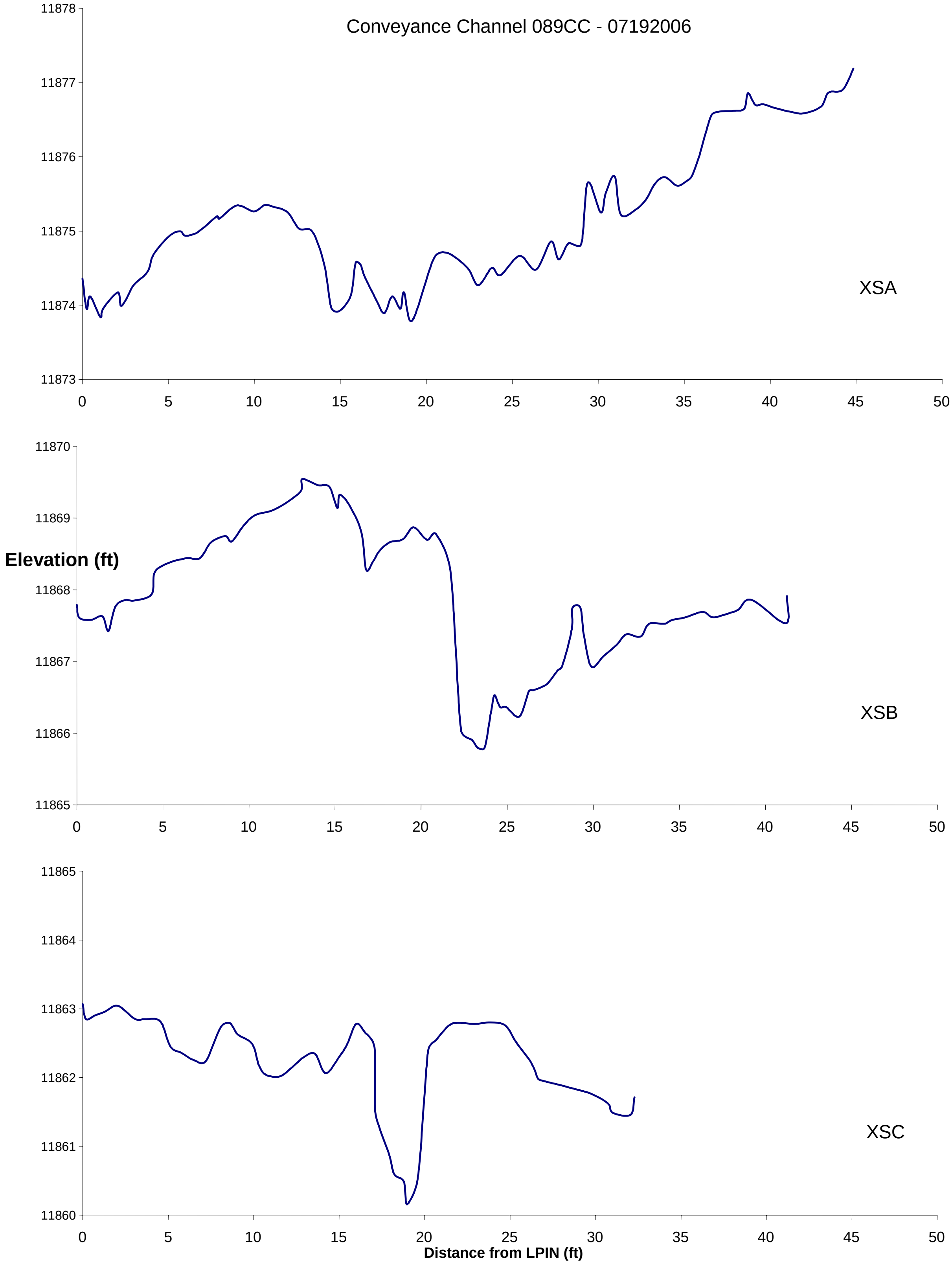

Conveyance Channel 040CC - 08092006
XSA
XSB
XSC
Elevation (ft)
Distance from LPIN (ft)
9797
9796
9795
9794
9793
9792
9791
9790
9789
9788
9787
9786
9785
9784
9783
9782
9781
9780
9779
9778
9777
9776
0
5
10
15
20
25
30
35

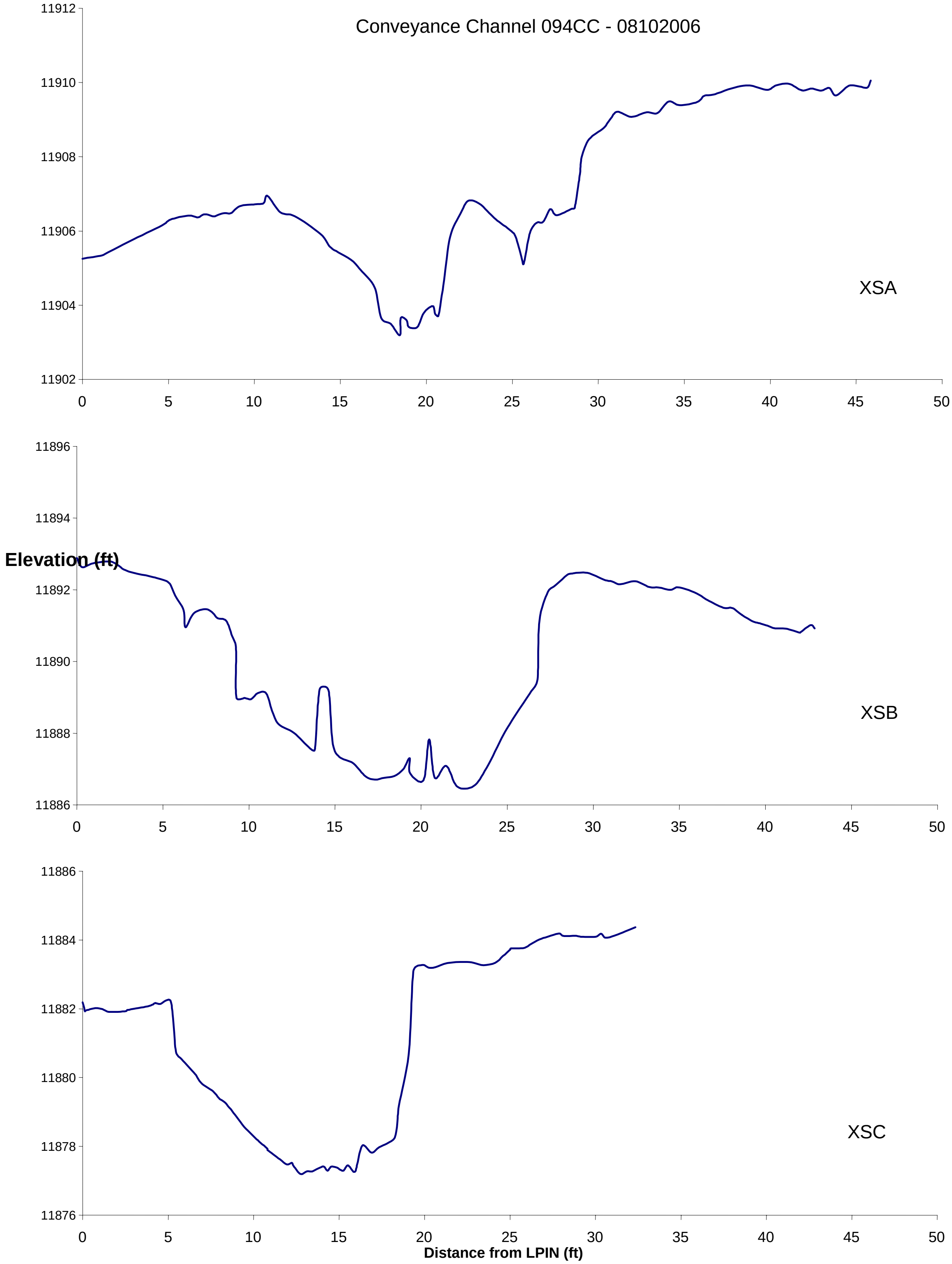

Conveyance Channel 058CC - 08132006
XSA
XSB
XSC
Elevation (ft)
Distance from LPIN (ft)
10509
10508
10507
10506
10505
10498
10497
10496
10495
10494
10489
10488
10487
10486
10485
0
5
10
15
20
25
30

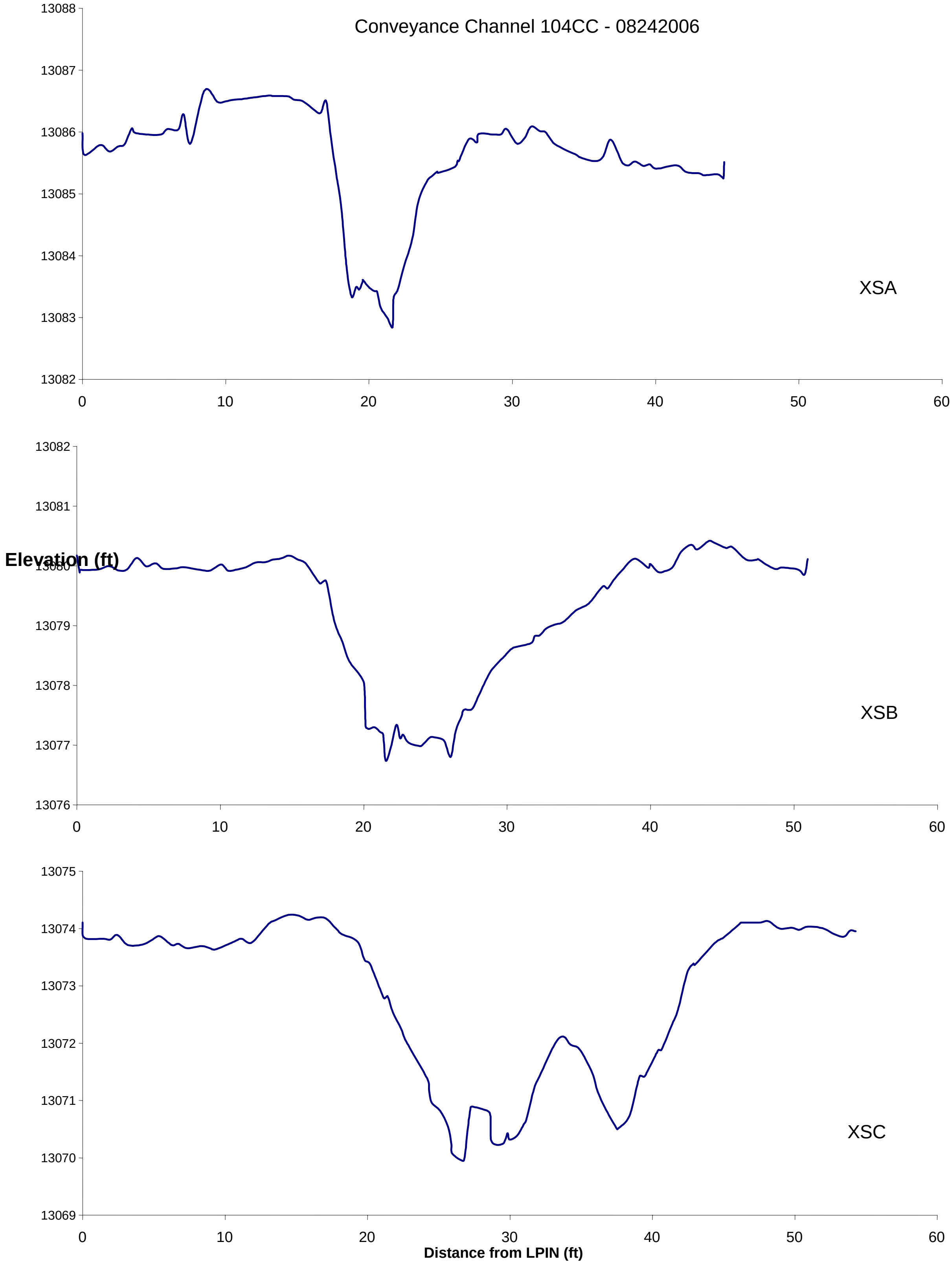

Conveyance Channel 063CC - 08162006
10814
10813
10812
10811
10810
0 5 10 15 20 25 30
XSA
10807
10806
10805
10804
10803
0 5 10 15 20 25 30
XSB
Elevation (ft)
10797
10796
10795
10794
10793
0 5 10 15 20 25 30
XSC
Distance from LPIN (ft)

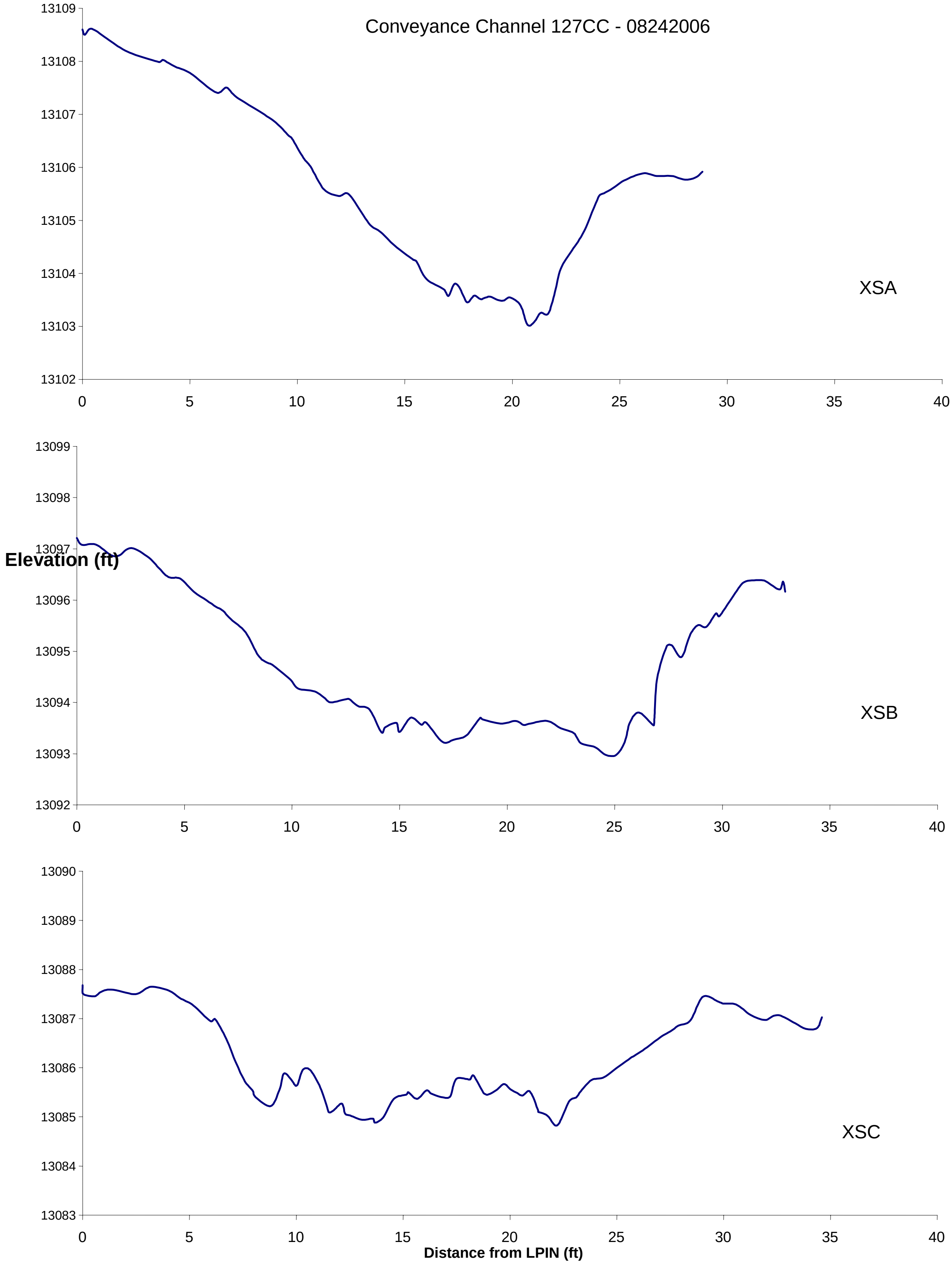


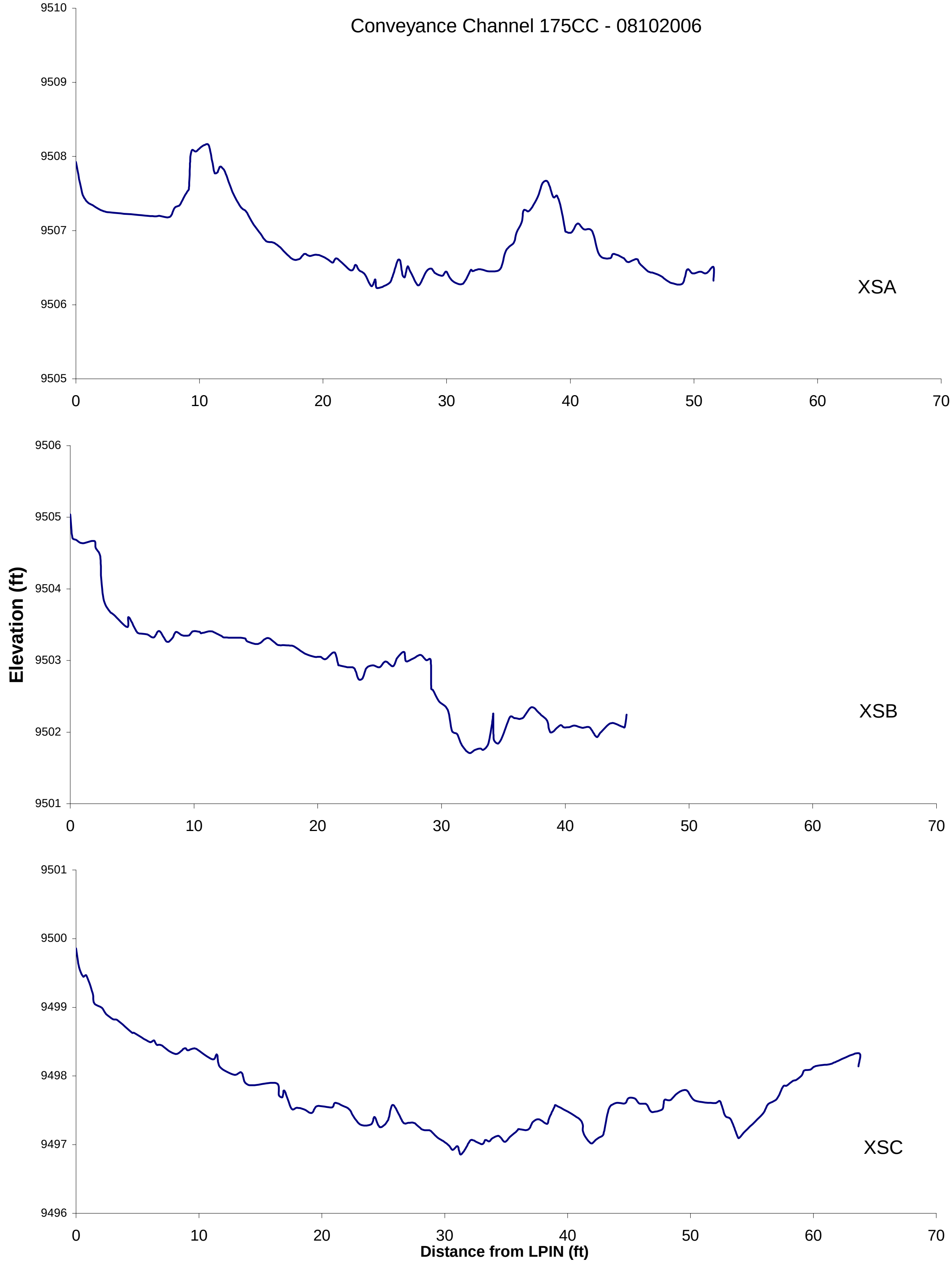
Conveyance Channel 070CC - 08172006
10004
10003
10002
10001
10000
9999
0
5
10
15
20
XSA
9997
9996
9995
9994
9993
9992
0
5
10
15
20
XSB
Elevation (ft)
9994
9993
9992
9991
9990
9989
0
5
10
15
20
XSC
Distance from LPIN (ft)

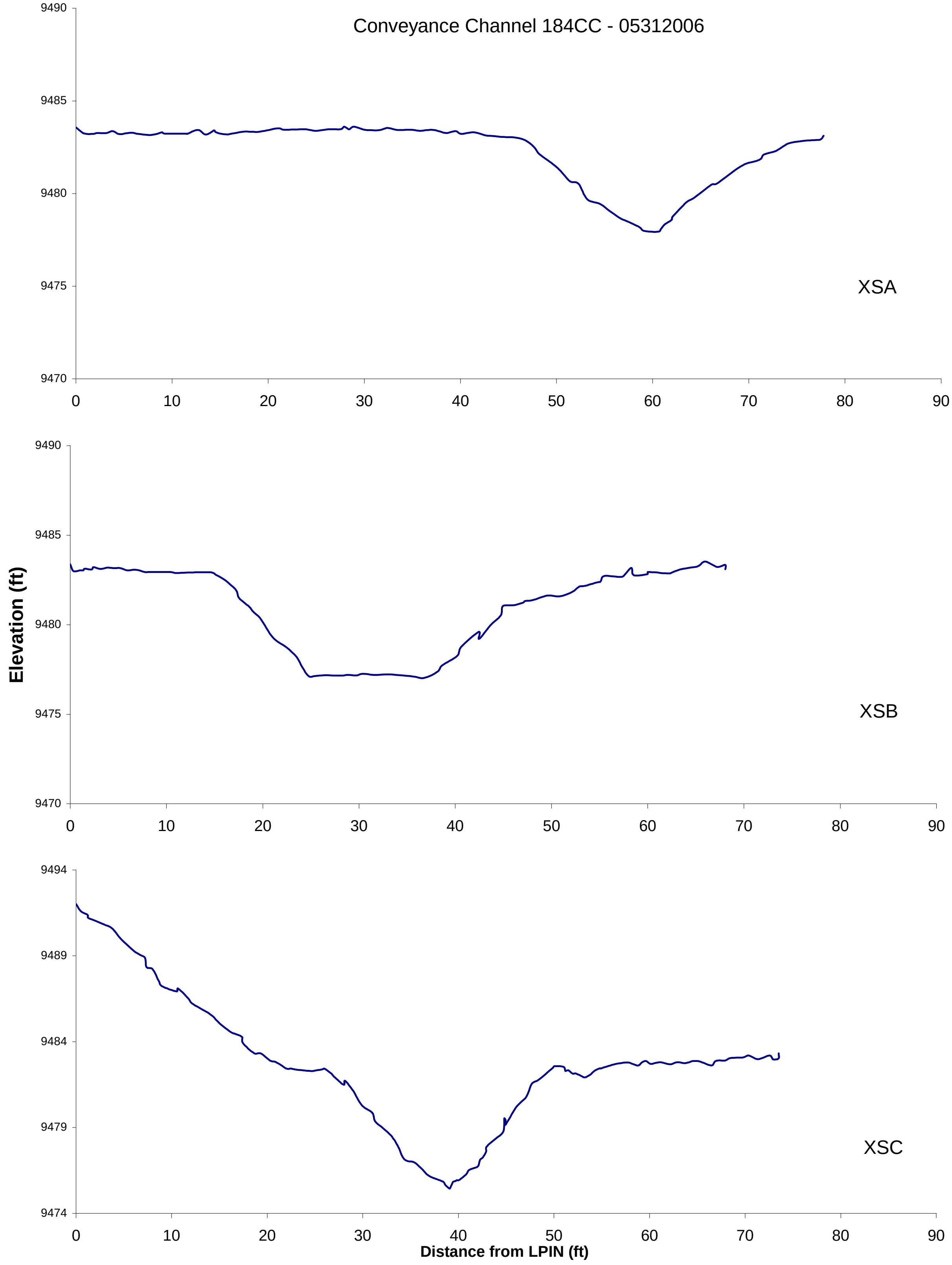

Conveyance Channel 089CC - 07192006
Elevation (ft)
Distance from LPIN (ft)
XSA
XSB
XSC
11878
11877
11876
11875
11874
11873
11870
11869
11868
11867
11866
11865
11864
11863
11862
11861
11860
0
5
10
15
20
25
30
35
40
45
50

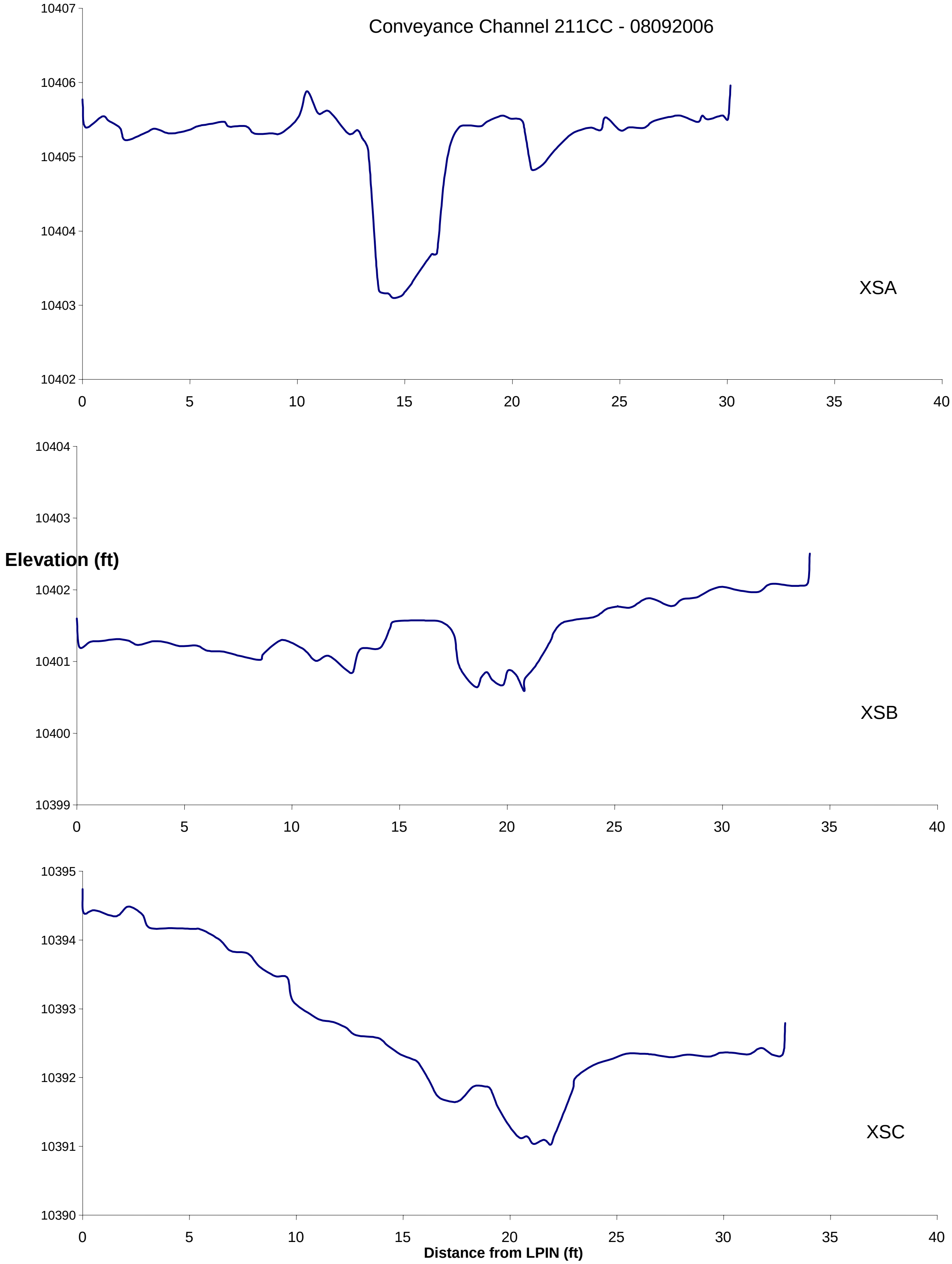

Conveyance Channel 094CC - 08102006
Elevation (ft)
Distance from LPIN (ft)
XSA
XSB
XSC
11912
11910
11908
11906
11904
11902
11896
11894
11892
11890
11888
11886
11884
11882
11880
11878
11876
0
5
10
15
20
25
30
35
40
45
50

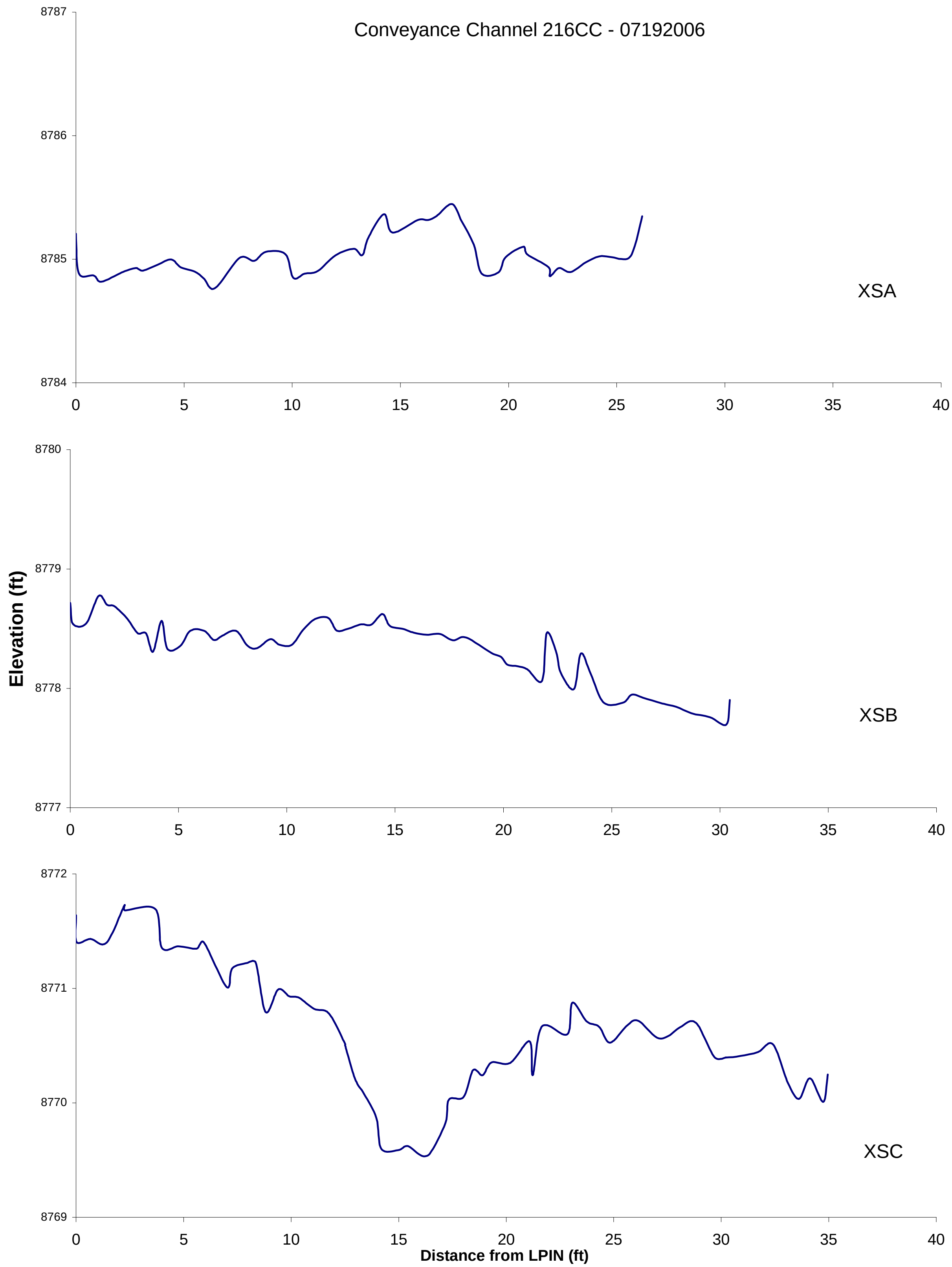

Conveyance Channel 104CC - 08242006
13088
13087
13086
13085
13084
13083
13082
0
10
20
30
40
50
60
XSA
13082
13081
13080
13079
13078
13077
13076
0
10
20
30
40
50
60
XSB
Elevation (ft)
13075
13074
13073
13072
13071
13070
13069
0
10
20
30
40
50
60
XSC
Distance from LPIN (ft)


Conveyance Channel 127CC - 08242006
XSA
XSB
XSC
Elevation (ft)
Distance from LPIN (ft)
13109
13108
13107
13106
13105
13104
13103
13102
13099
13098
13097
13096
13095
13094
13093
13092
13090
13089
13088
13087
13086
13085
13084
13083
0
5
10
15
20
25
30
35
40

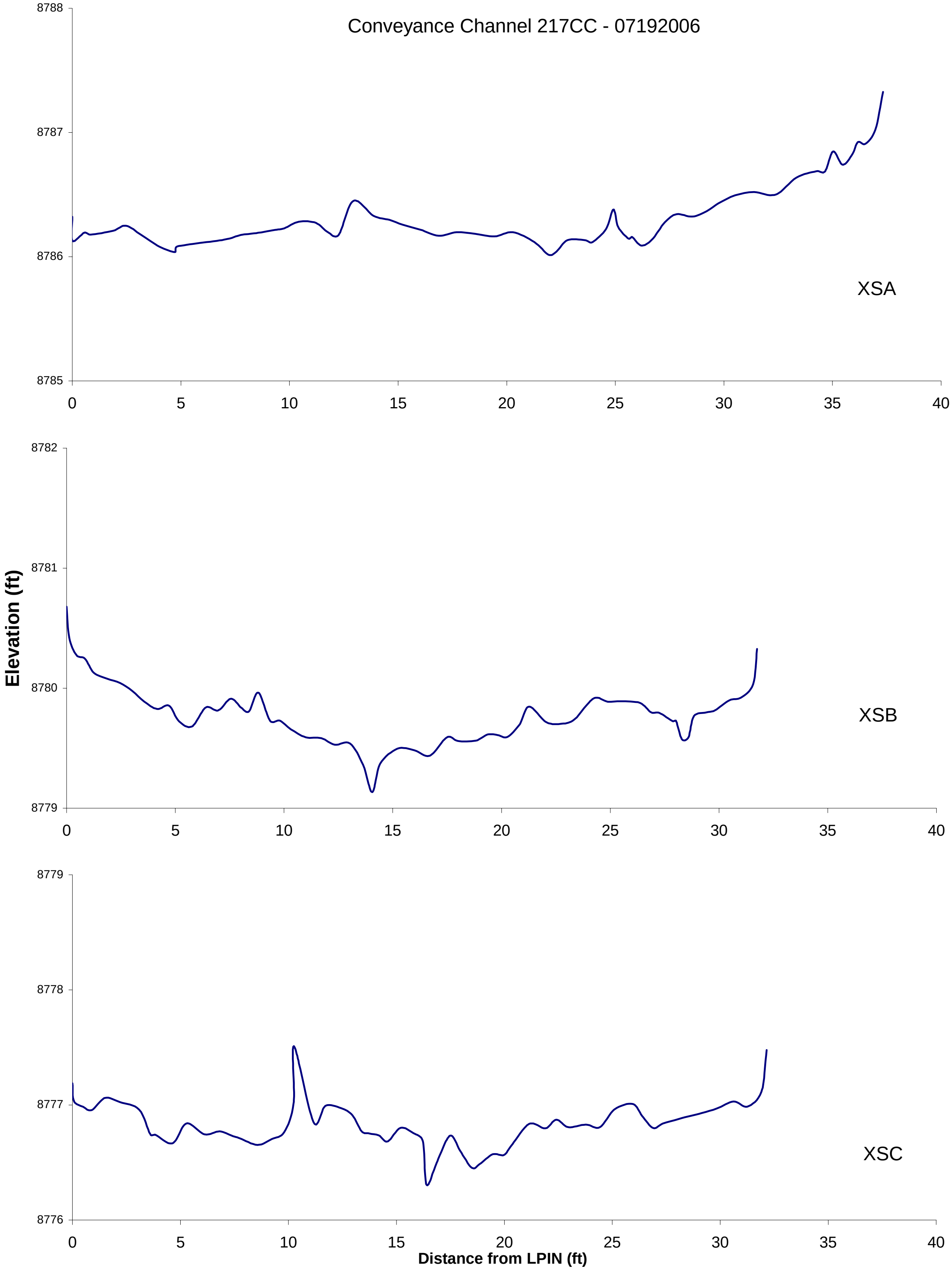

Conveyance Channel 175CC - 08102006
XSA
XSB
XSC
Elevation (ft)
Distance from LPIN (ft)
9510
9509
9508
9507
9506
9505
9504
9503
9502
9501
9500
9499
9498
9497
9496
0
10
20
30
40
50
60
70


Conveyance Channel 184CC - 05312006
Elevation (ft)
9490
9485
9480
9475
9470
0
10
20
30
40
50
60
70
80
90
XSA
9490
9485
9480
9475
9470
0
10
20
30
40
50
60
70
80
90
XSB
9494
9489
9484
9479
9474
0
10
20
30
40
50
60
70
80
90
XSC
Distance from LPIN (ft)

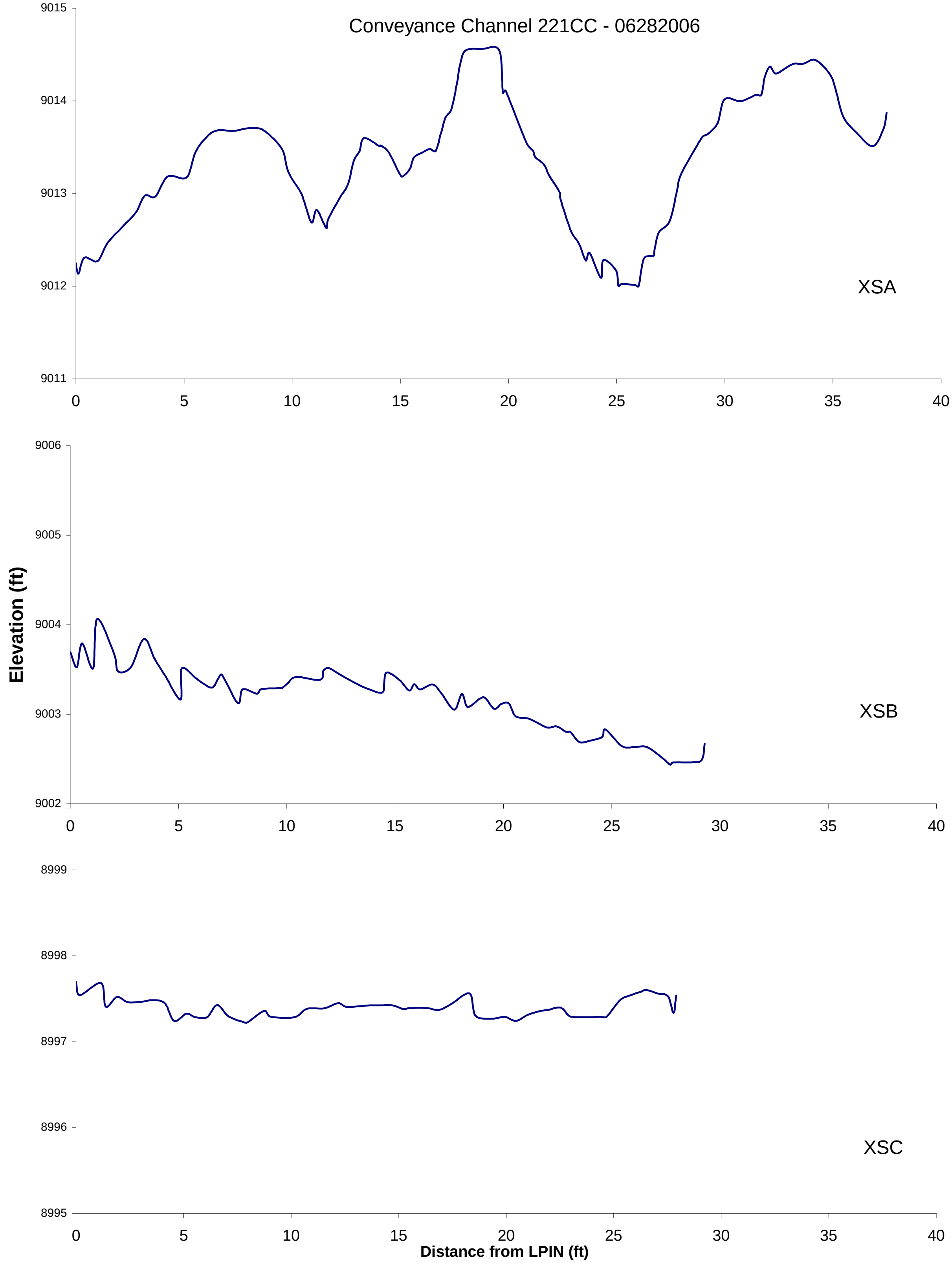

Conveyance Channel 211CC - 08092006
Elevation (ft)
Distance from LPIN (ft)
XSA
XSB
XSC
10407
10406
10405
10404
10403
10402
10404
10403
10402
10401
10400
10399
10395
10394
10393
10392
10391
10390
0
5
10
15
20
25
30
35
40

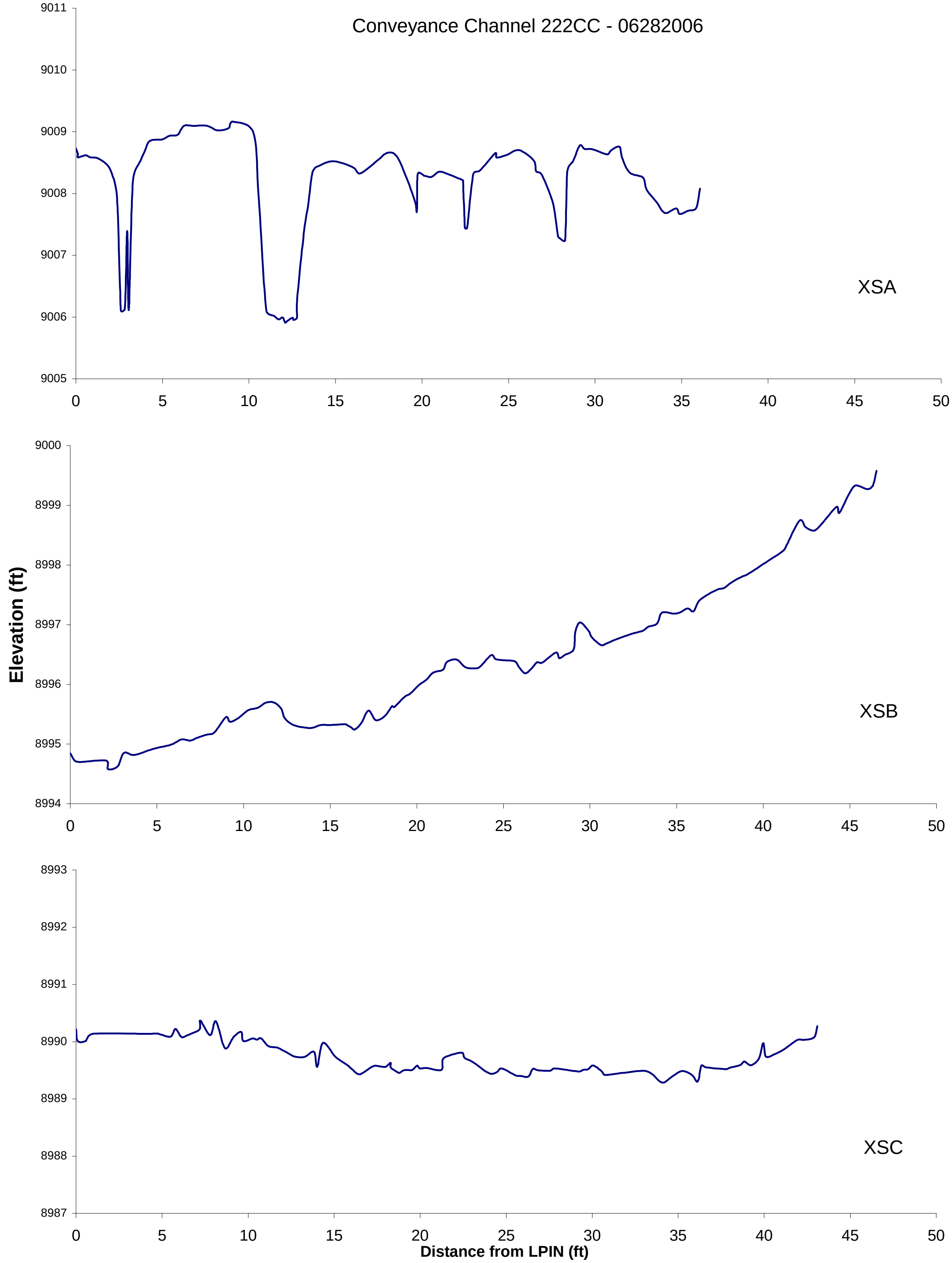


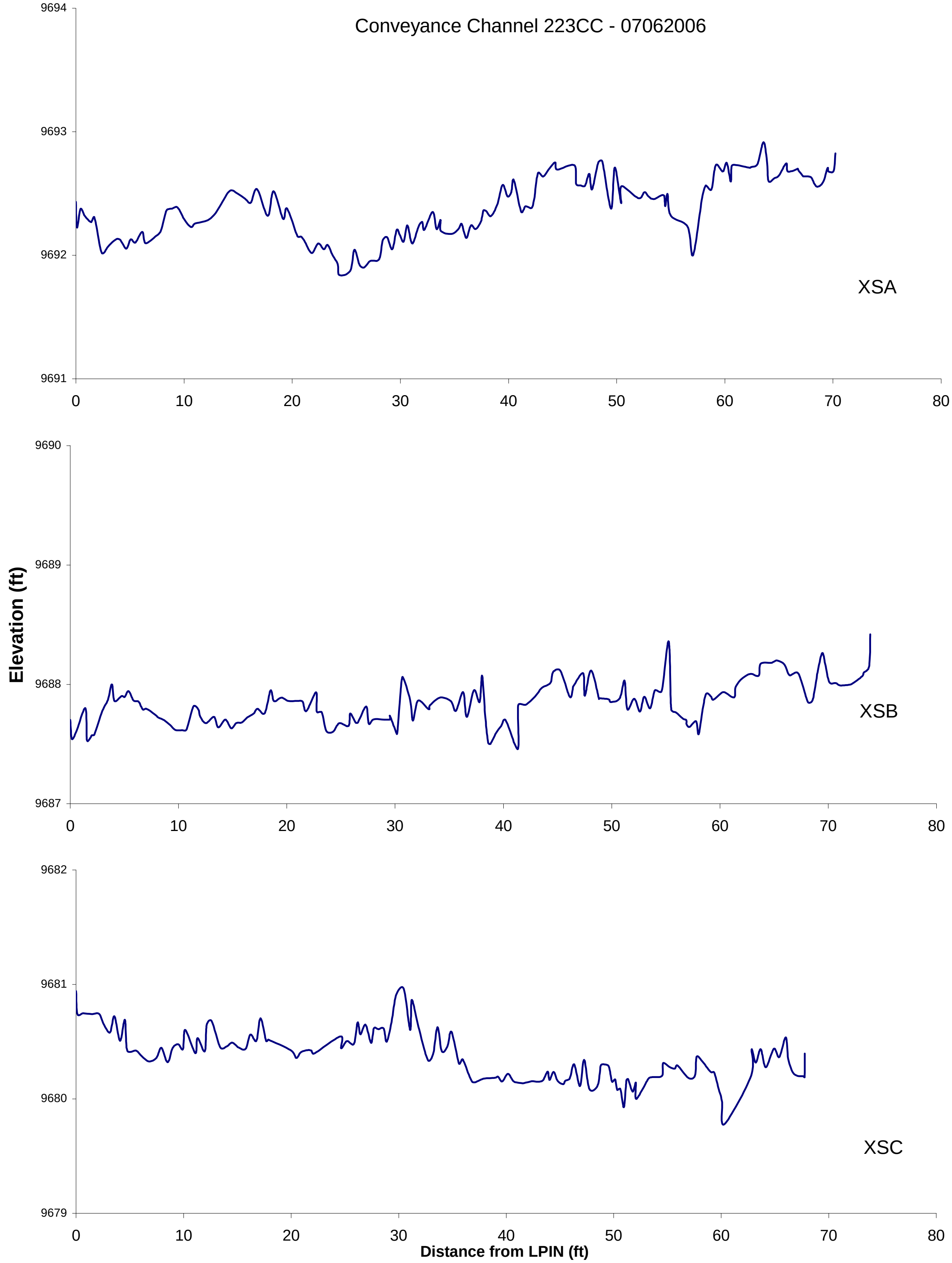
Conveyance Channel 216CC - 07192006
Elevation (ft)
8787
8786
8785
8784
XSA
0
5
10
15
20
25
30
35
40
8780
8779
8778
8777
XSB
8772
8771
8770
8769
XSC
Distance from LPIN (ft)

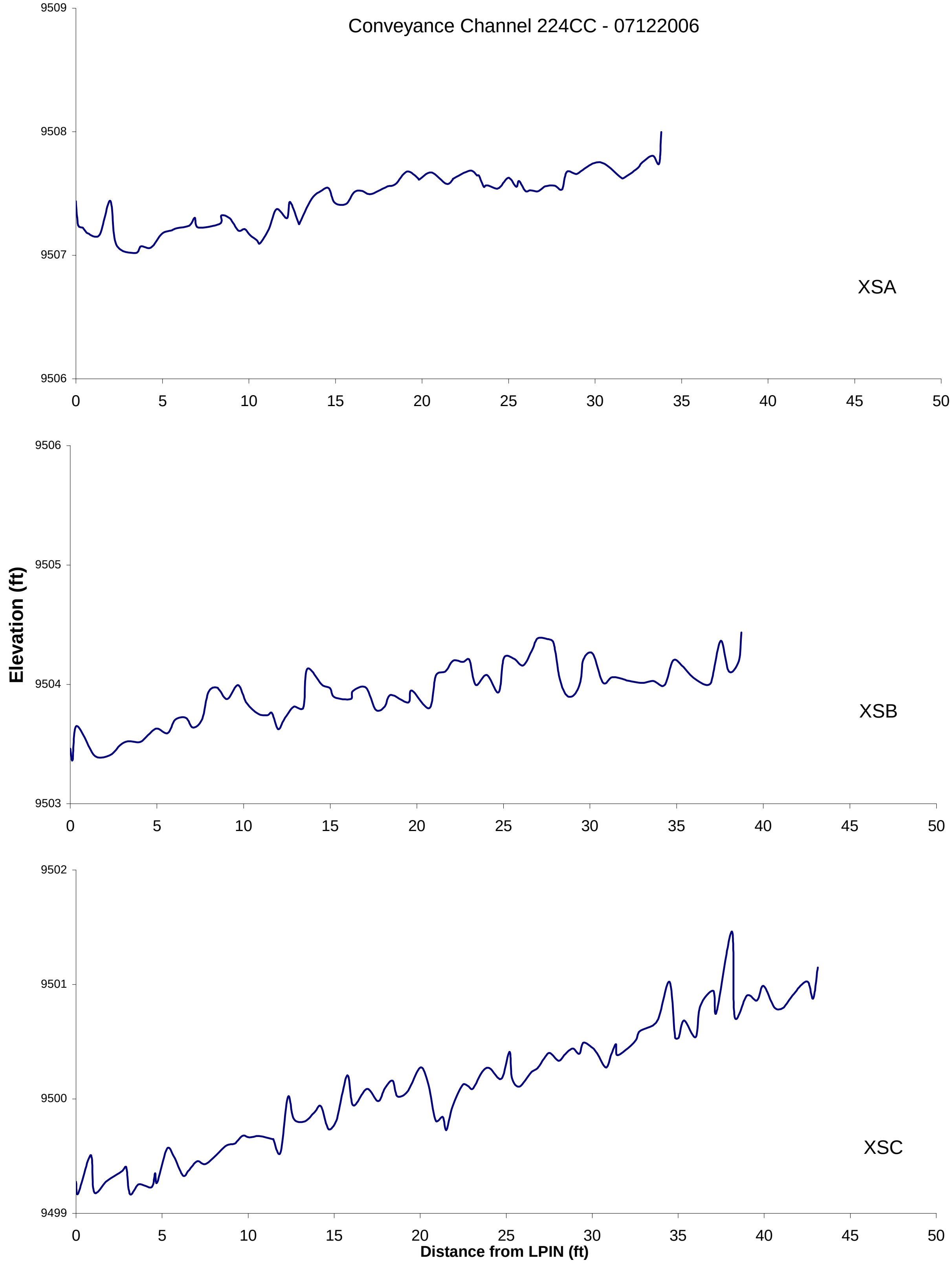

Conveyance Channel 217CC - 07192006
Elevation (ft)
Distance from LPIN (ft)
XSA
XSB
XSC
8788
8787
8786
8785
8782
8781
8780
8779
8778
8777
8776
0
5
10
15
20
25
30
35
40

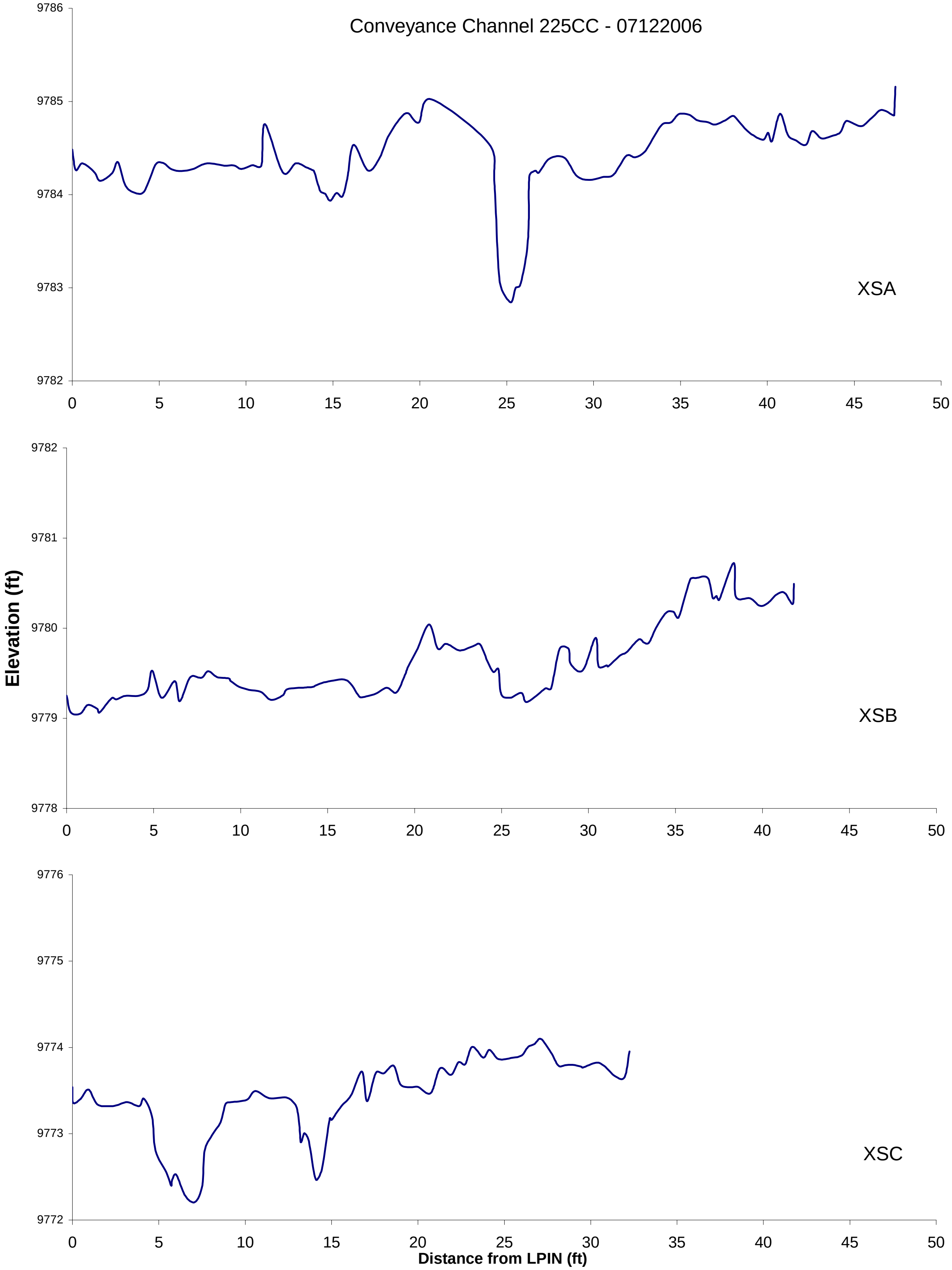

Conveyance Channel 220CC - 07062006
Elevation (ft)
Distance from LPIN (ft)
XSA
XSB
XSC
8994
8993
8992
8991
8990
8986
8985
8984
8983
8982
8981
8980
8979
8978
8977
0
10
20
30
40
50
60
70
80

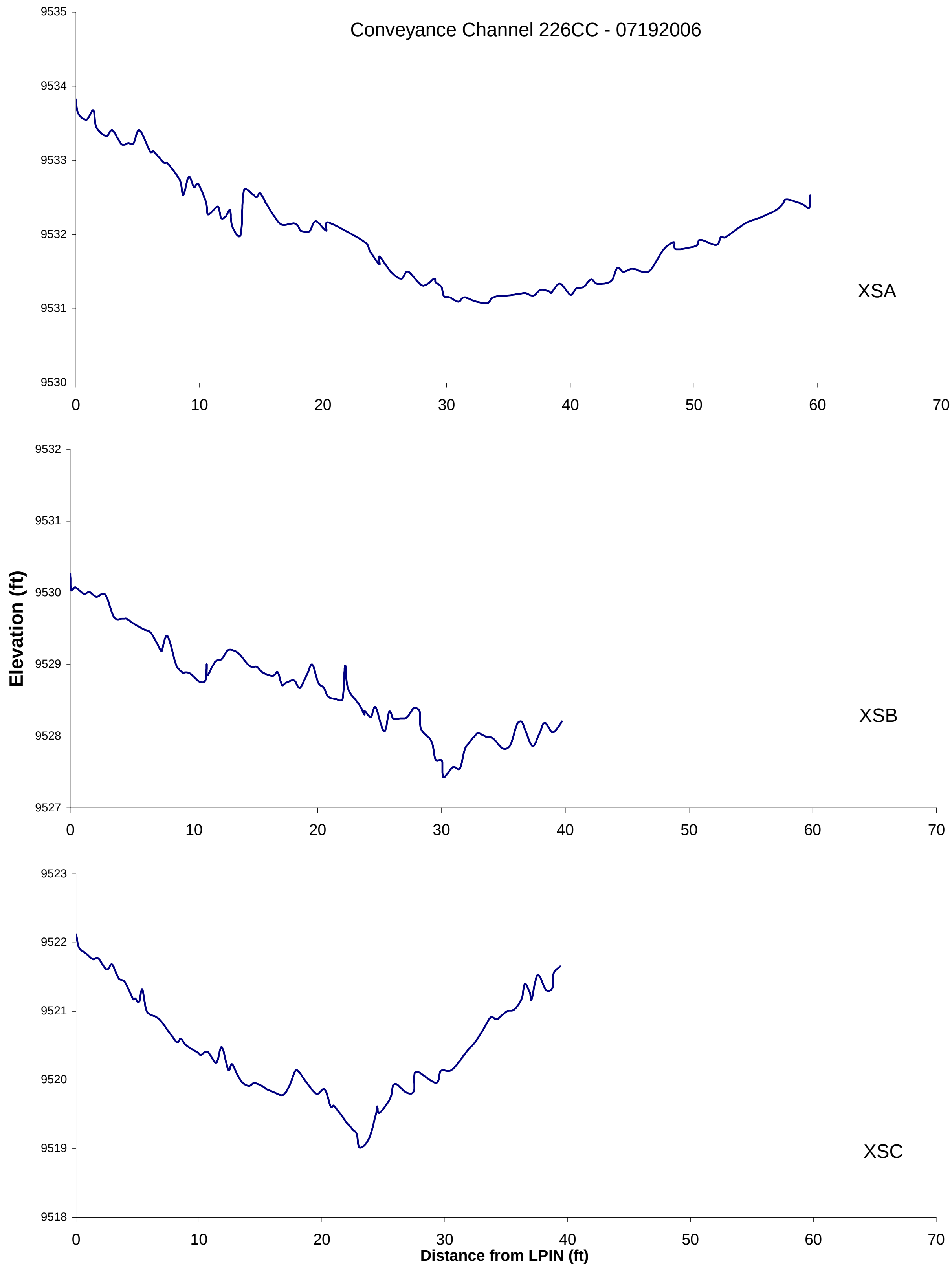

Conveyance Channel 221CC - 06282006
XSA
XSB
XSC
Elevation (ft)
Distance from LPIN (ft)
9015
9014
9013
9012
9011
9006
9005
9004
9003
9002
8999
8998
8997
8996
8995
0
5
10
15
20
25
30
35
40


Conveyance Channel 222CC - 06282006
XSA
XSB
XSC
Elevation (ft)
Distance from LPIN (ft)
9011
9010
9009
9008
9007
9006
9005
9000
8999
8998
8997
8996
8995
8994
8993
8992
8991
8990
8989
8988
8987
0
5
10
15
20
25
30
35
40
45
50

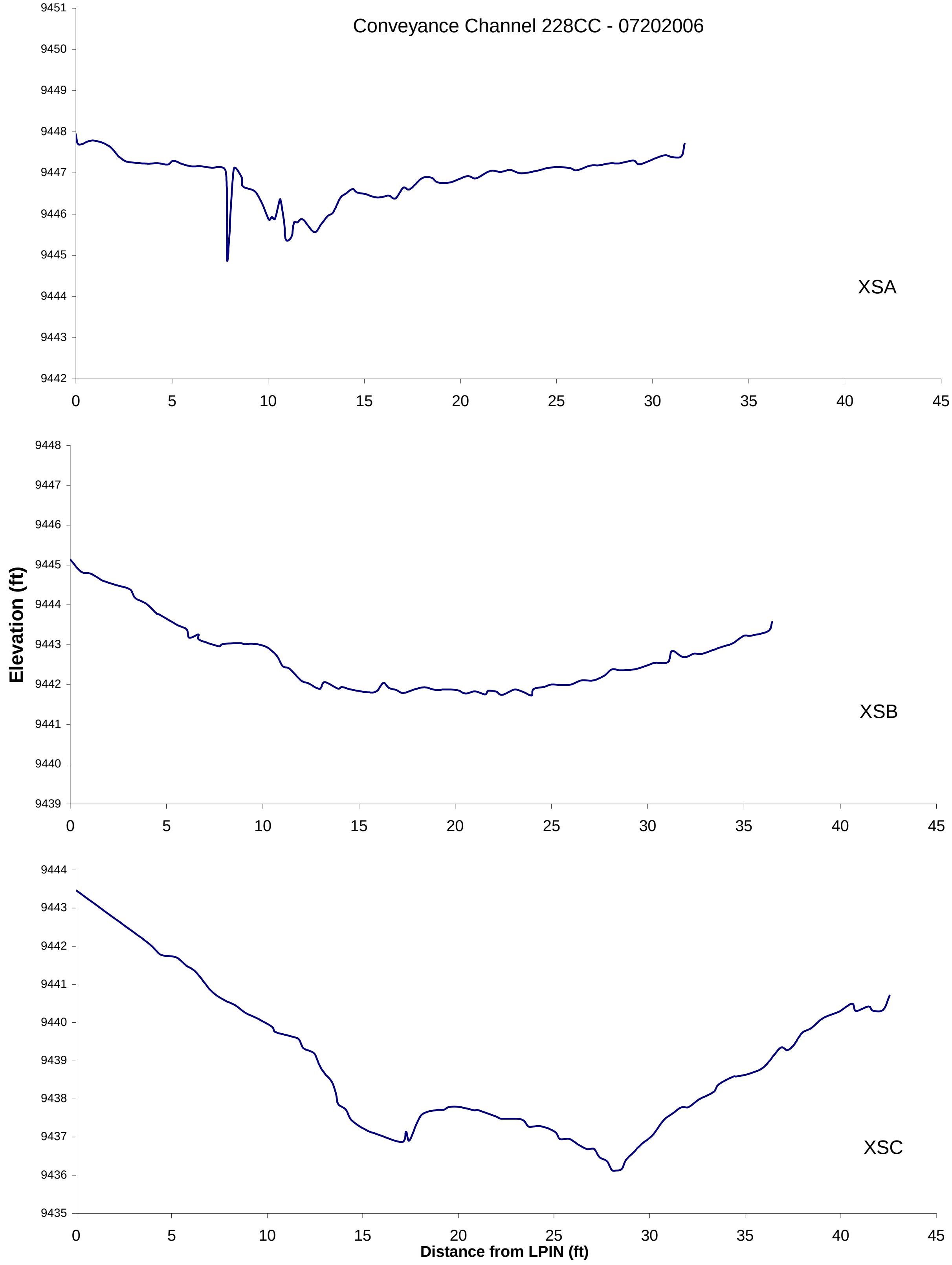

Conveyance Channel 223CC - 07062006
9694
9693
9692
9691
0
10
20
30
40
50
60
70
80
XSA
9690
9689
9688
9687
XSB
9682
9681
9680
9679
XSC
Elevation (ft)
Distance from LPIN (ft)

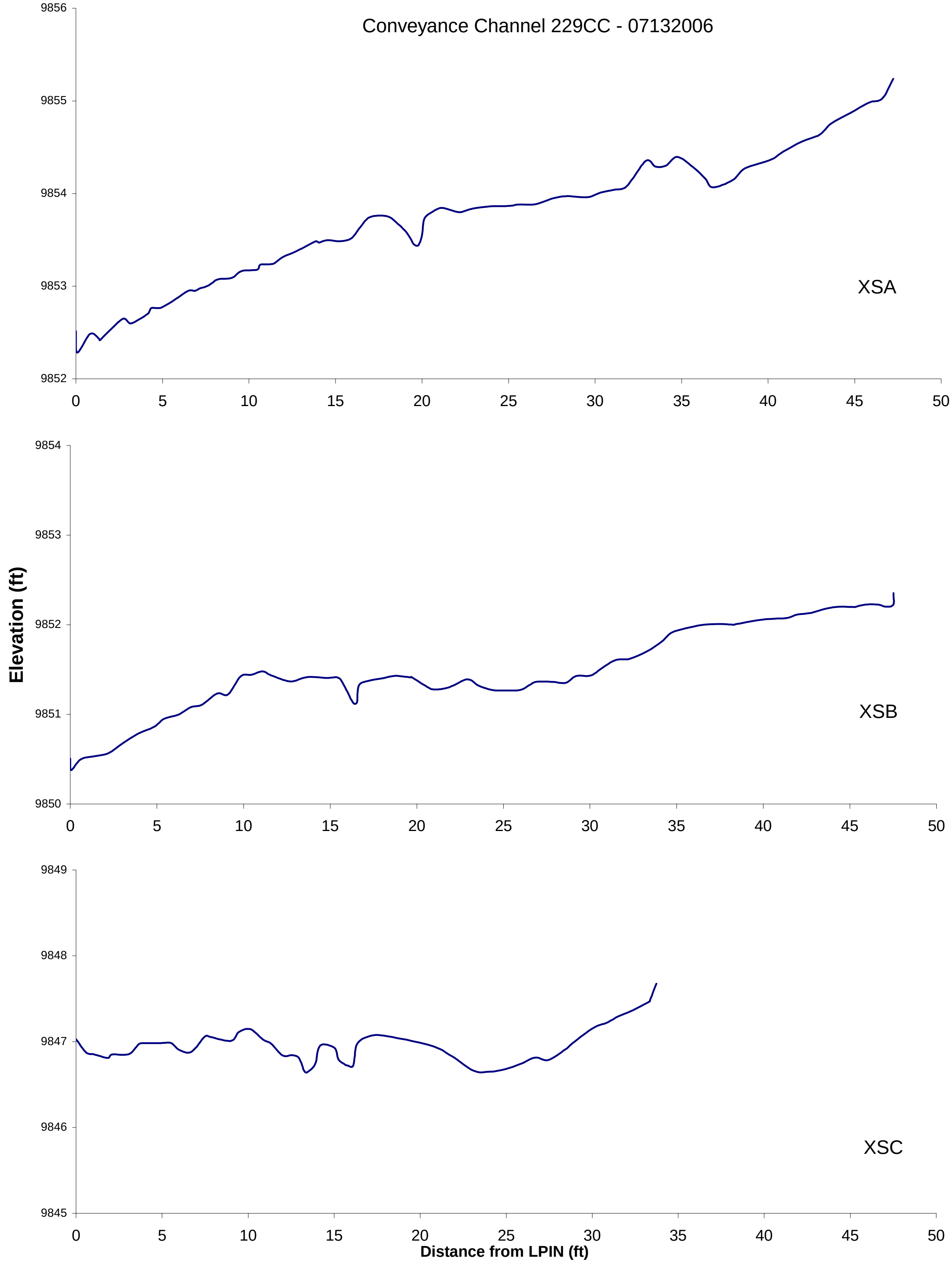

Conveyance Channel 224CC - 07122006
Elevation (ft)
Distance from LPIN (ft)
XSA
XSB
XSC
9509
9508
9507
9506
9505
9504
9503
9502
9501
9500
9499
0
5
10
15
20
25
30
35
40
45
50

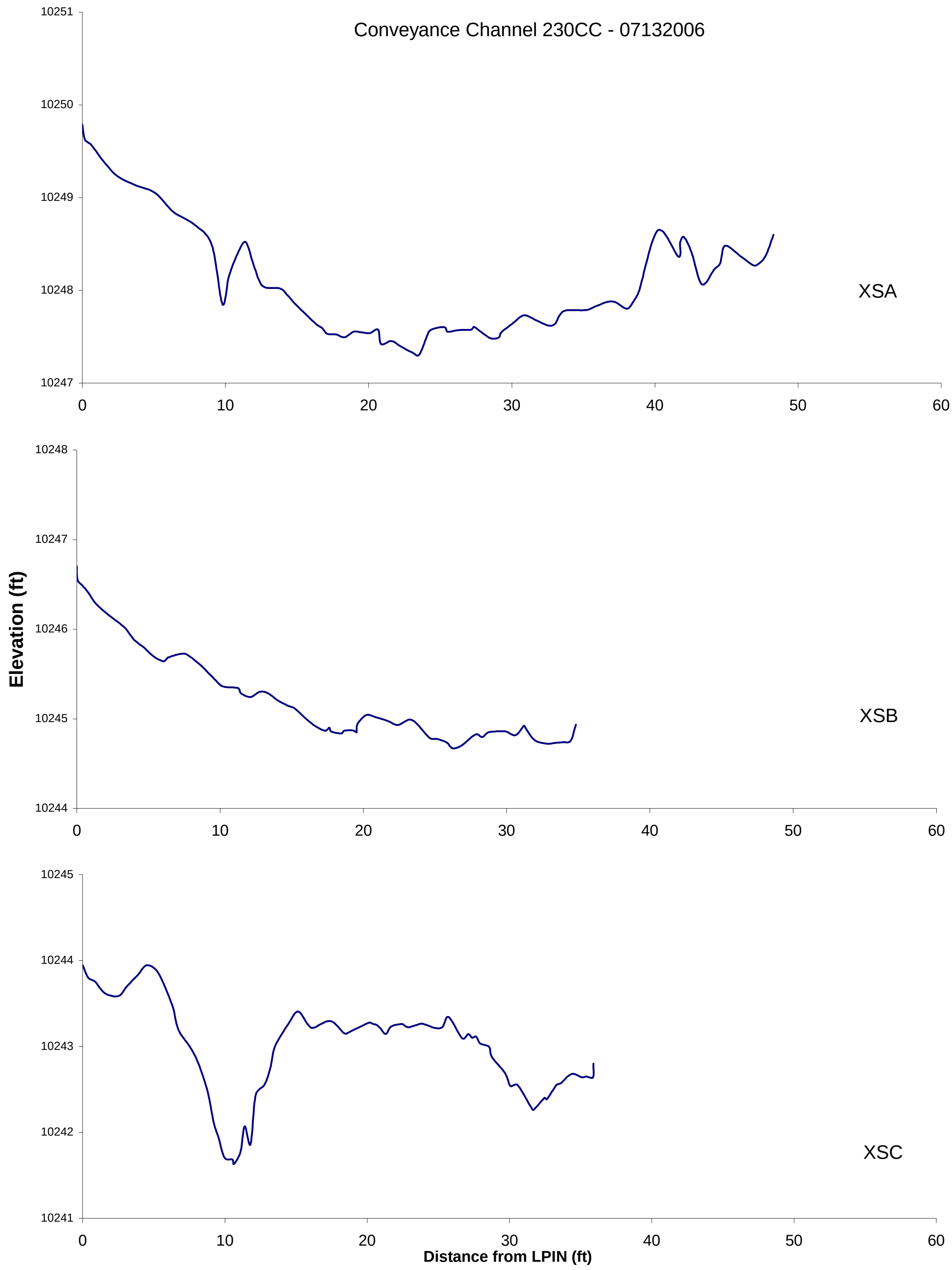

Conveyance Channel 225CC - 07122006
9786
9785
9784
9783
9782
0 5 10 15 20 25 30 35 40 45 50
XSA
9782
9781
9780
9779
9778
0 5 10 15 20 25 30 35 40 45 50
XSB
Elevation (ft)
9776
9775
9774
9773
9772
0 5 10 15 20 25 30 35 40 45 50
XSC
Distance from LPIN (ft)

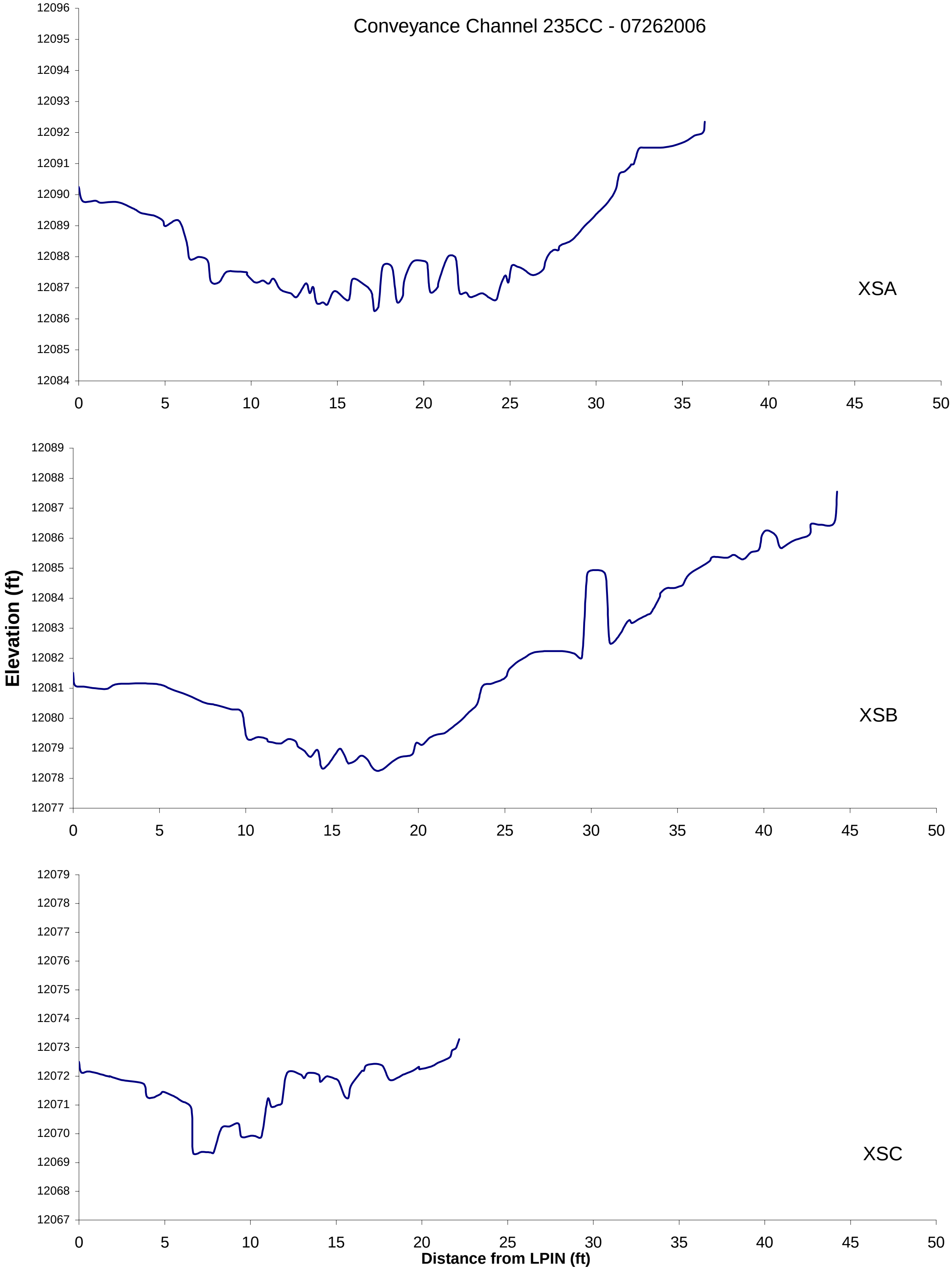


Conveyance Channel 226CC - 07192006
XSA
XSB
XSC
Elevation (ft)
Distance from LPIN (ft)
9535
9534
9533
9532
9531
9530
9529
9528
9527
9523
9522
9521
9520
9519
9518
0
10
20
30
40
50
60
70


Conveyance Channel 228CC - 07202006
XSA
XSB
XSC
Elevation (ft)
Distance from LPIN (ft)


Conveyance Channel 229CC - 07132006
XSA
XSB
XSC
Elevation (ft)
Distance from LPIN (ft)


Conveyance Channel 230CC - 07132006
XSA
XSB
XSC
Elevation (ft)
Distance from LPIN (ft)
10251
10250
10249
10248
10247
10246
10245
10244
10243
10242
10241
0
10
20
30
40
50
60


Conveyance Channel 235CC - 07262006
XSA
XSB
XSC
Elevation (ft)
Distance from LPIN (ft)

Appendix G

Sediment Ponds and Traps
Silt Fence Site Visit Dates

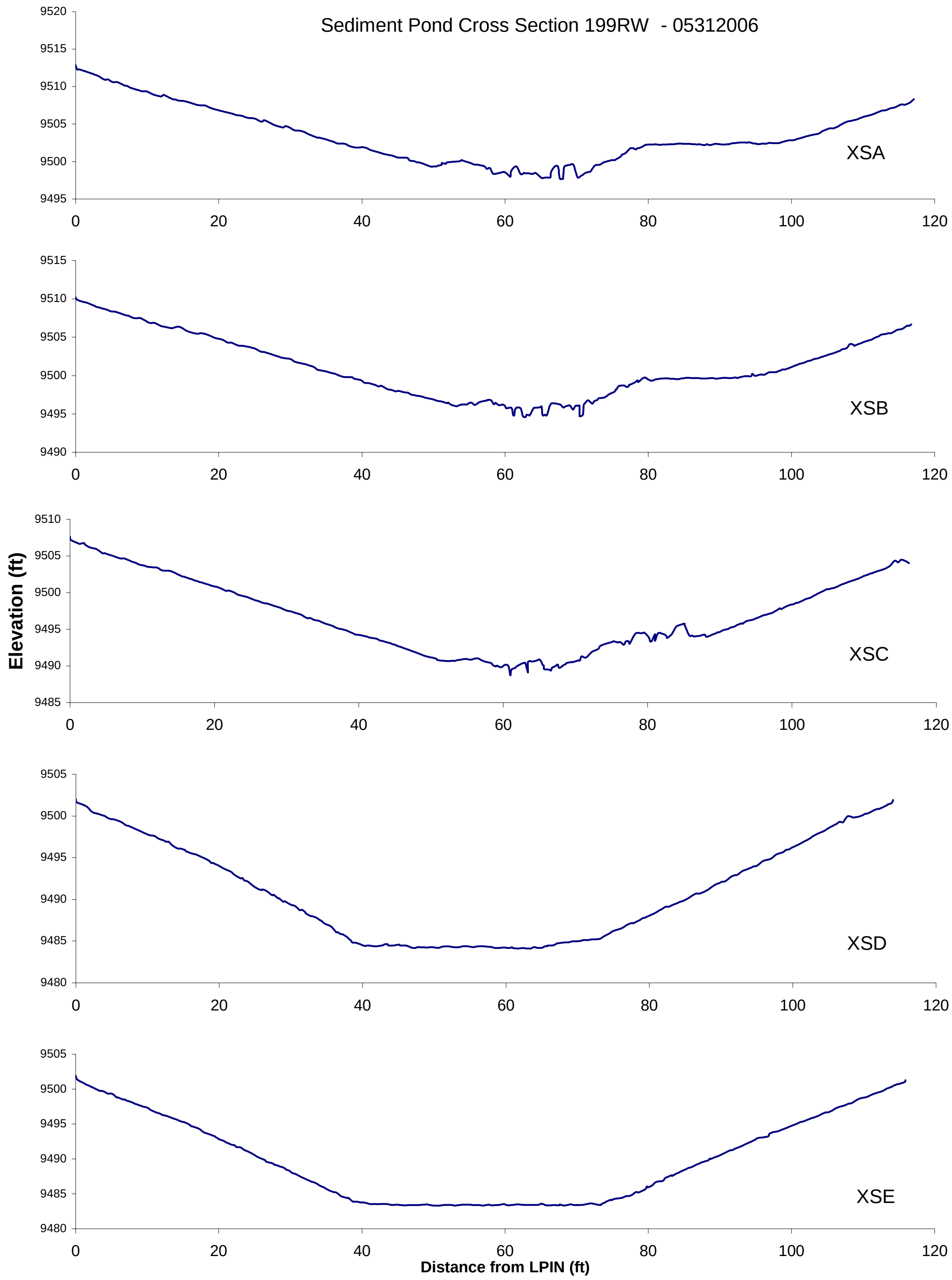
and

Sediment Pond Cross Section
Graphs

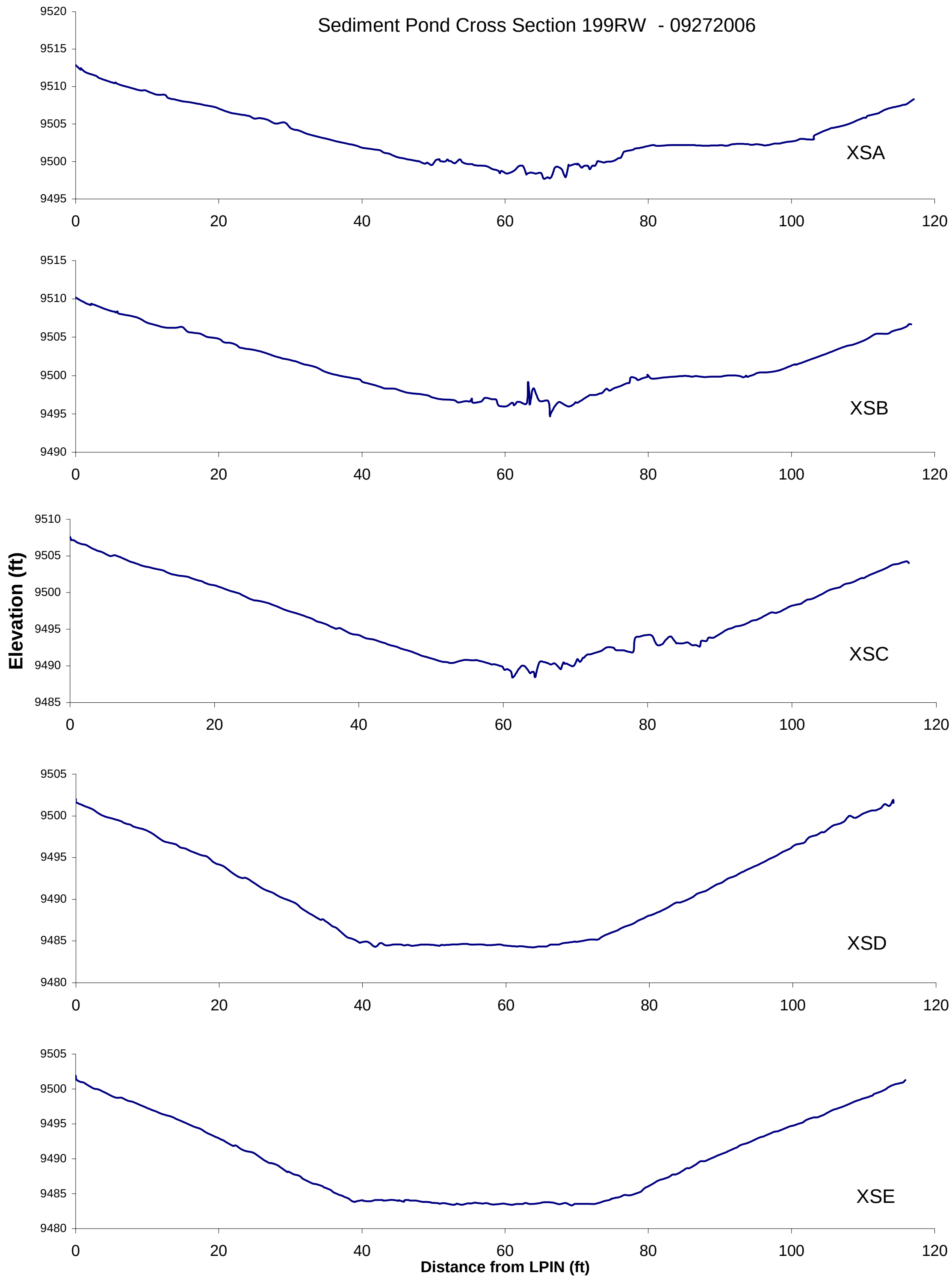
2006

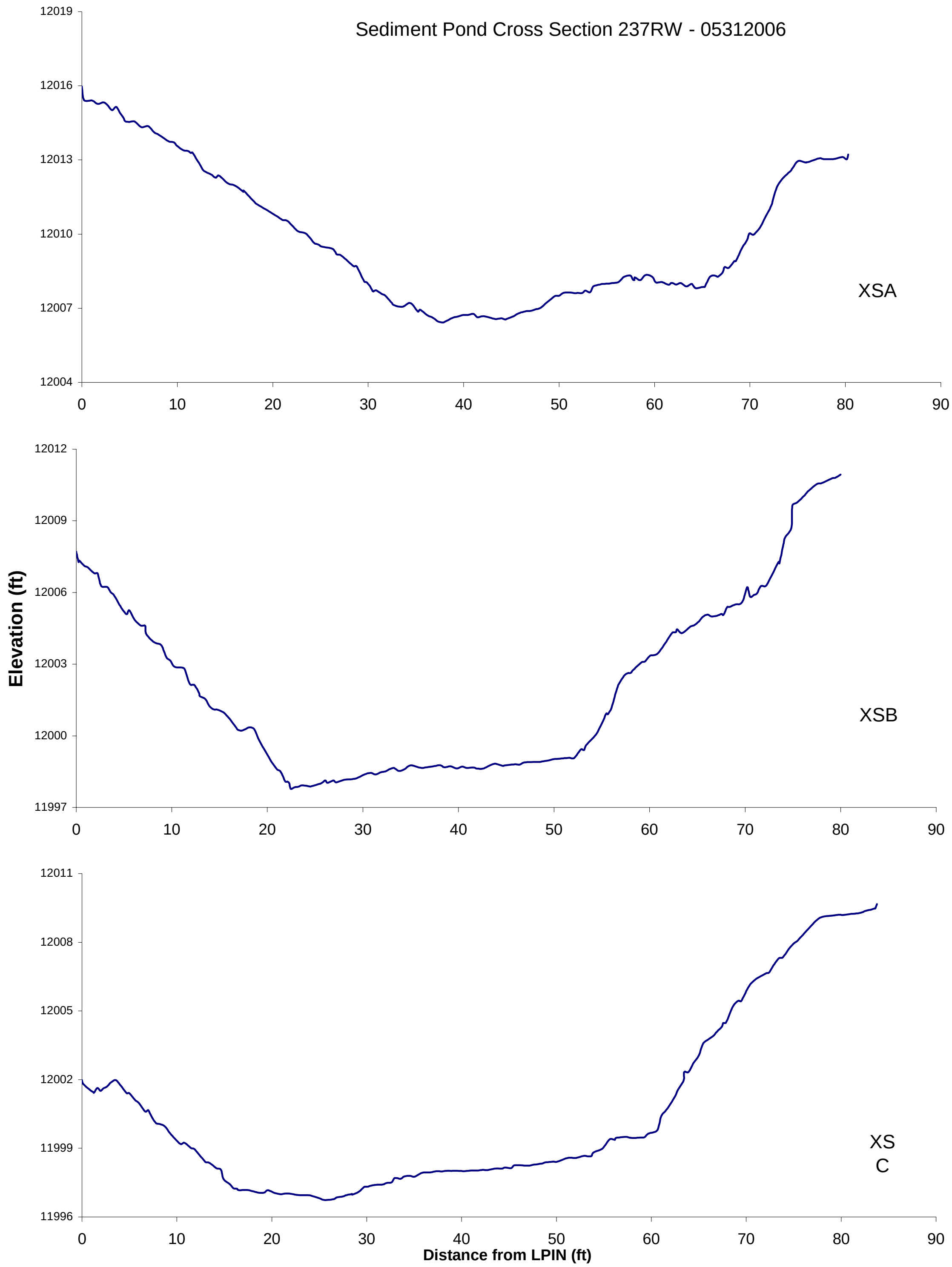
Survey Dates of Sediment Ponds and Traps Silt Fences 2006

Site ID	Sediment Ponds and Traps Site Visit Dates 2006									
002RW	5/8/2006	5/19/2006	5/26/2006	6/19/2006	7/27/2006	8/2/2006	8/17/2006	9/14/2006	9/20/2006	
003RW	5/8/2006	5/10/2006	6/19/2006	7/27/2006	8/2/2006	8/17/2006	9/1/2006	9/20/2006		
006RW	5/2/2006	5/8/2006	6/19/2006	7/27/2006	8/2/2006	8/17/2006	9/11/2006	9/20/2006		
008RW	5/6/2006	5/23/2006	6/19/2006	7/27/2006	8/2/2006	8/17/2006	9/5/2006	9/20/2006		
009RA	5/6/2006	5/8/2006	6/19/2006	7/27/2006	8/2/2006	8/17/2006	8/30/2006	9/3/2006	9/20/2006	
152RW	5/8/2006	5/10/2006	6/19/2006	7/27/2006	8/2/2006	8/17/2006	9/13/2006	9/20/2006		
153RW	5/30/2006	7/27/2006	9/14/2006							
161RW	5/23/2006	5/24/2006	8/17/2006	9/13/2006						
162RW	5/10/2006	5/18/2006	6/19/2006	6/26/2006	7/27/2006	8/2/2006	8/17/2006	9/6/2006	9/20/2006	
163RA	5/8/2006	5/21/2006	6/26/2006							
176RW	5/8/2006	5/24/2006	6/26/2006	7/27/2006	8/17/2006	9/5/2006	9/7/2006			
178RW	5/8/2006	5/21/2006	5/24/2006	6/26/2006	7/27/2006	8/17/2006	9/7/2006	9/19/2006		
179RW	5/21/2006	5/24/2006	6/26/2006	7/27/2006	8/17/2006	9/7/2006	9/11/2006			
180RW	5/11/2006	5/16/2006	5/23/2006	6/26/2006	7/27/2006	8/2/2006	8/17/2006	9/6/2006	9/7/2006	9/20/2006
181RW	5/11/2006	5/16/2006	5/23/2006	6/26/2006	7/27/2006	8/2/2006	8/17/2006	9/7/2006	9/20/2006	
200RW	5/4/2006	5/19/2006	6/19/2006	7/27/2006	8/17/2006	9/3/2006				
201RW	5/8/2006	5/23/2006	6/19/2006	9/13/2006						
202RW	5/8/2006	5/21/2006	5/24/2006	6/26/2006	7/27/2006	8/2/2006	8/17/2006	9/11/2006	9/20/2006	
233RW	5/26/2006									
234RW	5/31/2006									
236RW	5/31/2006									
237RW	5/31/2006									



Sediment Pond Cross Section 199RW - 05312006
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

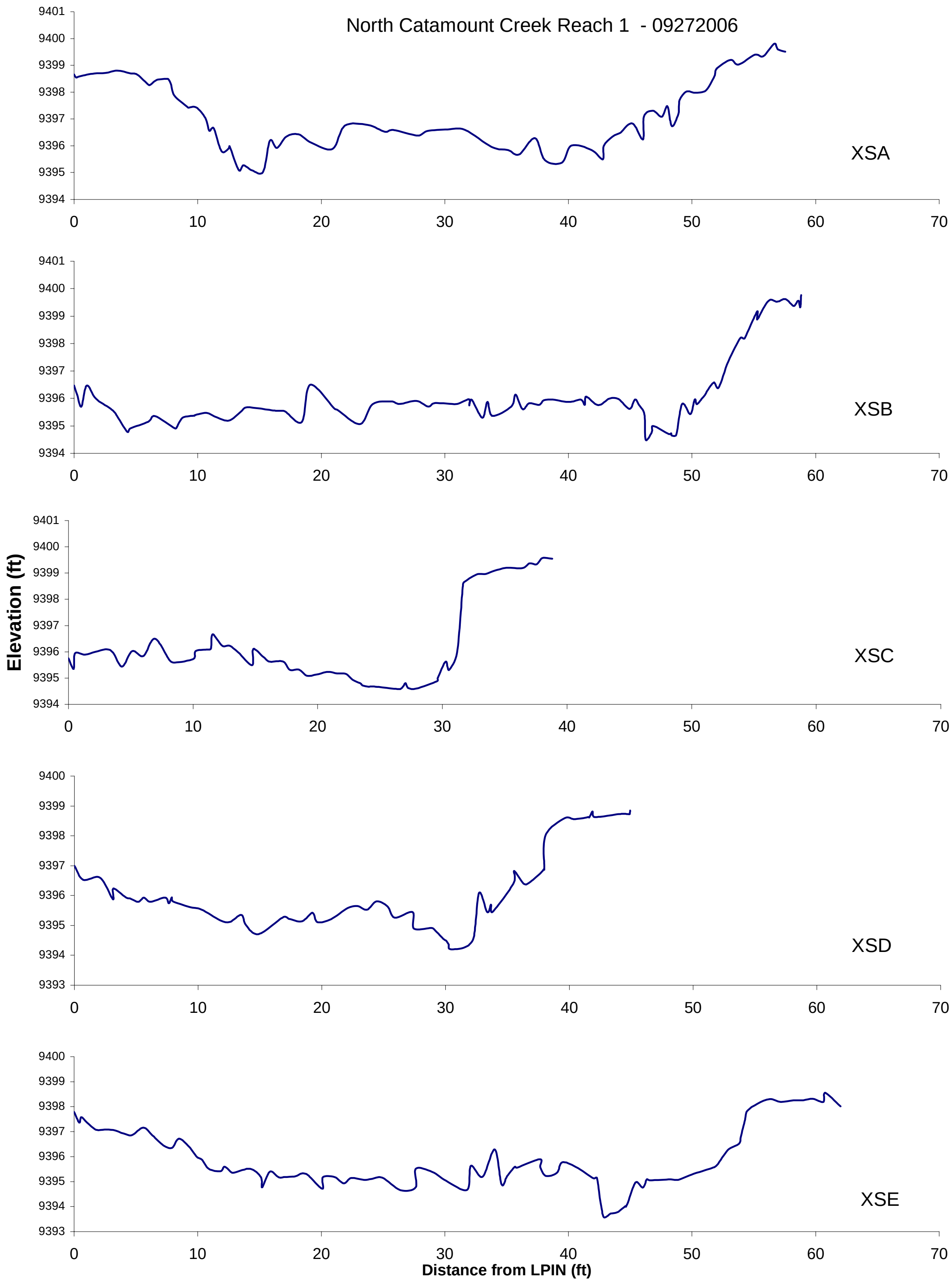

Sediment Pond Cross Section 199RW - 09272006
XSA
XSB
XSC
XSD
XSE
Elevation (ft)
Distance from LPIN (ft)
9520
9515
9510
9505
9500
9495
9490
9485
9480
0
20
40
60
80
100
120

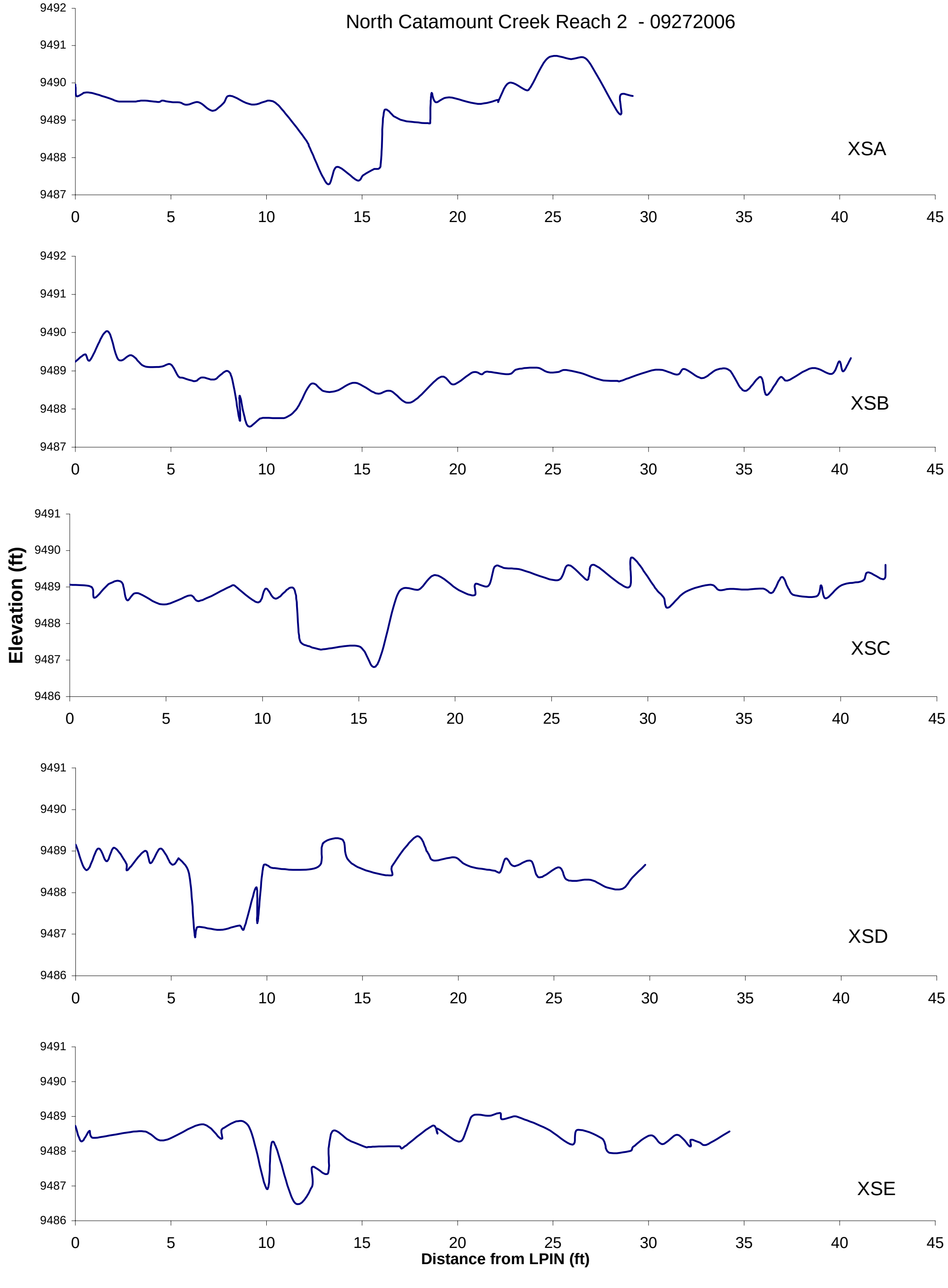

Sediment Pond Cross Section 237RW - 05312006
XSA
XSB
XS
C
Elevation (ft)
Distance from LPIN (ft)
12019
12016
12013
12010
12007
12004
12012
12009
12006
12003
12000
11997
12011
12008
12005
12002
11999
11996
0
10
20
30
40
50
60
70
80
90

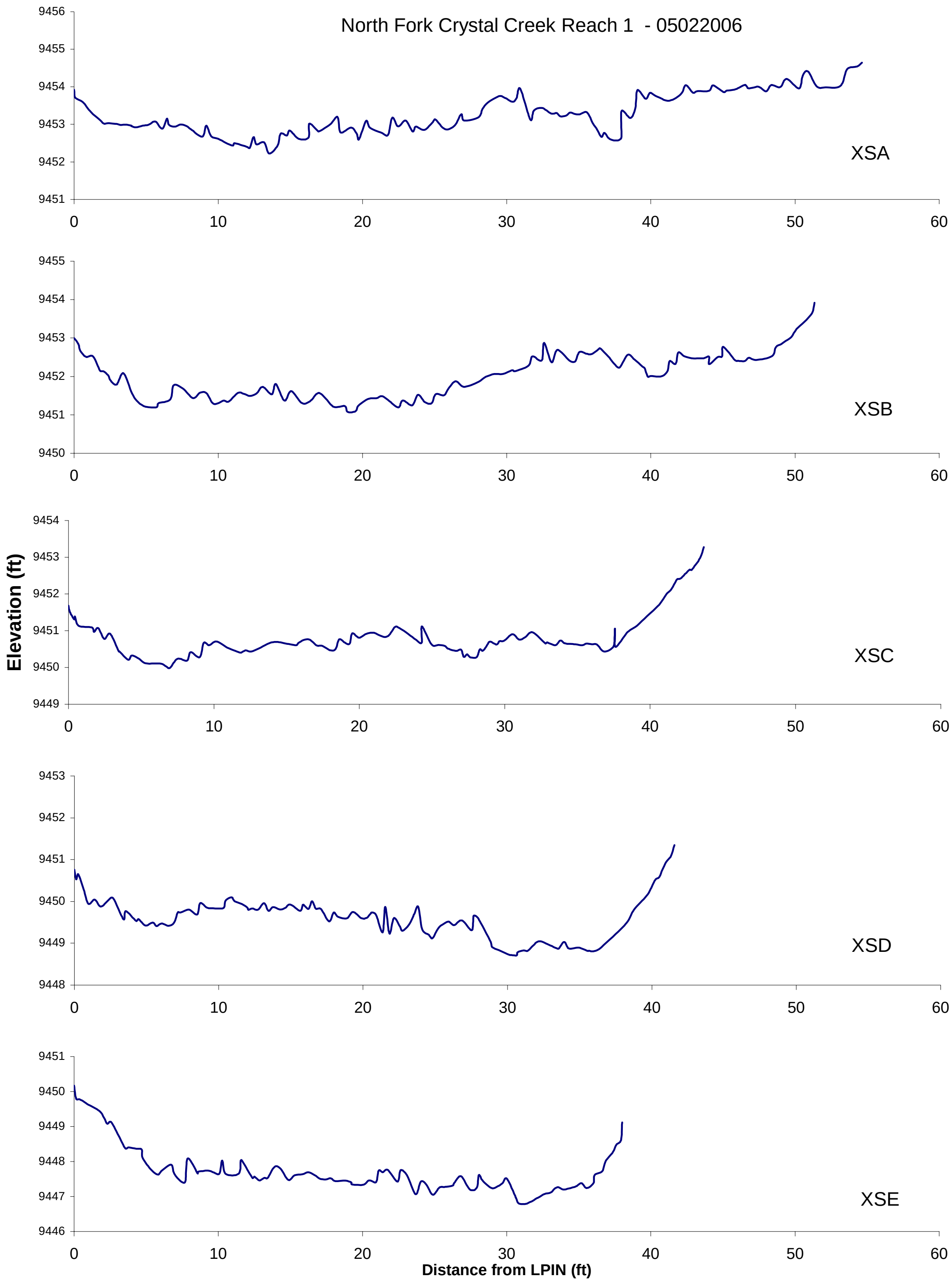
Appendix H

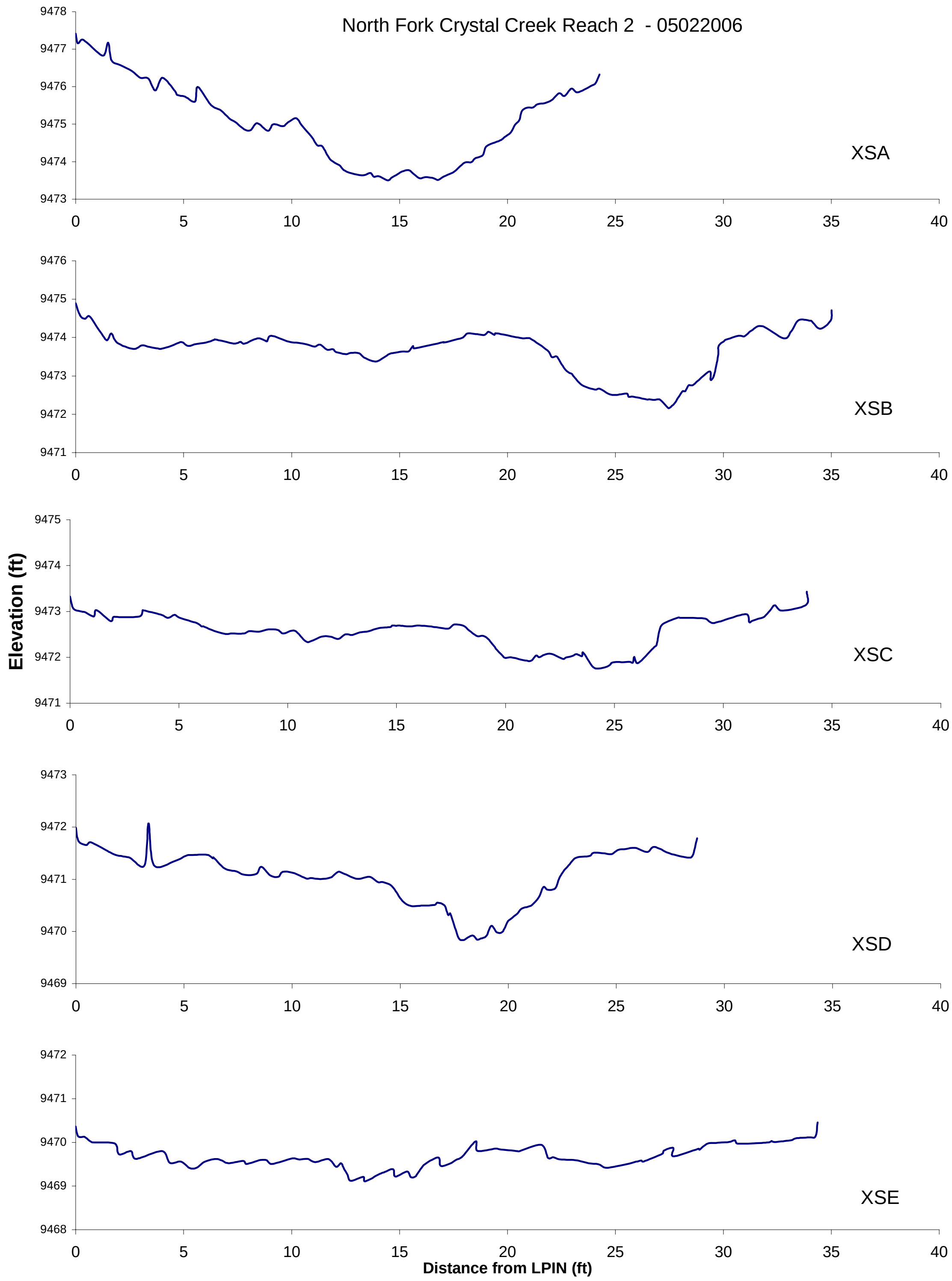
Stream Cross Section Graphs

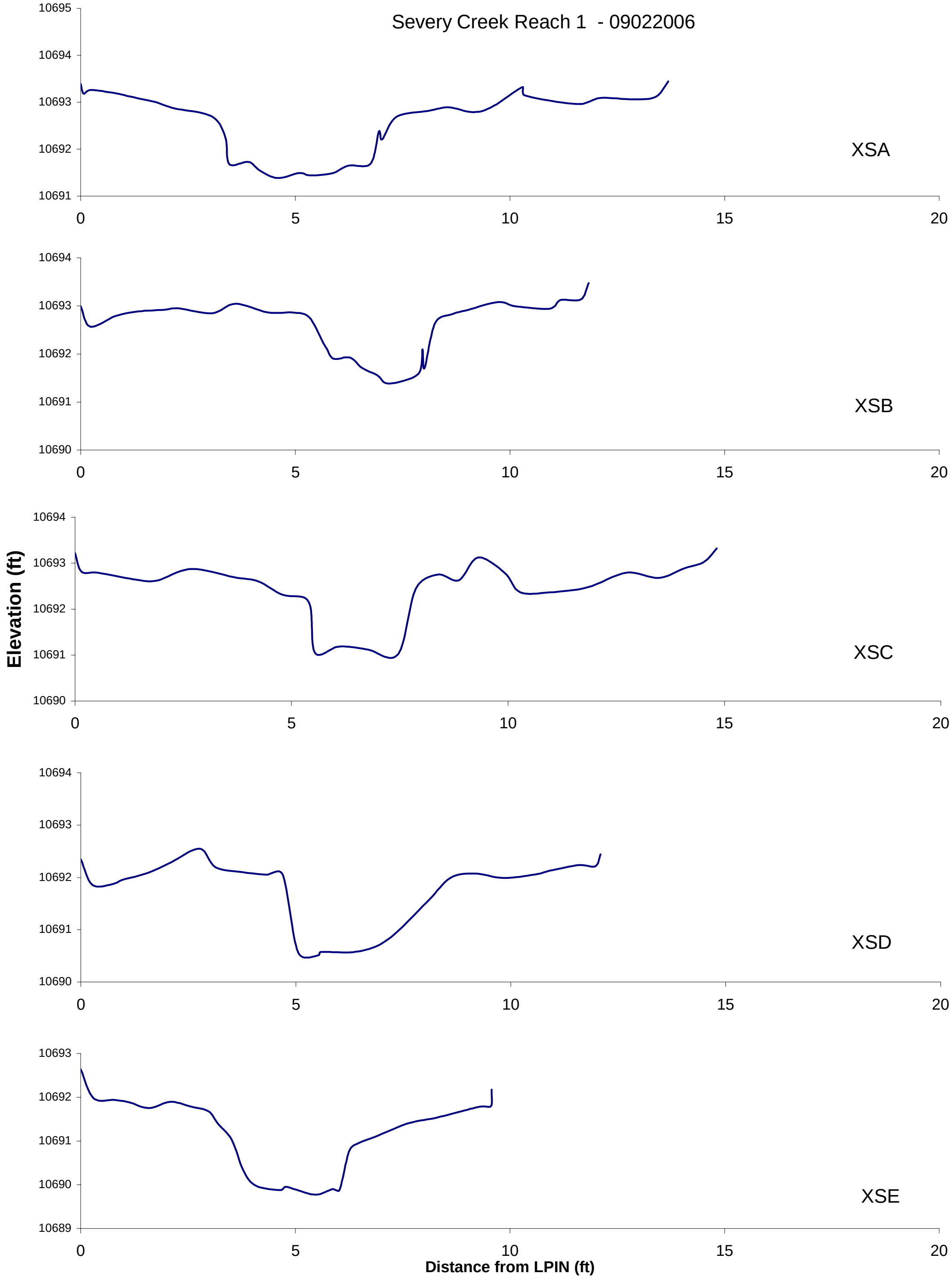
2006

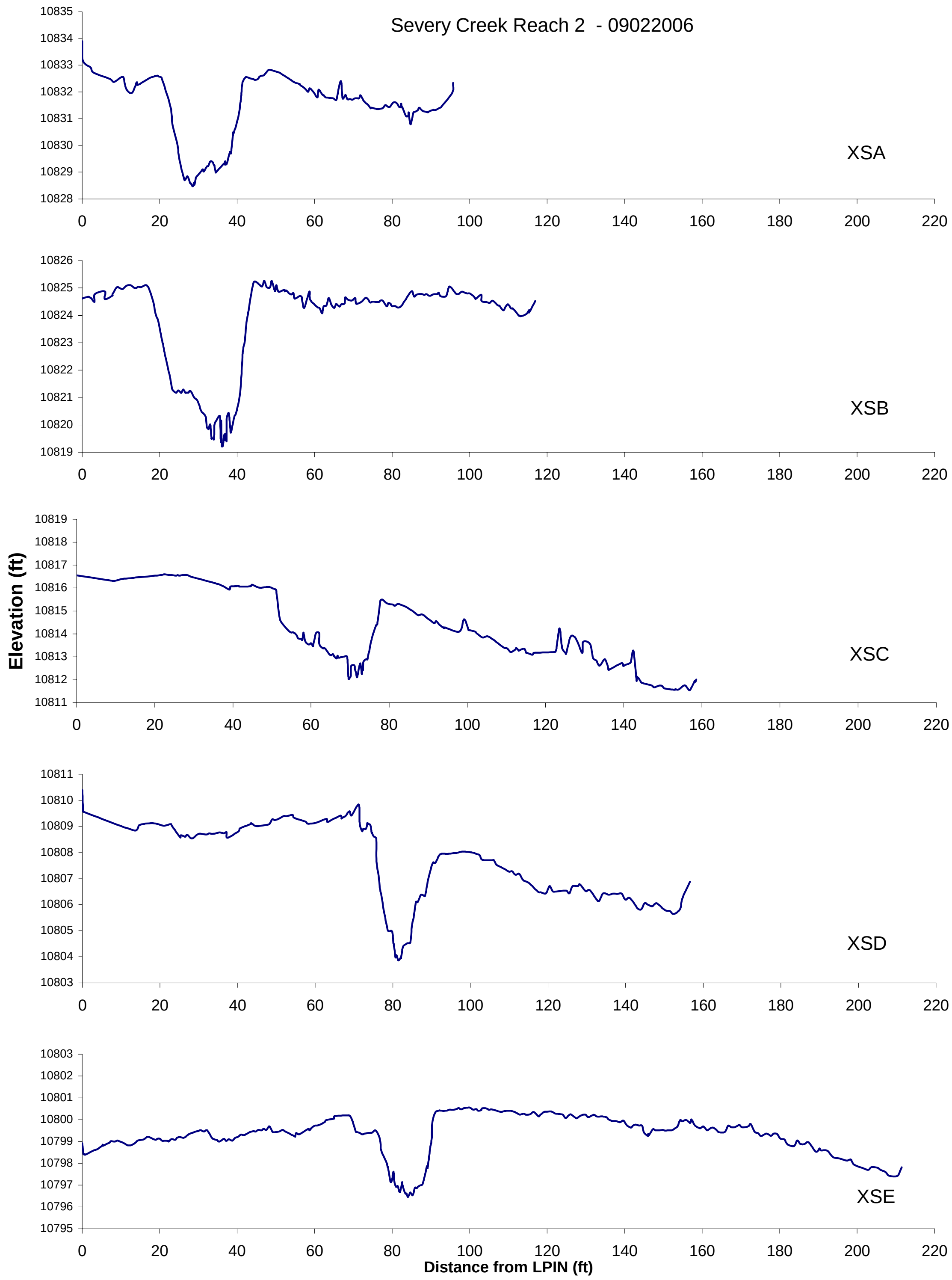

North Catamount Creek Reach 1 - 09272006
XSA
XSB
XSC
XSD
XSE
Elevation (ft)
Distance from LPIN (ft)
9401
9400
9399
9398
9397
9396
9395
9394
9393
0
10
20
30
40
50
60
70


North Catamount Creek Reach 2 - 09272006
XSA
XSB
XSC
XSD
XSE
Elevation (ft)
Distance from LPIN (ft)
9492
9491
9490
9489
9488
9487
9486
0
5
10
15
20
25
30
35
40
45


North Fork Crystal Creek Reach 1 - 05022006
XSA
XSB
XSC
XSD
XSE
Elevation (ft)
Distance from LPIN (ft)


North Fork Crystal Creek Reach 2 - 05022006
Elevation (ft)
Distance from LPIN (ft)
XSA
XSB
XSC
XSD
XSE
9478
9477
9476
9475
9474
9473
9472
9471
9470
9469
9468
0
5
10
15
20
25
30
35
40


Severy Creek Reach 1 - 09022006
Elevation (ft)
Distance from LPIN (ft)
XSA
XSB
XSC
XSD
XSE
10695
10694
10693
10692
10691
10690
10689
0
5
10
15
20


Severy Creek Reach 2 - 09022006
XSA
XSB
XSC
XSD
XSE
Elevation (ft)
Distance from LPIN (ft)

Appendix I

Stream Pebble Counts, Particle Size Distributions and Graphs

2006

Pebble Count Worksheet

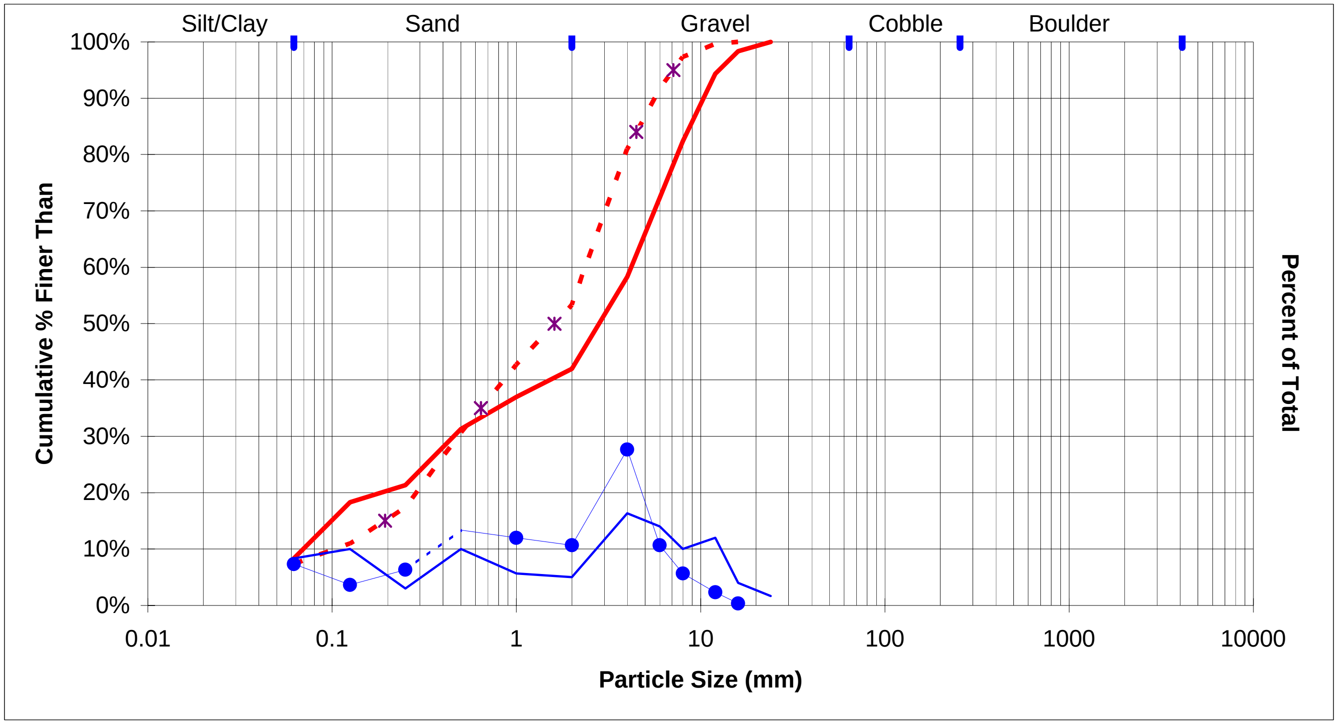
Particle Size (mm)	% finer than	Total Count
<0.062	7%	22
0.062 - 0.125	11%	11
0.125 - 0.25	17%	19
0.25 - 0.5	31%	40
0.5 - 1.0	43%	36
1 - 2	53%	32
2 - 4	81%	83
4 - 6	92%	32
6 - 8	97%	17
8 - 12	100%	7
12 - 16	100%	1
16 - 24		
24 - 32		
32 - 48		
48 - 64		
64 - 96		
96 - 128		
128 - 192		
192 - 256		
256 - 384		
384 - 512		
512 - 1024		
1024 - 2048		
2048 - 4096		

COMMENTS: ERO Reach

STREAM NAME: North Catamount Ck
ID NUMBER: NCAT1
DATE: 9/27/2006
CREW: L. Howell, B. Waddell

Particle Size Distribution (mm)

D15	D35	D50	D84	D95	Lpart	Year	Graph
0.19	0.64	1.61	4.5	7.1	16.0	2006	Dashed
0.10	0.78	2.81	8.5	12.6	20.0	2003	Solid



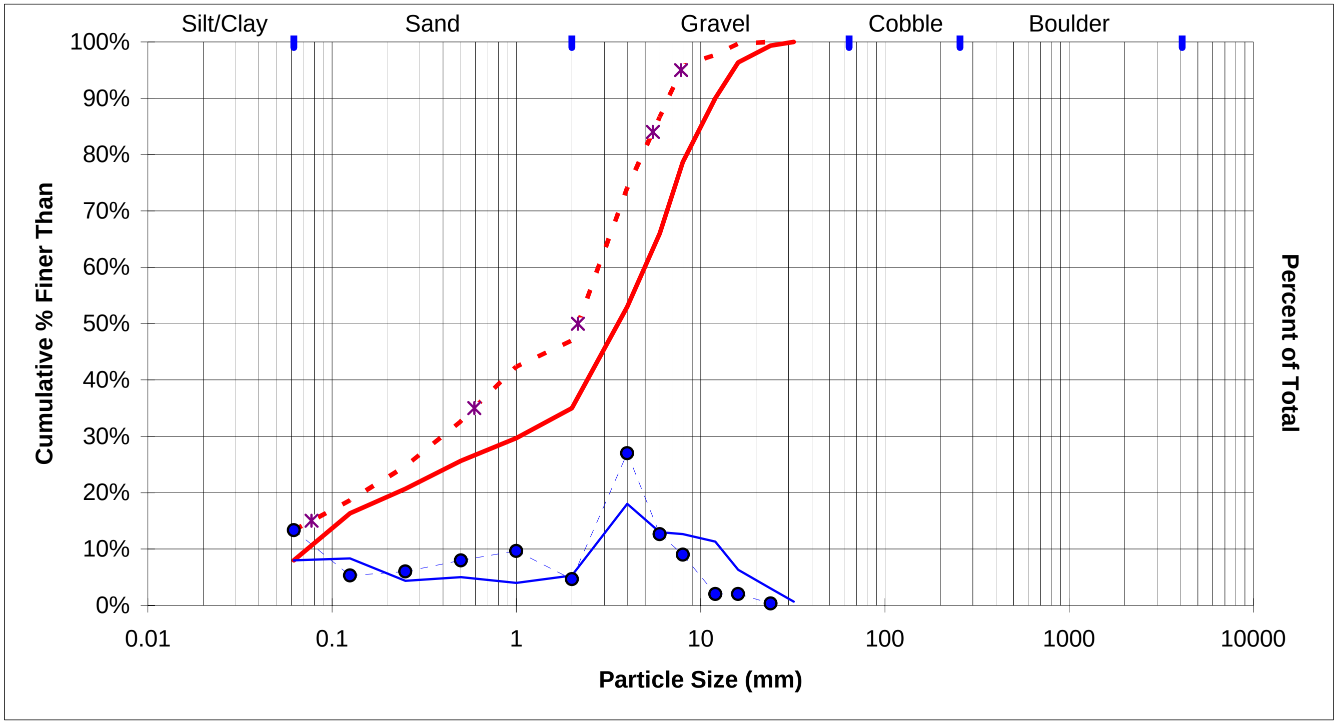
Pebble Count Worksheet **COMMENTS:** Second reach 500 ft upstream of ERO reach

Particle Size (mm)	% finer than	Total Count
<0.062	13%	40
0.062 - 0.125	19%	16
0.125 - 0.25	25%	18
0.25 - 0.5	33%	24
0.5 - 1.0	42%	29
1 - 2	47%	14
2 - 4	74%	81
4 - 6	87%	38
6 - 8	96%	27
8 - 12	98%	6
12 - 16	100%	6
16 - 24	100%	1
24 - 32		
32 - 48		
48 - 64		
64 - 96		
96 - 128		
128 - 192		
192 - 256		
256 - 384		
384 - 512		
512 - 1024		
1024 - 2048		
2048 - 4096		

STREAM NAME: North Catamount Ck
ID NUMBER: NCAT2
DATE: 9/27/2006
CREW: L. Howell, B. Waddell

Particle Size Distribution (mm)

D15	D35	D50	D84	D95	Lpart	Year	Graph
0.08	0.59	2.16	5.5	7.8	20.0	2006	Dashed
0.11	2.00	3.56	9.7	15.1	28.0	2003	Solid



Pebble Count Worksheet

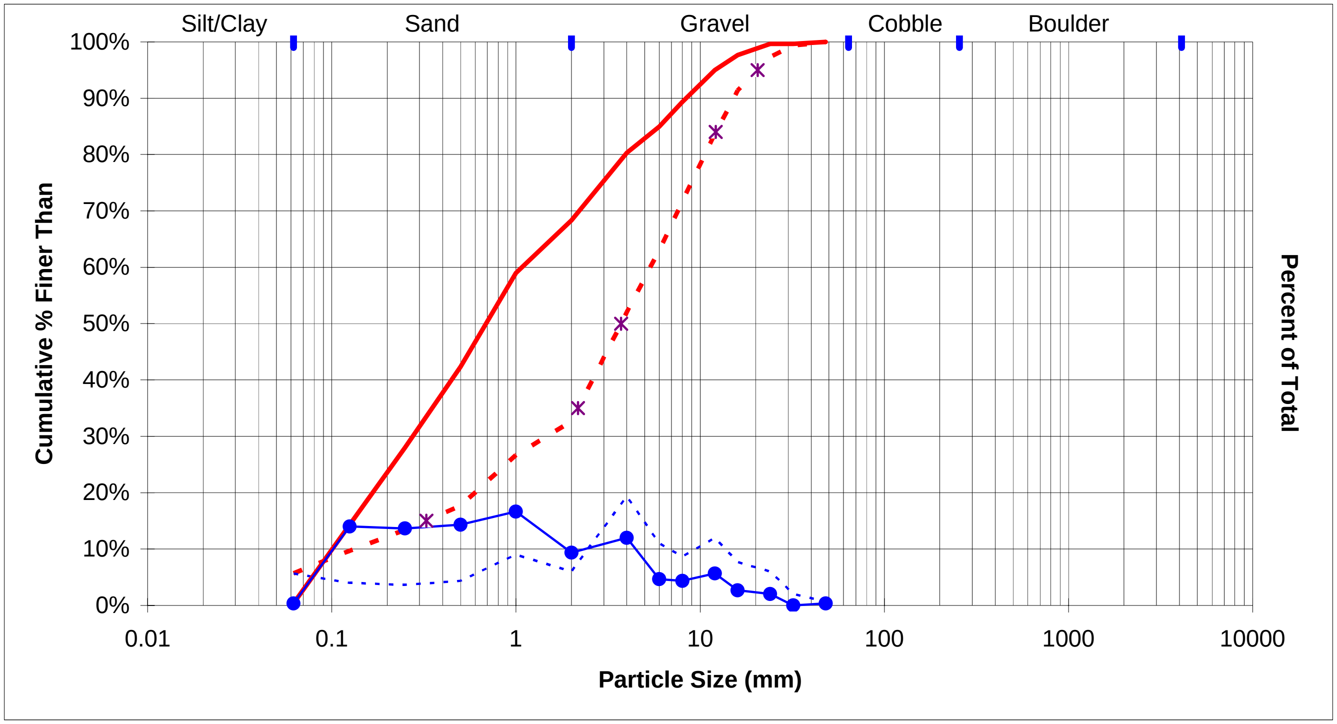
COMMENTS: ERO Study Site

Particle Size (mm)	% finer than	Total Count
<0.062	6%	17
0.062 - 0.125	10%	12
0.125 - 0.25	13%	11
0.25 - 0.5	18%	13
0.5 - 1.0	27%	27
1 - 2	33%	18
2 - 4	52%	58
4 - 6	63%	33
6 - 8	72%	26
8 - 12	84%	36
12 - 16	91%	23
16 - 24	97%	18
24 - 32	99%	6
32 - 48	100%	2
48 - 64		
64 - 96		
96 - 128		
128 - 192		
192 - 256		
256 - 384		
384 - 512		
512 - 1024		
1024 - 2048		
2048 - 4096		

STREAM NAME: North Fork Crystal Ck
ID NUMBER: NCRY1
DATE: 5/3/2006
CREW: J.Nankervis, S. Belz, B. Waddell, L. Howell

Particle Size Distribution (mm)

D15	D35	D50	D84	D95	Lpart	Year	Graph
0.33	2.17	3.72	12.2	20.5	36.0	2006	Dashed
0.13	0.35	0.69	5.5	12.0	37.0	2003	Solid



Pebble Count Worksheet

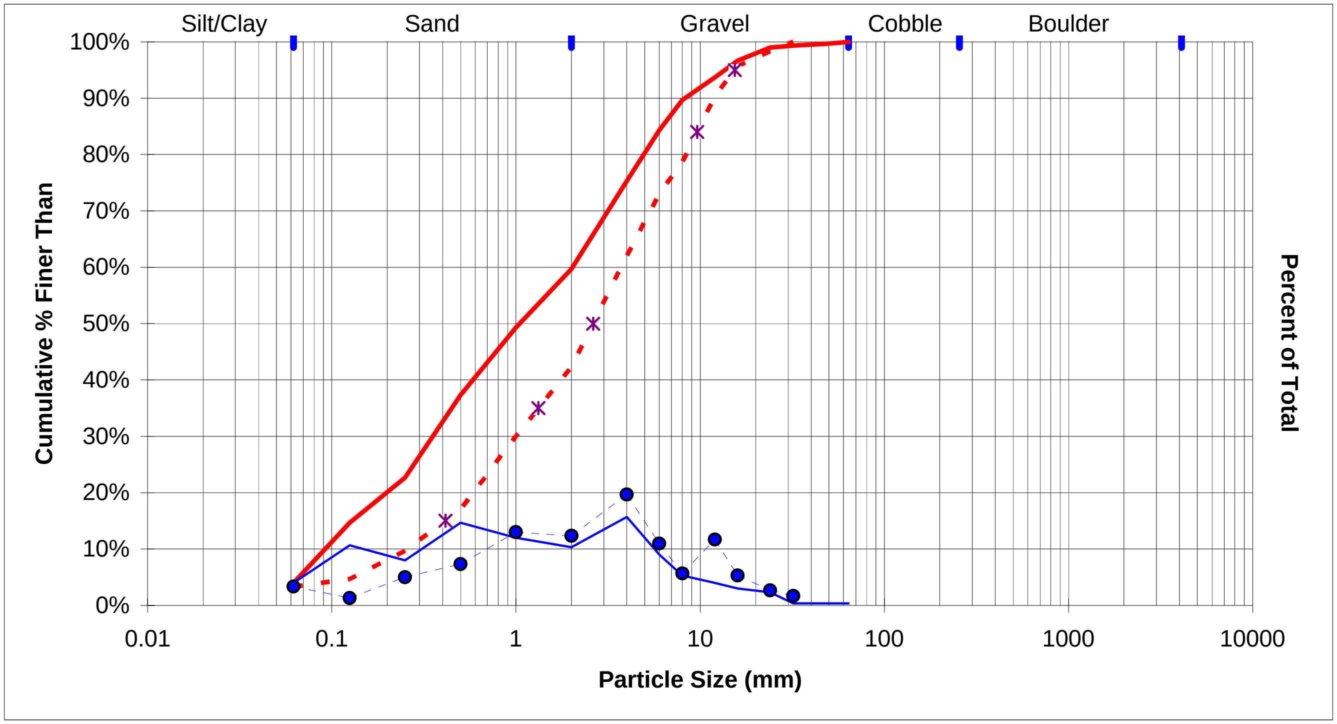
COMMENTS: Second reach 500 ft upstream from ERO study site

Particle Size (mm)	% finer than	Total Count
<0.062	3%	10
0.062 - 0.125	5%	4
0.125 - 0.25	10%	15
0.25 - 0.5	17%	22
0.5 - 1.0	30%	39
1 - 2	42%	37
2 - 4	62%	59
4 - 6	73%	33
6 - 8	79%	17
8 - 12	90%	35
12 - 16	96%	16
16 - 24	98%	8
24 - 32	100%	5
32 - 48		
48 - 64		
64 - 96		
96 - 128		
128 - 192		
192 - 256		
256 - 384		
384 - 512		
512 - 1024		
1024 - 2048		
2048 - 4096		

STREAM NAME: North Fork Crystal Ck
ID NUMBER: NCRY2
DATE: 5/3/2006
CREW: J.Nankervis, S. Belz, B. Waddell, L. Howell

Particle Size Distribution (mm)

D15	D35	D50	D84	D95	Lpart	Year	Graph
0.41	1.32	2.62	9.6	15.4	26.0	2006	Dashed
0.13	0.45	1.05	5.9	13.6	55.0	2003	Solid



Pebble Count Worksheet

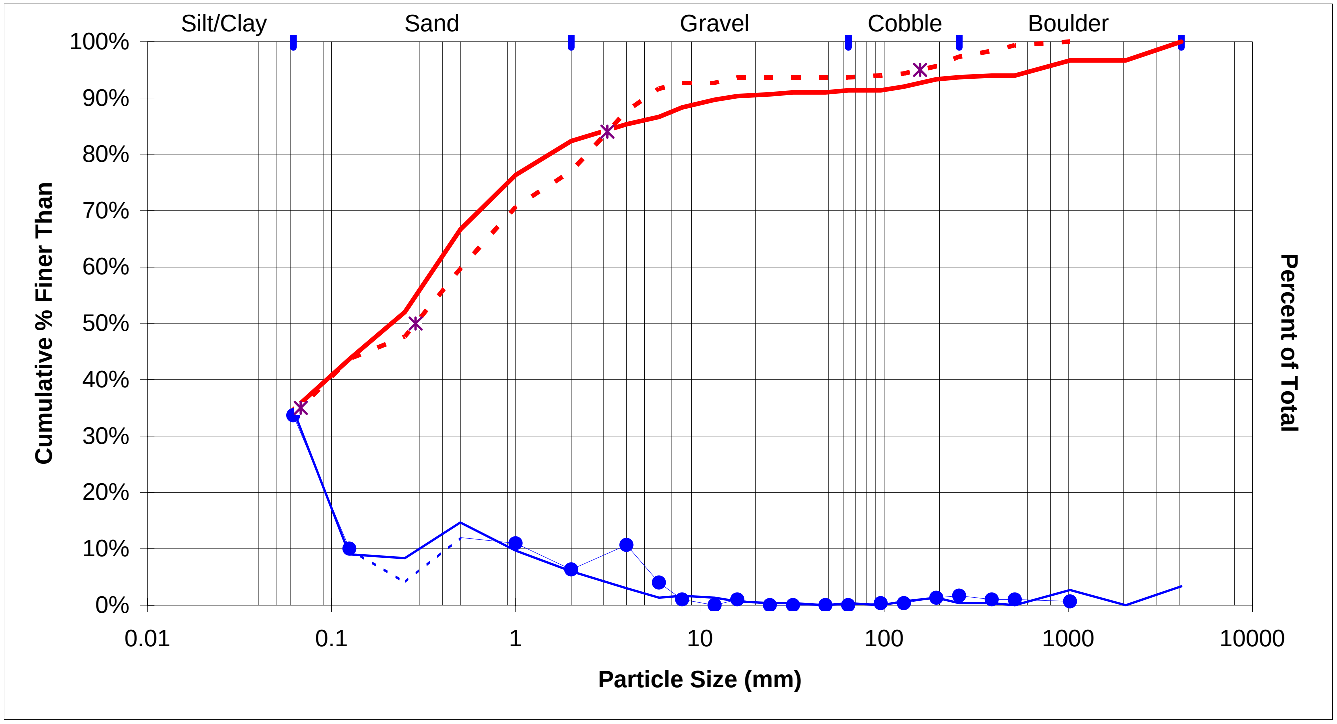
Particle Size (mm)	% finer than	Total Count
<0.062	34%	101
0.062 - 0.125	44%	30
0.125 - 0.25	48%	12
0.25 - 0.5	60%	36
0.5 - 1.0	71%	33
1 - 2	77%	19
2 - 4	88%	32
4 - 6	92%	12
6 - 8	93%	3
8 - 12	93%	0
12 - 16	94%	3
16 - 24	94%	0
24 - 32	94%	0
32 - 48	94%	0
48 - 64	94%	0
64 - 96	94%	1
96 - 128	94%	1
128 - 192	96%	4
192 - 256	97%	5
256 - 384	98%	3
384 - 512	99%	3
512 - 1024	100%	2
1024 - 2048		
2048 - 4096		

COMMENTS: ERO Reach

STREAM NAME: Severy Ck
ID NUMBER: SVRY1
DATE: 9/20/2006
CREW: L. Howell, K. Howell, S. Winkler

Particle Size Distribution (mm)

D15	D35	D50	D84	D95	Lpart	Year	Graph
	0.07	0.29	3.2	156.8	580.0	2006	Dashed
	0.06	0.21	2.9	664.0	4097.0	2003	Solid



Pebble Count Worksheet

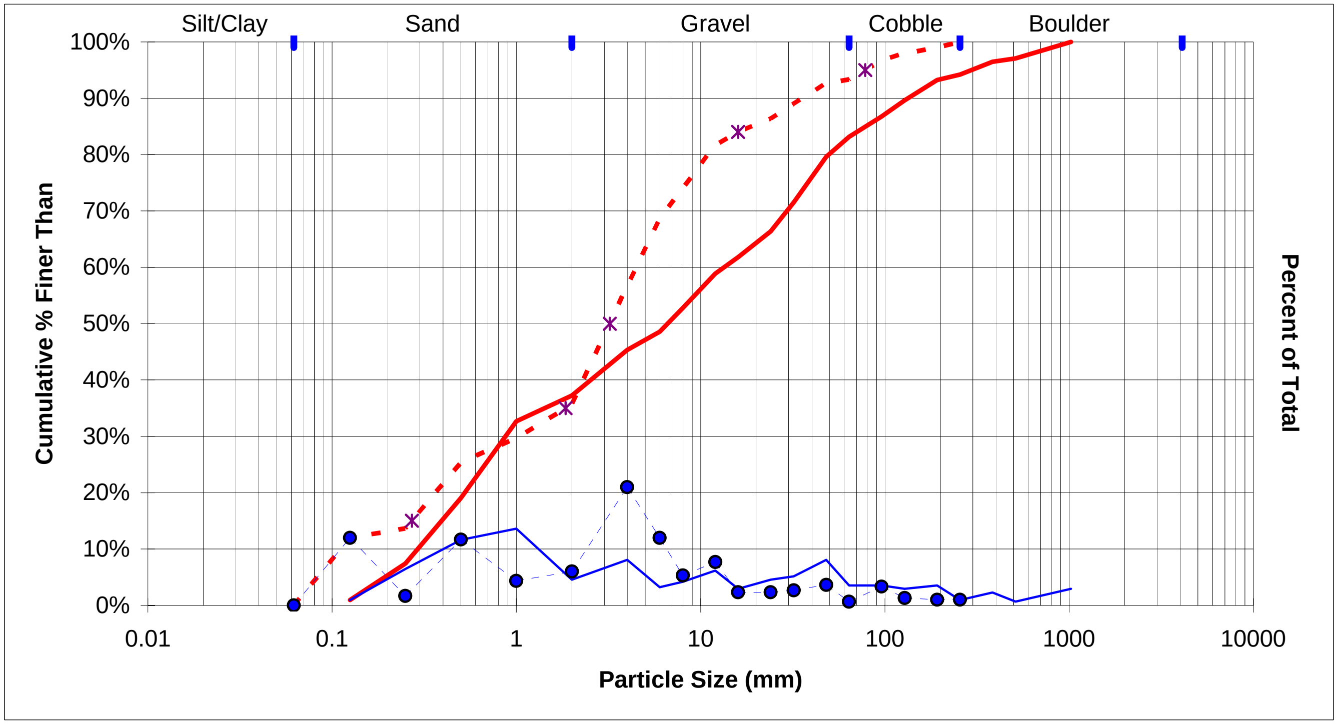
COMMENTS: Second reach 1000 ft upstream of ERO reach

Particle Size (mm)	% finer than	Total Count
<0.062	0%	0
0.062 - 0.125	12%	36
0.125 - 0.25	14%	5
0.25 - 0.5	25%	35
0.5 - 1.0	30%	13
1 - 2	36%	18
2 - 4	57%	63
4 - 6	69%	36
6 - 8	74%	16
8 - 12	82%	23
12 - 16	84%	7
16 - 24	86%	7
24 - 32	89%	8
32 - 48	93%	11
48 - 64	93%	2
64 - 96	97%	10
96 - 128	98%	4
128 - 192	99%	3
192 - 256	100%	3
256 - 384		
384 - 512		
512 - 1024		
1024 - 2048		
2048 - 4096		

STREAM NAME: Severy Ck
ID NUMBER: SVRY2
DATE: 9/20/2006
CREW: L. Howell, K. Howell, S. Winkler

Particle Size Distribution (mm)

D15	D35	D50	D84	D95	Lpart	Year	Graph
0.3	1.85	3.21	16.0	78.4	240.0	2006	Dashed
0.4	1.42	6.63	70.3	296.7	400.0	2003	Solid



Appendix J

Riparian Vegetation
Description and Bank Photographs

2006

Photo Points								
Site	Date	Camera	Cross Section	Bank	Bank - Distance from LPIN (ft)	Camera - Distance from LPIN (ft)	Percent Cover	Comments
NCAT1	092706	Olympus Stylus 400	A	Left	12.5	17.0	30	grass, forb, shrub
NCAT1	092706	Olympus Stylus 400	A	Right	16.5	12.0	100	grass, forb
NCAT1	092706	Olympus Stylus 400	B	Left	46.0	50.0	100	grass, sedge
NCAT1	092706	Olympus Stylus 400	B	Right	48.8	45.0	100	grass, sedge
NCAT1	092706	Olympus Stylus 400	C	Left	16.7	21.5	90	grass, sedge
NCAT1	092706	Olympus Stylus 400	C	Right	30.3	26.0	20	dirt, gravel
NCAT1	092706	Olympus Stylus 400	D	Left	26.0	30.0	90	sedge, shrub
NCAT1	092706	Olympus Stylus 400	D	Right	32.5	29.3	100	grass, sedge
NCAT1	092706	Olympus Stylus 400	E	Left	42.8	47.0	70	sedge
NCAT1	092706	Olympus Stylus 400	E	Right	45.1	41.0	90	sedge
NCAT2	092706	Olympus Stylus 400	A	Left	12.0	16.5	100	grass, sedge, shrub
NCAT2	092706	Olympus Stylus 400	A	Right	16.2	12.0	100	grass, sedge
NCAT2	092706	Olympus Stylus 400	B	Left	8.8	13.0	100	grass, sedge
NCAT2	092706	Olympus Stylus 400	B	Right	11.8	8.0	100	grass, sedge
NCAT2	092706	Olympus Stylus 400	C	Left	12.4	17.0	100	grass, sedge
NCAT2	092706	Olympus Stylus 400	C	Right	16.0	11.5	100	grass, sedge
NCAT2	092706	Olympus Stylus 400	D	Left	6.4	10.5	100	grass, sedge
NCAT2	092706	Olympus Stylus 400	D	Right	9.7	5.0	100	grass, sedge, forb
NCAT2	092706	Olympus Stylus 400	E	Left	10.5	14.0	100	grass, sedge, shrub
NCAT2	092706	Olympus Stylus 400	E	Right	13.1	9.5	100	grass, sedge, forb
NCRY1	050306	Olympus Stylus 400	A	Left	31.7	35.0	2	grass
NCRY1	050306	Olympus Stylus 400	A	Right	38.8	36.0	1	grass
NCRY1	050306	Olympus Stylus 400	B	Left	36.8	39.5	1	grass
NCRY1	050306	Olympus Stylus 400	B	Right	42.5	39.0	1	shrub
NCRY1	050306	Olympus Stylus 400	C	Left	26.7	29.0	0	gravel
NCRY1	050306	Olympus Stylus 400	C	Right	28.7	25.0	0	gravel
NCRY1	050306	Olympus Stylus 400	D	Left	30.0	32.8	0	gravel
NCRY1	050306	Olympus Stylus 400	D	Right	31.5	29.5	0	gravel
NCRY1	050306	Olympus Stylus 400	E	Left	30.5	33.7	0	gravel
NCRY1	050306	Olympus Stylus 400	E	Right	34.3	31.0	0	gravel

Red values denote distance change from 2004

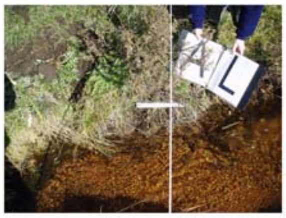
Photo Points								
Site	Date	Camera	Cross Section	Bank	Bank - Distance from LPIN (ft)	Camera - Distance from LPIN (ft)	Percent Cover	Comments
NCRY2	050306	Olympus Stylus 400	A	Left	11.0	15.5	0	sand, gravel
NCRY2	050306	Olympus Stylus 400	A	Right	20.6	15.0	5	grass, forb
NCRY2	050306	Olympus Stylus 400	B	Left	21.4	25.0	25	grass, forb
NCRY2	050306	Olympus Stylus 400	B	Right	30.0	26.0	5	moss, forb, shrub
NCRY2	050306	Olympus Stylus 400	C	Left	19.3	24.0	10	grass
NCRY2	050306	Olympus Stylus 400	C	Right	27.4	23.0	0	sand, gravel
NCRY2	050306	Olympus Stylus 400	D	Left	14.5	18.3	0	sand, gravel
NCRY2	050306	Olympus Stylus 400	D	Right	22.9	19.3	0	sand, gravel
NCRY2	050306	Olympus Stylus 400	E	Left	5.3	7.1	0	sand, gravel
NCRY2	050306	Olympus Stylus 400	E	Right	18.4	15.6	5	moss
SVRY1	091004	Olympus Stylus 400	A	Left	3.0	2.0	70	sedge, shrub
SVRY1	091004	Olympus Stylus 400	A	Right	7.8	4.0	50	sedge, shrub
SVRY1	091004	Olympus Stylus 400	B	Left	5.0	3.5	80	sedge, shrub
SVRY1	091004	Olympus Stylus 400	B	Right	8.9	10.0	90	sedge, shrub
SVRY1	091004	Olympus Stylus 400	C	Left	4.9	4.0	80	sedge, shrub
SVRY1	091004	Olympus Stylus 400	C	Right	7.8	5.0	70	sedge, f orb, shrub
SVRY1	091004	Olympus Stylus 400	D	Left	4.6	3.0	70	sedge, forb, shrub
SVRY1	091004	Olympus Stylus 400	D	Right	8.6	5.2	40	forb, shrub
SVRY1	091004	Olympus Stylus 400	E	Left	2.7	7.0	40	sedge, forb, shrub
SVRY1	091004	Olympus Stylus 400	E	Right	6.6	4.0	30	sedge, forb, shrub
SVRY2	091004	Olympus Stylus 400	A	Left	20.8	19.8	0	gravel, sand
SVRY2	091004	Olympus Stylus 400	A	Right	41.3	44.5	0	gravel, sand
SVRY2	091004	Olympus Stylus 400	B	Left	19.1	17.5	0	gravel, sand
SVRY2	091004	Olympus Stylus 400	B	Right	46.3	48.7	0	gravel, sand
SVRY2	091004	Olympus Stylus 400	C	Left	51.2	49.5	0	gravel, sand
SVRY2	091004	Olympus Stylus 400	C	Right	78.4	80.3	0	gravel, sand
SVRY2	091004	Olympus Stylus 400	D	Left	74.8	71.7	0	gravel, sand
SVRY2	091004	Olympus Stylus 400	D	Right	90.1	92.5	0	gravel, sand
SVRY2	091004	Olympus Stylus 400	E	Left	68.1	67.3	0	gravel, sand
SVRY2	091004	Olympus Stylus 400	E	Right	91.3	93.2	0	gravel, sand

Red values denote distance change from 2004

North Catamount Creek 1: NCAT1 2006

Left

Right



NCAT1_002.JPG

XSA

NCAT1_003.JPG

NCAT1_006.JPG

XSB

NCAT1_007.JPG

NCAT1_010.JPG

XSC

NCAT1_011.JPG

NCAT1_014.JPG

XSD

NCAT1_015.JPG

NCAT1_018.JPG

XSE

NCAT1_019.JPG

North Catamount Creek 2: NCAT2 2006

Left		Right

NCAT2_003.JPG

XSA

NCAT2_004.JPG

NCAT2_008.JPG

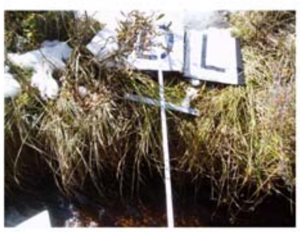
XSB

NCAT2_009.JPG

NCAT2_013.JPG

XSC

NCAT2_014.JPG



NCAT2_017.JPG

XSD

NCAT2_018.JPG

NCAT2_021.JPG

XSE

NCAT2_022.JPG

North Crystal Creek 1 NCRY1 2006

Left

Right

AL_P5030091.JPG

XSA

AR_P5030092.JPG

BL_P5030093.JPG

XSB

BR_P5030094.JPG

CL_P5030095.JPG

XSC

CR_P5030096.JPG

DL_P5030001.JPG

XSD

DR_P5030003.JPG

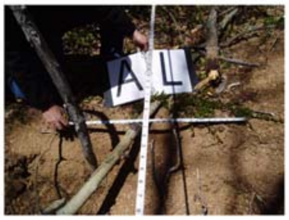
EL_P5030008.JPG

XSE

ER_P5030009.JPG

North Crystal Creek 2: NCRY2 2006

Left | Right



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XSA

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BL_P5030037.JPG

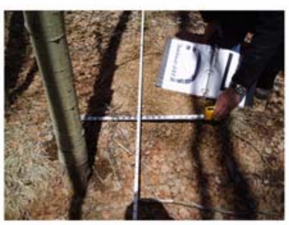
XSB

BR_P5030038.JPG

CL_P5030030.JPG

XSC

CR_P5030031.JPG



DL_P5030023.JPG

XSD

DR_P5030024.JPG

EL_P5030017.JPG

XSE

ER_P5030018.JPG

Severy Creek 1: SVRY1 2006

Left

Right

XSA

SVRY1_003.jpg

SVRY1_004.jpg

XSB

SVRY1_007.jpg

SVRY1_008.jpg

XSC

SVRY1_011.jpg

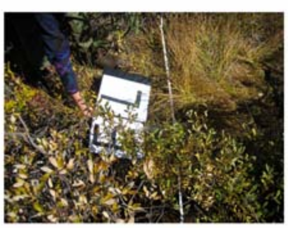
SVRY1_013.jpg

XSD

SVRY1_015.jpg

SVRY1_016.jpg

XSE



SVRY1_021.jpg

SVRY1_022.jpg

Severy Creek 2: SVRY2 2006

Left		Right
	XSA	
AL_SVRY2_019.jpg		AR_SVRY2_020.jpg
	XSB	
BL_SVRY2_015.jpg		BR_SVRY2_016.jpg
	XSC	
CL_SVRY2_011.jpg		CR_SVRY2_012.jpg
	XSD	
DL_SVRY2_007.jpg		DR_SVRY2_008.jpg
	XSE	
ER_SVRY2_003.jpg		ER_SVRY2_004.jpg