

**PHYSICAL MONITORING AND SEDIMENT MAPPING SURVEY
OF THE PATAPSCO RIVER NEAR BLOEDE DAM
HOWARD AND BALTIMORE COUNTIES, MARYLAND**

Prepared By:

Stephen M. Van Ryswick, Elizabeth Sylvia, Katherine A. Knippler,
Anna Gillmor, and Christopher Connallon

Maryland Department of Natural Resources
Resource Assessment Service
Maryland Geological Survey
2300 St. Paul Street
Baltimore, MD 21218

Prepared for:

University of Maryland Baltimore County
1000 Hilltop Circle
Baltimore, MD 21250

And

American Rivers
1101 12th Street NW, Suite 1400
Washington, DC 20005

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Maryland Department of Natural Resources

<http://www.dnr.maryland.gov>

Maryland Geological Survey

2300 St. Paul Street

Baltimore, MD 21218

<http://www.mgs.md.gov>

(410)554-5500

Larry Hogan, Governor

Mark Belton, Secretary

Richard A. Ortt, Jr., Director

Toll free in Maryland: 877-620-8DNR ext. 3460

Out of state call: 410-260-3460

TTY users call via the MD Relay

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Introduction

Historical Context

Bloede Dam is located on the Patapsco River between Baltimore County and Howard County, Maryland. The Dam was constructed in 1906-1907 for the purpose of hydroelectric power generation by Consolidated Gas Electric Light and Power Company (Ortt and Sylvia, 2012). Shortly after its construction, sediments began to accumulate behind the Dam prompting a routine operation of maintenance and dredging (Ortt and Sylvia, 2012). In 1914, the sediment depth behind the dam was documented at 12.5 feet (Ortt and Sylvia, 2012). In 1924, the hydroelectric generation operation ceased, and presumably all sediment maintenance behind the dam also ceased at that time (Ortt and Sylvia, 2012). Currently, the Maryland Department of Natural Resources (DNR) owns the Dam. DNR, along with American Rivers and the National Oceanic and Atmospheric Administration (NOAA), are collecting information to determine possible alternative uses of the Dam including the potential removal of the Dam.

Physical and Geological Setting

The Patapsco River Valley between Ellicott City and Bloede Dam is underlain by ancient, very hard rock formations. The major rock type around Ellicott City is the Ellicott City Granite, which is about 420 million years old. It is used as a building stone and is seen extensively in old Ellicott City construction. South of Ellicott City, the river has eroded through the valley into the much older Baltimore Gabbro Complex, which is about 750 million years old. This dark, dense rock is also valued for construction. Throughout the valley are numerous mineral veins and deposits within the bedrock. Quarry and mining operations in the Patapsco Valley were common in the 18th and 19th century, and were an important part of the regional economy.

Soils within the river valley are derived from the bedrock erosion. Most of the rock erodes to sandy and gravelly sediments, with relatively little clayey material remaining. While the bedrock produces clay and iron-rich fine sediments, most of these are swept away by water. The valley walls are steep enough in many areas to prevent thick accumulations of fine-grained soils.

Study Objectives

The objectives for this study included:

1. Survey 30 monumented cross-sections across the Patapsco River and complete facies maps by utilizing pebble counts and analyzing grab samples in the laboratory;
2. Produce a digital elevation model (DEM) of the Bloede Dam impoundment; and
3. Take photographs to document visual topographic and sedimentological changes in and around the river along each of the transect lines.

Methods

Cross Section Surveys

Cross section surveys were completed over 12 days from May 9th to May 31st 2016 for all 30 sites of this study (Table 1). The two most upstream sites (RB and RA) were used as reference sites. Heading downstream from the reference sites, transect sites were numbered in order from 1-26; however, two transects, C and D, were added between cross sections 21 and 22, and 22 and 23, respectively. Transect length varied by site. All transect surveys extended across the river from bank pin to bank pin; at some sites, the survey extended beyond the extent of previous surveys to capture elevations across a larger floodplain area.

Field Methods

First, a team of two people located the benchmarks (Table 2) and end point markers for each transect site by using a metal detector, Topcon RTK GPS antenna, and Carlson SurvPC software. These benchmarks and transect endpoints were utilized by McCormick Taylor during their Patapsco Dam Impoundment Studies, which focused on the Simpkins and Bloede Dams (McCormick-Taylor, 2011). Each located benchmark or marker was flagged to ensure quick relocation during the cross section survey. Benchmarks were replaced when necessary, and installed at the two additional, new transects, C and D.

A team consisting of two to three people utilized a Topcon ES-103 total station, a handheld computer using Carlson SurvPC software, measuring tape, and two prisms to complete each of the surveys. All survey data were collected and stored using the projection NAD83 Maryland State Plane in US Survey Feet. The localization details are shown in Table 3.

Table 1. Dates of transect surveys in May 2016

Date	Transects Surveyed
9-May	15, 16
10-May	17, 18, 19
11-May	20, 21
12-May	22, C
17-May	11, 12, 13
18-May	10, RA, RB
19-May	23, 24, 25, 26
20-May	1, 2
24-May	3, 4, 9
26-May	6, 7, 8
27-May	5, D
31-May	11, 14

Table 2. Benchmarks utilized for triangulation. * indicates the benchmark had been reinstalled prior to surveying after unsuccessful attempts at locating the original benchmarks installed by McCormick Taylor.

Bloede Transect	Points used for triangulation				
RB	LB	RB	BM1	BM2	
RA		RB	BM1	BM2	
1	LB	RB			
2	LB	RB	BM1	BM2*	
3	LB	RB	BM1	BM2	
4	LB	RB	BM1		
5	LB	RB	BM1	BM2	
6	LB	RB	BM1	BM2	
7	LB	RB	BM1		
8	LB		BM1	BM2	
9	LB	RB	BM1		
10	LB		BM1	BM2	
11		RB*	BM1	BM2	
12		RB*	BM1	BM2	
13			BM1	BM2	
14	LB	RB	BM1	BM2*	
15		RB*	BM1	BM2	
16	LB	RB	BM1		
17	LB		BM1	BM2	
18	LB*		BM1*	BM2	
19	LB	RB*		BM2	
20		RB	BM1*		
21	LB	RB	BM1	BM2	
C	LB*	RB*			BM3*
22		RB	BM1		
D	LB*	RB*		BM2*	
23		RB	BM1	BM2	
24	LB	RB	BM1	BM2	
25		RB	BM1		
26	LB	RB	BM1	BM2	

Table 3. Survey localization details.

Projection	Lambert Conformal Conic 2SP
Horizontal Datum	NAD83
Ellipsoid	GRS1980
Geoid	2012a with Quadratic Interpolation
Vertical Datum	NAVD88

In order for the total station to determine its location with respect to the cross section, triangulation was performed by using combinations of the benchmarks and/or transect

end points. Between two and four benchmarks were used in combination at each transect to produce a root mean square (RMS) error. At each transect, the combination of benchmarks with the lowest RMS value was noted on field sheets and used for triangulation. The benchmarks not used for triangulation yielded higher RMS values due to multiple factors including inaccurate position values when installed or movement/disturbance subsequent to installation.

Once triangulation was complete and the total station was stationed in a known reference location, a tape measure was extended across the river between the left bank and right bank pins. At some sites, the tape was extended beyond the pins to capture portions of the floodplain along transects where the endpoint pins were placed within the floodplain. For this reason, some transects extend beyond the cutoff points of the previous work done by McCormick Taylor. Elevation points were collected at least once every five feet, and more often if there were features to be noted (e.g. top of bank, bottom of bank, edge of water, or facies changes).

To ensure the total station did not move during the survey, closeout points of the triangulation benchmarks were taken at each site.

Data Processing

Data points were downloaded from the Carlson SurvPC into ArcGIS 10 and plotted. Each transect was then brought into Microsoft Excel and plotted on a 1:1 ratio graph (Appendix B) to show elevation over distance.

Digital Elevation Model Survey

The digital elevation model (DEM) was surveyed behind Bloede Dam to cover the area defined as the Bloede Dam impoundment. The DEM included Cross Sections 7 and 8, and extended upriver to just below Cross Section 6, near the swinging bridge. The DEM consisted of 58 unique transects surveyed over the course of 4 days (June 1st, 2nd, 6th, and 7th, 2016) plus data from Cross Sections 7 and 8 for a total of 61 transects.

Field Methods

To begin, a team of four people installed wooden stakes every 30 feet on each side of the River. Each stake was labeled and flagged to locate and identify each appropriately. Notes were taken during installment for relative location.

Benchmarks at Cross Section 8 were used for triangulation on the first day of surveying the DEM. During this day, and subsequent days surveying the DEM, several wooden stakes were surveyed in to allow for triangulation as the team progressed upstream. This made for a smooth day-to-day transition when triangulating the total station.

Survey methods for the DEM were very similar to that of the cross section surveys. Due to the close proximity of each of the DEM transects, the total station was set up in one location for the day and multiple transects were surveyed without resetting the total

station or triangulating in between transects. In order to maintain a minimum spacing of 30 feet between transects going around the bend, transects were pivoted and river left stakes were reused to match up to next river right stakes. This was done at each of the two sharp bends along the DEM site (Figure 3).

Similarly to the transect surveys, elevation points were recorded at least every five feet. Points were also recorded at the top and bottom of the banks, waters' edge, facies changes, and any other notable features.

Data Processing

The DEM point data were imported into Surfer 10 for processing. The data points were gridded using the Minimum Curvature method using a 5 foot grid. Previous bathymetric studies performed by MGS on various lakes and reservoirs have shown that the Minimum Curvature method creates a grid more realistic of water bodies containing channels than do other methods such as the TIN method (Ortt et al., 2007). Although the TIN method honors every data point and creates a surface that preserves the original data points, this method underestimates depths of reservoir and riverine systems as it connects points in a straight line rather than following bathymetric trends. For this reason, the Minimum Curvature method presents the most accurate (lowest residual RMS) results. A masking file was then used in Surfer to clip the resulting DEM to show only the gridded data where survey points were located. Lastly, the resulting DEM was exported as a TIFF for import into Arc GIS.

Facies Mapping

Field Methods

Once the cross sections and benchmarks were located, facies and site mapping occurred concurrently with the cross section and DEM surveys. Teams of two to four scientists worked together to characterize the stream channel and associated flood plain areas at each of the 30 individual cross section sites and at the DEM site. Mapping extents included areas 25 feet upstream and downstream of each individual cross section; and across the 58 transects comprising the DEM survey area.

Like previous efforts, facies and site maps included a detailed assessment of facies boundaries and channel substrate and size, as well as additional descriptive information such as the presence of large woody debris, bedrock, emergent bars, vegetation, bridges, bridge abutments, etc. At most sites, mapping units were delineated and described by scientists who waded in the stream channel and walked throughout the floodplain areas. At a few cross sections, stream conditions (depth and/or current) made sediment sampling and wading unsafe across portions of the stream and a visual assessment of the bed material difficult. At these sites, MGS described and/or collected sediment samples in accessible portions of the stream channel. In general, coarse bed material (predominantly gravel, cobbles, and boulders) were sampled using the Wolman pebble count method, and finer-grained sediments (predominately sand, silt and clay)

were collected as grab samples for laboratory grain size analysis (see “Sediment Sampling” section for more information). Facies maps for deep water sites were created using a clam shell sampler to verify bottom sediments, even if that assessment had to be made from onboard a small boat/raft. At deep water sites where the substrate was too coarse for sampling, an assessment was made using the survey pole to assess bedrock, boulders, or interbedded sediments in place of a pebble count. There were instances where water level may have been low, but was still treacherous to walk through, where boulders could be seen from the shoreline, allowing facies maps to be created. This was the case in the thalweg of cross section 9.

The facies and site maps were hand drawn in the field upon scaled paper, by a scientist recording the visual and spatial information measured and reported by another one to three scientists. Simple measurements to delineate facies boundaries were made using a surveyor’s tape, and preliminary facies contacts along the transect proper were noted within the surveying software during the cross section and DEM surveys. Using best professional judgement, distinct facies types were provisionally identified based on perceived material size, class, and distribution. Examples of facies identified include gravel, gravel-sand-cobble, gravel-cobble-boulder, etc. For those facies with multiple particle types, the name describes the particle size in descending predominance. Hand-drawn maps were later digitized in ESRI’s ArcGIS 10.1, and facies names/descriptions were updated to reflect the results of the pebble count and grain size analysis. To facilitate digitizing the hand-drawn maps, facies changes observed along the surveyor’s tape were documented using the Carlson SurvPC software to associate the change in facies with a point along the transect.

Digitization of Facies and Site Maps

In addition to imagery, monument points, cross section survey points, and DEM survey points were brought in to an ArcGIS map as shapefiles. Facies shapefile polygons were generated using field notes, hand-drawn maps, and descriptions associated with survey points. Helpful descriptions in the survey point files included edge of water, facies changes, and any woody debris. Edge of water points were useful when plotting the edge of the river in ArcGIS to ensure spatial accuracy. When digitizing the facies map for the DEM, bathymetry data as well as the edge of water points for each transect facilitated digitizing the shoreline. Notes about woody debris, such as fallen trees, enabled more precise plotting of those typically smaller areas. Each facies classification in the shapefile is displayed as its own symbology pattern to make it distinguishable from other facies classifications.

Sediment Sampling

Field Methods

Once the provisional sedimentary facies were mapped, this information was used to determine substrate sampling locations. Attempts were made to sample each facies type more than once; and alternately, to not collect excessive samples of the same

facies type. Facies were sampled based on the average grain size of the facies, using either the Wolman pebble count method (Wolman, 1954) or grab sampling for later laboratory analysis. Out of the 71 total samples taken, 23 were Wolman pebble counts (this sum includes one duplicate pebble count at Transect #11 for QA/QC purposes) and 48 were sediment grab samples. Locations of collected samples are denoted by green points on the facies maps (Appendix B).

For each facies, scientists used best professional judgement to determine if the overall facies median diameter (D50) was greater or less than 6 millimeters (mm) (fine gravel). For coarser-grained facies consisting of D50 > 6 mm, Wolman pebble counts were completed using a sample size of 150+ particles. Pebble counted facies are denoted by blue points on the facies maps (Appendix B). A team of two to four scientists performed the pebble counts; one scientist recorded particle sizes on a field sheet, and the balance of the pebble count team randomly selected particles throughout the mapped facies type and measured the particle's intermediate axis using a gravelometer. The gravelometer contained 14 square holes of common sieve sizes ranging from 2 to 180 mm, as well as a scale in 10 mm increments along one side for measuring particles up to 310 mm. The gravelometer used was Part #14-D40 from Wildlife Supply Company. For finer-grained facies consisting of D50 < 6 mm, surficial grab samples were collected with a clam shell sampler and placed into Whirl-Pak plastic bags, sealed, labeled, and brought to the laboratory for later analysis.

Laboratory Methods

Sediment grab samples were analyzed for water content, bulk density, and grain size (sand, silt, clay contents, as well as gravel, when present). Two homogeneous splits of each sample were processed, one for bulk property analyses and the other for grain-size characterization. Analyses were performed as soon as possible after sample collection, and all samples were refrigerated in sealed Whirl-Pak™ plastic bags prior to analysis.

Water content was determined by weighing 20-30 g of sediment; the sediment was dried at 65°C, and then the dried sediment was re-weighed. Water content was calculated as the percentage of water weight to the weight of the wet sediment using Equation 1.

$$\%Water = \frac{W_w}{W_t} * 100 \quad \text{Equation 1}$$

Where: W_w is the weight of water;
and
 W_t is the weight of wet sediment.

Wet bulk density (ρ_B) is calculated from water content utilizing Equation 2 by assuming an average grain density (ρ_s) of 2.72 g/cm³ and saturation of voids with water of density

$\rho_w = 1.0 \text{ g/cm}^3$. This method was adopted from the work of Bennett and Lambert (1971):

$$\rho_B = \frac{W_t}{W_d / 2.72 + W_w} \quad \text{Equation 2}$$

Where: W_d is the weight of dry sediment.

Gravel, sand, silt, and clay contents were determined using the textural analysis detailed in Kerhin and others (1988). Grain size in this report (Table 4) is presented in phi units, a scale devised by Krumbein (1936) where phi is defined as the negative log (to the base 2) of the particle diameter (mm). For example, 4 phi corresponds to a particle with a diameter of $1/2^4 \text{ mm}$ (=1/16 mm, or 0.0625 mm or 62.5 microns).

Table 4. Sediment grain size definitions used in this study are based on the Wentworth (1922) scale. The term 'mud' is used to describe all particles smaller than sand (less than 0.0625 millimeters). The term 'gravel' is used to describe all rock fragment particles that are 2 millimeters or larger.

Descriptor	Grain Size (millimeters)	Class Sizes (phi)
Mud	< 0.0625	> 4
Clay	< 0.004	> 8
Silt	0.004 to 0.0625	> 4 to 8
Sand	0.0625 to 2	4 to -1
Very Fine Sand	0.0625 to 0.125	4 to 3
Fine Sand	0.125 to 0.25	3 to 2
Medium Sand	0.25 to 0.5	2 to 1
Coarse Sand	0.5 to 1	1 to 0
Very Coarse Sand	1 to 2	0 to -1
Gravel	2 to 4,096	-1 to -12
Granule	2 to 4	-1 to -2
Pebble	4 to 64	-1 to -6
Cobble	64 to 256	-6 to -8
Boulder	256 to 4,096	-8 to -12

Samples containing primarily coarser sediments of gravels and sands were dry sieved only through a series of 10 sieves ranging from 75 microns to 16 mm. Sediments which passed through the 75 micron sieve were classified as silts. Grain size analysis of samples containing a higher proportion of finer grains (silts and clays) consisted of cleaning the sediment samples in solutions of 10 percent hydrochloric acid and 6 or 15 percent hydrogen peroxide (determined by water content) with subsequent rinsing with deionized water. This process removed soluble salts, carbonates, and organic matter that could interfere with the dis-aggregation of the individual grains. The samples were then treated with a 0.26 percent solution of the dispersant sodium hexametaphosphate ((NaPO₃)₆) to ensure that individual grains did not re-aggregate (floculate) during pipette analysis.

The separation of sand and silt-clay (mud) portions of the sample was accomplished by wet-sieving through a 4-phi mesh sieve (0.0625 mm, U.S. Standard Sieve #230). The gravel-sand fraction (*i.e.* that portion of the sample not passing through the sieve) was dried and weighed, and saved for further analysis. The finer silt and clay-sized particles (*i.e.*, passing through the sieve) were suspended in a 1000 ml cylinder in a solution of 0.26 percent sodium hexametaphosphate. The suspension was agitated and, at specified times thereafter, 20 ml pipette withdrawals were made (Carver, 1971; Folk, 1974). The rationale behind this process is that larger particles settle faster than smaller ones (Stoke's law). By knowing the settling velocities for different sized particles, times for withdrawal can be determined at which all particles of a specified size will have settled past the point of withdrawal. Sampling times were calculated to permit the determination of the amount of particles corresponding to silt sized (4 phi) particles and clay sized (8 phi) particles in the suspension. Withdrawn samples were dried at 65°C and weighed. From these data the percentages by dry weight of sand, silt, and clay were calculated for each sample and classified according to Shepard (1954) and Folk (1974) nomenclatures (Figures 1 and 2). Sample weight loss due to cleaning was determined; the weight loss approximates the amount of non-clastic component in the

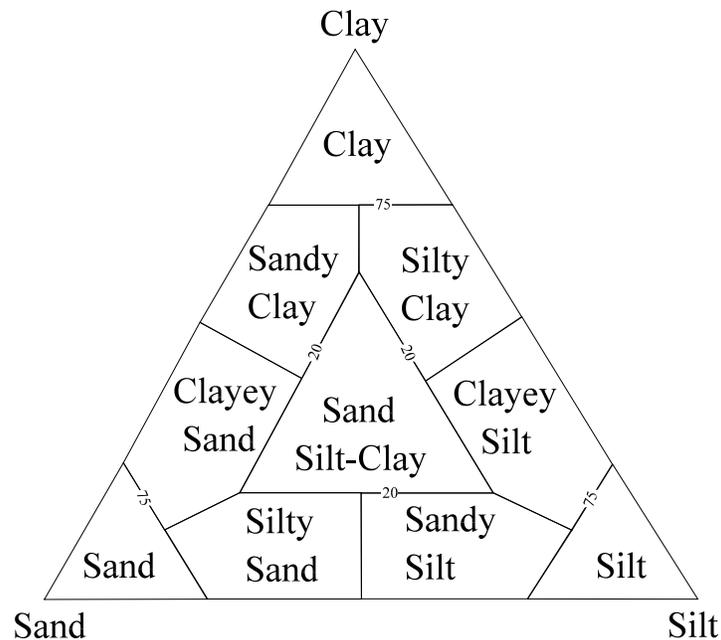


Figure 1. Shepard (1954) classification of sediment types. Sediment type classification is based on relative percentages of each size component (sand, silt, and clay).

sediment. The sand/gravel fractions of these samples were passed through a series of 3-inch sieves, at whole phi intervals. The largest sieve used corresponds to -2 phi (4 mm mesh). The resulting whole phi size fractions were converted to cumulative weight percentages and incorporated the silt and clay components of the sediment sample, extrapolating the fine-grained end to 14 phi (6×10^{-5} mm)).

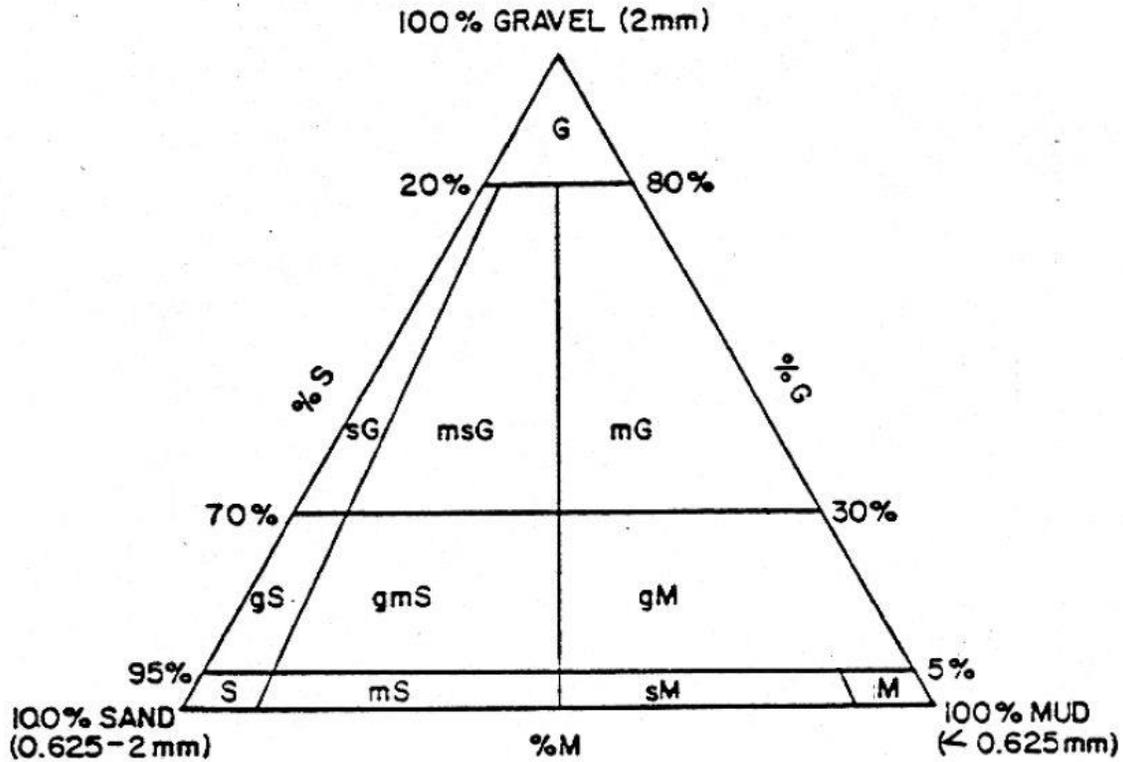


Figure 2. Folk (1974) classification of sediment types. Sediment type classification is based on relative percentages of each size component (gravel, sand, and mud (i.e. silt plus clay)).

Based on the cumulative weight distributions of the size fractions, the following Folk (1974) graphic statistical parameters were calculated for each sample.

The graphic mean (M_G) is defined by equation 3.

$$M_G = \frac{\phi_{16} + \phi_{50} + \phi_{84}}{3} \quad \text{Equation 3}$$

where ϕ_{16} (or 50, 84..) is the phi class corresponding to 16th percentile (or 50%, 84%...) on the cumulative weight curve.

This graphic mean corresponds very closely to the mean as computed by the method of moments, yet is much easier to find. Inclusive Graphic Standard Deviation (SD_{IG}), defined by equation 4, gives the best overall measure of sorting (Table 5).

$$SD_{IG} = \frac{\phi_{84} - \phi_{16}}{4} + \frac{\phi_{95} - \phi_5}{6.6} \quad \text{Equation 4}$$

Table 5. Folk definitions of sorting.

SD_{IG} Range	Verbal Description
< 0.35 phi	very well sorted
0.35 - 0.50 phi	well sorted
0.50 - 0.71 phi	moderately well sorted
0.71 - 1.00 phi	moderately sorted
1.00 - 2.00 phi	poorly sorted
2.00 - 4.00 phi	very poorly sorted
> 4.00 phi	extremely poorly sorted

Inclusive Graphic Skewness (Sk_{IG}), define by equation 5, measures the asymmetry of the distribution as well as the direction of the skewness (*i.e.*, excessive coarse tail (-) or excessive fine tail (+)).

$$Sk_{IG} = \frac{\phi_{16} + \phi_{84} - 2 * \phi_{50}}{2 * (\phi_{84} - \phi_{16})} + \frac{\phi_{5} + \phi_{95} - 2 * \phi_{50}}{2 * (\phi_{95} - \phi_{5})} \quad \text{Equation 5}$$

Graphic Kurtosis (K_G) is defined by equation 6. This statistic defines the degree of peakedness or departure from the "normal" frequency or cumulative curve.

$$K_G = \frac{\phi_{95} - \phi_{5}}{2.44 * (\phi_{75} - \phi_{25})} \quad \text{Equation 6}$$

Repeat Photography

Photographs were taken at each site to visually capture changes in the river system. At least six photographs were taken at each transect – including 3 photographs taken facing upstream, across stream, and downstream from the left bank of the river; and 3 photographs taken facing upstream, across stream, and downstream from the right bank. Photographs were captured using an Olympus TG-4 16.0 megapixel camera and a tripod was used to hold the camera steady at a fixed horizontal and vertical position. The lens height of the camera was documented on the field sheet at each picture location. The camera was also equipped with an internal GPS which geotagged all photos with latitude, longitude, compass heading, data and time. Photo capture mode was set to programmable mode at 1080p with F-stop of f/2, exposure time of 1/80 seconds, ISO speed of 100, 4 mm focal length, maximum aperture of 3, and no flash. When possible, photographs were taken from the locations utilized in McCormick-Taylor's previous studies, some of which were staked, others we referenced a map of the previous photo locations, to enable consistent visual comparisons of the river system.

Results

Sediment Sampling

Grain Size Analysis Data

Appendix A presents graphical data of the grain size analysis. Table 6 summarizes the types of samples taken at each transect, whether it was a pebble count, grab sample, and how many facies were identified at each transect.

Table 6. Location, type, and number of samples collected for each cross section, and the number of facies identified.

	Pebble Count	Grab Sample	Facies Identified
XS-Ref B	1		3
XS-Ref A	1		4
XS-1	2		5
XS-2			4
XS-3	1		3
XS-4	1	2	4
XS-5			2
XS-6	2		3
XS-7		2	4
XS-8		4	6
XS-9			2
XS-10	1	1	4
XS-11	2		4
XS-12			6
XS-13			2
XS-14		3	4
XS-15	2	1	5
XS-16		3	3
XS-17	1	2	5
XS-18	1	4	8
XS-19		5	3
XS-20		2	2
XS-21		2	2
XS-C		4	5
XS-22			5
XS-D			2
XS-23	2	2	5
XS-24			2
XS-25		1	2
XS-26		2	4

Pebble Count Results

Based on pebble count results, provisional facies names assigned in the field were adjusted to rank the sample's particle components in order of decreasing predominance. For example, a sample consisting of 43% sand, 33% cobble, and 23% gravel was named "Sand-Cobble-Gravel". Grain sizes present at a frequency of 10% or greater are represented in the facies name. These refined facies names are utilized in the final digital facies maps. Please see Table 7 for a list of the facies types identified via pebble counts, and the individual transects where these facies were observed.

Table 7. Facies types identified using pebble counts.

Relative Abundance			Quantity	Examples
1	2	3		
SAND	COBBLE	GRAVEL	1	Transect 1
GRAVEL	SAND	COBBLE	2	Transect 10, 23
GRAVEL	SAND	--	2	Transect 6, 26
GRAVEL	--	--	4	Transect 13, 15, 17, 18
GRAVEL	COBBLE	--	3	Transect 13, 14, 15
GRAVEL	COBBLE	SAND	4	Transect 3, 4, 11, 12
GRAVEL	COBBLE	BOULDER	2	Transect REF A, B
GRAVEL	BOULDER	--	1	Transect 6
COBBLE	GRAVEL	SAND	2	Transect 1, 23
COBBLE	GRAVEL	BOULDER	1	Transect 11

Pebble counts were also used to prepare grain-size distribution histograms and cumulative percent-finer-than plots. Distribution histograms indicated that approximately half of the coarser facies had grain-size distributions which were normally distributed (i.e. well sorted) and the remaining half had grain-size distributions which were not normally distributed (i.e. poorly sorted). Mean grain-sizes for the coarser sediments ranged from 10mm to 153mm, corresponding to medium gravel and large cobble, respectively. Grain-size distribution plots with summary statistics are provided in Appendix A.

Sieve Sample Analysis

Grab samples were transported to the laboratory and analyzed. Out of the 48 samples, the 35 coarse samples were dry sieved and their Folk classification (Figure 2) was documented in Table 8. The other 13 samples, which are the shaded samples in Table 8, were finer-grained (predominantly sand-silt-clay composition) and were cleaned, wet sieved using sodium hexametaphosphate, and classified using Shepard and Folk schemes.

Table 8. Summary of bulk properties for the grab sediment samples. Shaded samples were cleaned and wet sieved, while the other samples were dry sieved to classify the sample.

Sample	%H2O	Wet Bulk Density (g/cm ³)	Broad Textural Component				Sediment Classification	
			%GRAVEL	%SAND	%SILT	%CLAY	Shepard (1954)	Folk (1974)
CS-4-1	35.76	1.68	0.00	4.64	61.53	33.83	Clayey-Silt	Mud
CS-4-2	15.67	2.14	14.89	82.62	2.49	0.00	Sand	Gravelly Sand
CS-7-1	8.54	2.37	26.57	73.01	0.42	0.00	Sand	Gravelly Sand
CS-7-2	22.62	1.96	0.00	99.78	0.22	0.00	Sand	Sand
CS-8-1	10.25	2.31	73.07	26.74	0.18	0.00	Sand	Sandy Gravel
CS-8-2	18.51	2.06	41.15	58.62	0.23	0.00	Sand	Sandy Gravel
CS-8-3	23.97	1.93	6.67	92.94	0.39	0.00	Sand	Gravelly Sand
CS-8-4	60.57	1.33	0.00	33.41	42.01	24.59	Sand-Silt-Clay	Sandy Mud
CS-10-1	23.82	1.93	0.00	88.78	7.75	3.47	Sand	Muddy Sand
CS-12-1	28.10	1.83	0.00	87.54	8.70	3.76	Sand	Muddy Sand
CS-14-1	22.56	1.96	0.94	98.62	0.45	0.00	Sand	Sand
CS-14-2	11.38	2.27	49.88	49.87	0.26	0.00	Sand	Sandy Gravel
CS-14-3	24.38	1.92	0.00	92.73	5.02	2.26	Sand	Sand
CS-15-1	12.27	2.25	56.85	42.85	0.30	0.00	Sand	Sandy Gravel
CS-16-1	16.54	2.12	25.79	74.18	0.03	0.00	Sand	Gravelly Sand
CS-16-2	12.35	2.24	48.99	50.94	0.07	0.00	Sand	Sandy Gravel
CS-16-3	17.57	2.09	9.35	90.65	0.00	0.00	Sand	Gravelly Sand
CS-17-1	4.74	2.52	66.42	33.54	0.04	0.00	Sand	Sandy Gravel
CS-17-2	19.01	2.05	40.35	59.63	0.01	0.00	Sand	Sandy Gravel
CS-18-1	20.79	2.00	9.98	89.97	0.05	0.00	Sand	Gravelly Sand
CS-18-2	35.10	1.70	0.00	42.77	36.41	20.82	Sand-Silt-Clay	Sandy Mud
CS-18-3	17.85	2.08	0.00	99.93	0.07	0.00	Sand	Sand
CS-18-4	5.74	2.48	44.26	54.85	0.89	0.00	Sand	Sandy Gravel
CS-19-1	33.65	1.72	0.00	70.00	19.78	10.22	Silty-Sand	Muddy Sand
CS-19-2	21.83	1.98	7.31	92.60	0.09	0.00	Sand	Gravelly Sand

Sample	%H2O	Wet Bulk Density (g/cm ³)	%GRAVEL	%SAND	%SILT	%CLAY	Shepard (1954)	Folk (1974)
CS-19-3	12.42	2.24	47.54	52.42	0.04	0.00	Sand	Sandy Gravel
CS-19-4	41.24	1.59	0.00	56.45	27.77	15.77	Silty-Sand	Muddy Sand
CS-19-5	30.34	1.79	0.00	78.83	13.45	7.73	Sand	Muddy Sand
CS-20-1	18.48	2.06	15.70	84.26	0.05	0.00	Sand	Gravelly Sand
CS-20-2	23.22	1.94	0.00	88.66	7.33	4.01	Sand	Muddy Sand
CS-21-1	18.59	2.06	12.94	87.03	0.03	0.00	Sand	Gravelly Sand
CS-21-2	14.96	2.16	44.43	55.54	0.03	0.00	Sand	Sandy Gravel
CS-C-1	12.16	2.25	61.04	38.93	0.02	0.00	Sand	Sandy Gravel
CS-C-2	36.69	1.67	0.00	55.41	28.96	15.63	Silty-Sand	Muddy Sand
CS-C-3	16.97	2.11	28.54	71.45	0.02	0.00	Sand	Gravelly Sand
CS-C-4	12.69	2.23	39.97	60.00	0.02	0.00	Sand	Sandy Gravel
CS-D-1	18.49	2.06	5.52	94.44	0.04	0.00	Sand	Gravelly Sand
CS-23-1	14.73	2.17	0.00	98.89	0.75	0.36	Sand	Sand
CS-23-2	22.14	1.97	16.71	83.26	0.03	0.00	Sand	Gravelly Sand
CS-25-1	20.47	2.01	22.94	76.97	0.09	0.00	Sand	Gravelly Sand
CS-26-1	20.98	2.00	1.59	97.62	0.78	0.00	Sand	Sand
CS-26-2	14.75	2.17	45.99	54.00	0.02	0.00	Sand	Sandy Gravel
DEM DL24 to DR26 #1	2.93	2.59	95.91	4.08	0.01	0.00	Sand	Gravel
DEM DL24 to DR26 #2	12.71	2.23	25.84	73.95	0.21	0.00	Sand	Gravelly Sand
DEM DL26 to DR31 #1	32.00	1.75	0.00	76.65	14.51	8.84	Sand	Muddy Sand
DEM DL27 to DR32 #1	3.03	2.59	0.71	98.44	0.85	0.00	Sand	Sand
DEM DL27 to DR32 #2	20.00	2.02	44.18	55.51	0.32	0.00	Sand	Sandy Gravel
DEM DL27 to DR32 #3	13.66	2.20	106.79	-6.82	-5.88	5.91	Clay	Gravel

Cross Sections and Facies Maps

Cross section graphs and facies maps of each transect site are presented in Appendix B. Cross section graphs are plotted on a 1:1 scale. Facies maps are presented under their respective cross section graphs and are oriented the same way as the graphs – from river left to river right. The red triangles represent the staked endpoints (LB and RB monuments) of the transects surveyed by McCormick-Taylor or installed by MGS for the new transects C and D. The distance is plotted as feet from the center point between the staked endpoints.

Digital Elevation Model and DEM Facies Map

A map of the 61 transects used to create the DEM can be found in Figure 3. The DEM of the Bloede impoundment area (including the river bed, bank edges, a small portion of the river left floodplain, and the steep, river right bank slope) yielded elevations ranging from 66 to 100 feet (Figure 4). River bed elevations within the impoundment ranged from 66 feet in the scoured holes located river right (seen in Figure 3 as very dark blue-black in color) to approximately 75 feet denoted as the waters' edge elevation at the time of the survey.

The continuous facies map of the DEM area yielded eleven different facies classes ranging in size from boulders to sand-silt-clay with several small areas of woody debris (Figure 5). The coarser boulder and boulder silt classes were predominately located in the deep scoured holes seen in the DEM. The majority of the sediments within the impoundment fall into the six predominantly gravel and/or sand classes of gravel, gravel sand, gravel sand cobble, sand, sand gravel, and sand silt. The finer sediments consisting of sand silt and sand silt clay were predominantly located directly upriver from fallen trees or other woody debris which created a lower hydraulic energy environment and prevented scouring. Smaller areas of sand silt clay were also found very near the bank edges where the bank material contained higher percentages of fines relative to the impoundment deposits.

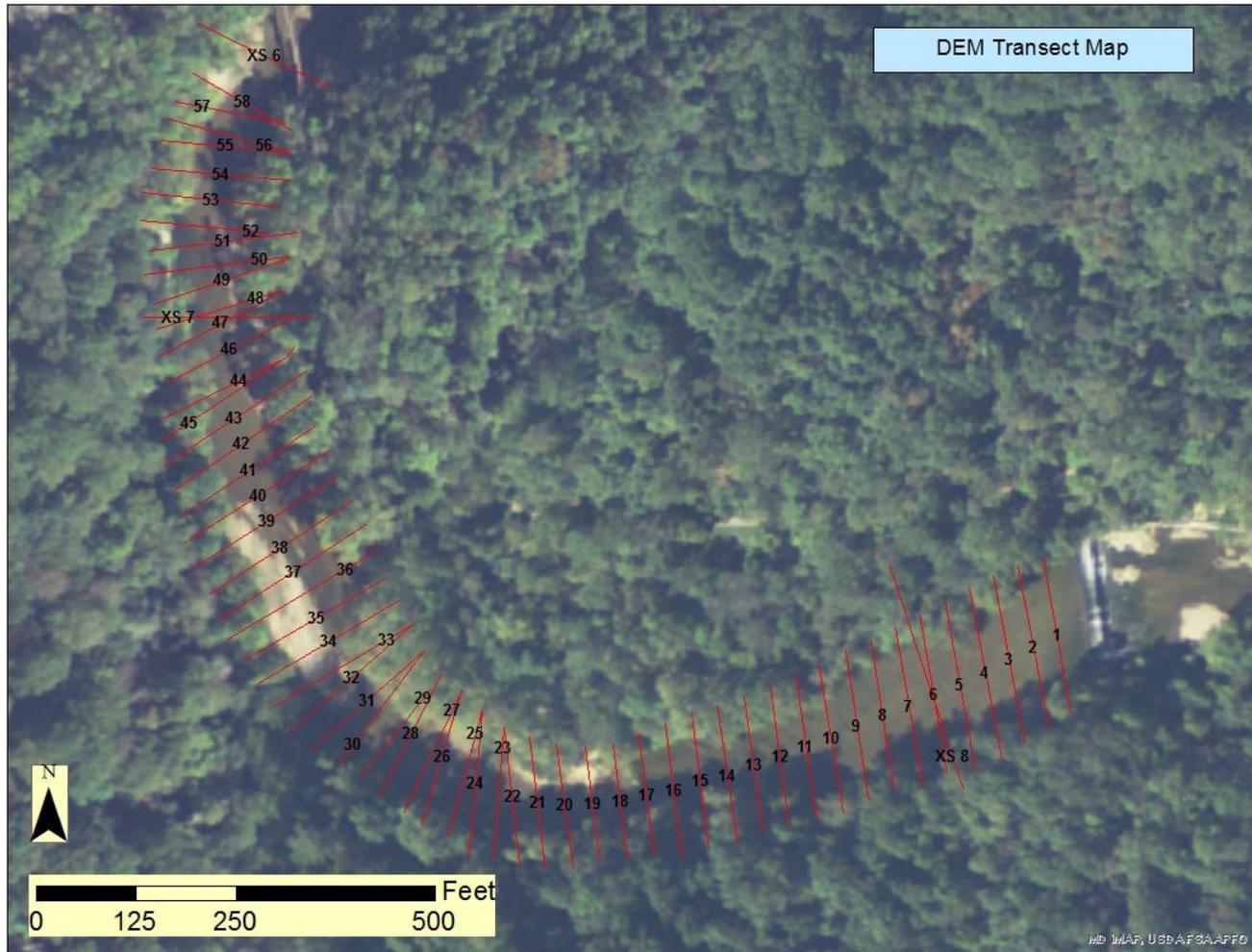


Figure 3. Map of transects used to conduct DEM survey and facies mapping.

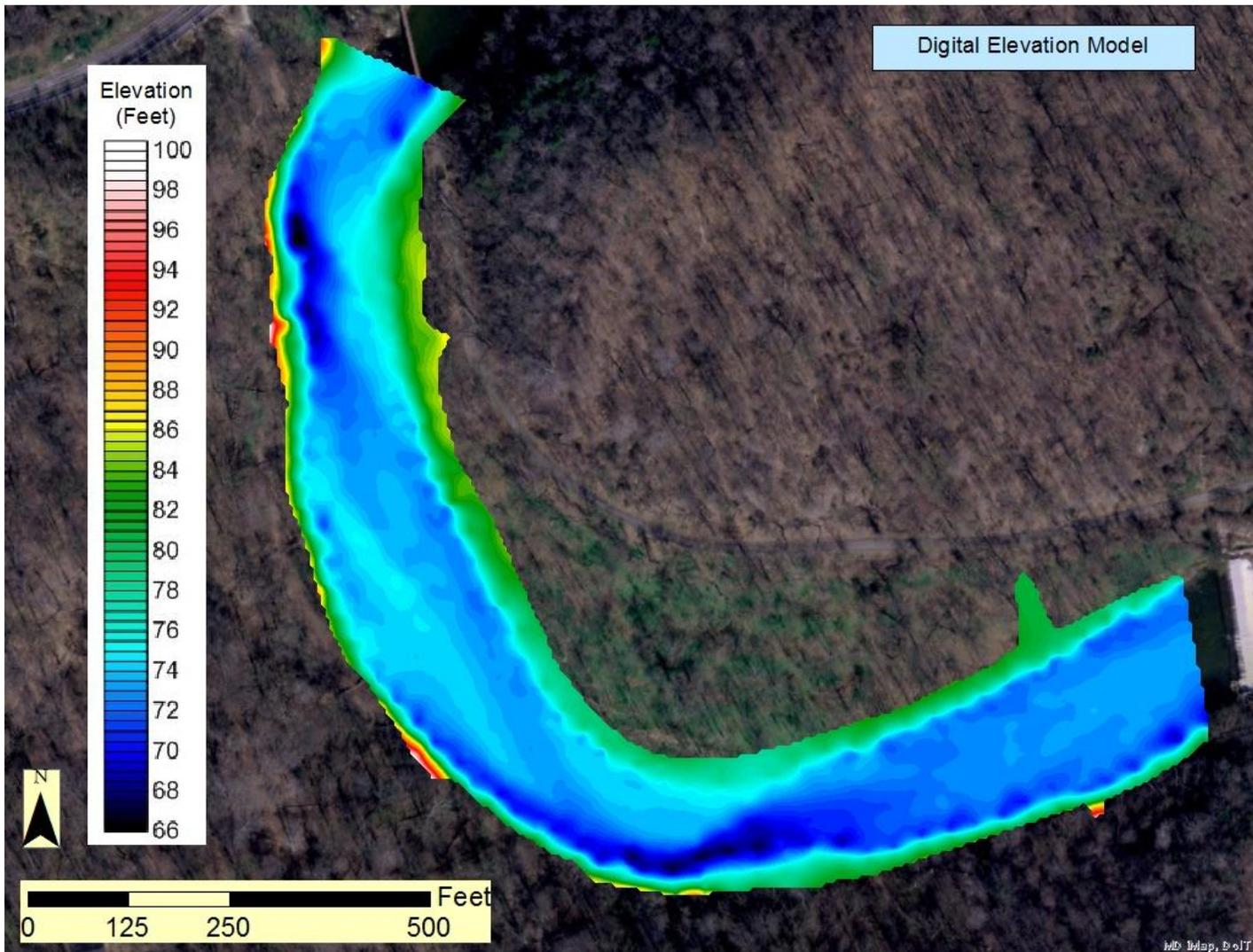


Figure 4. Finalized Digital Elevation Model of Bloede Impoundment, elevation in feet.

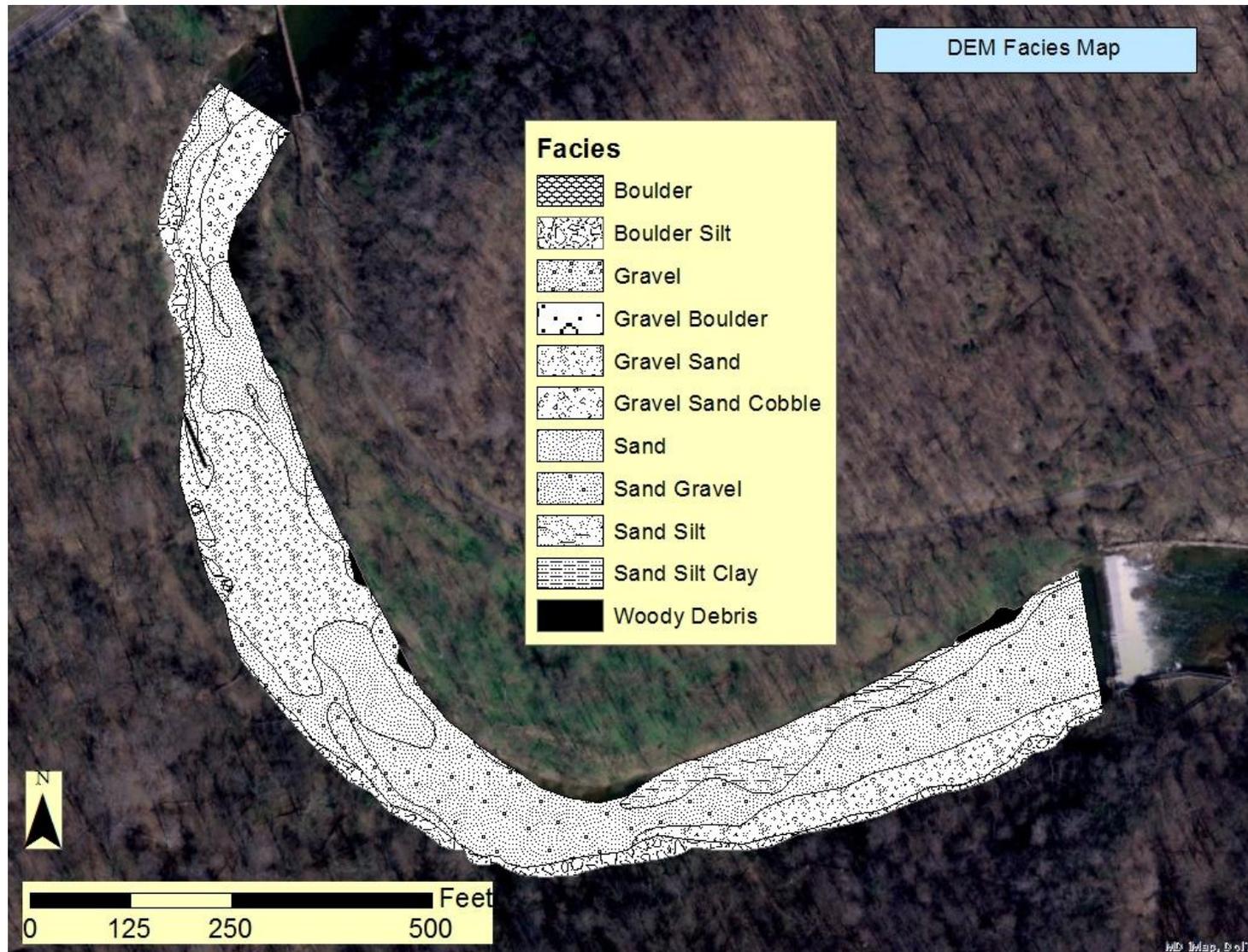


Figure 5. Facies map for the Digital Elevation Model coverage. This map contains 38 different polygons, comprising 11 different facies.

Repeat Photography

Photographs taken at each transect site and at the DEM site are viewable on ArcGIS

Online: <http://arcg.is/2f1sFnb>.

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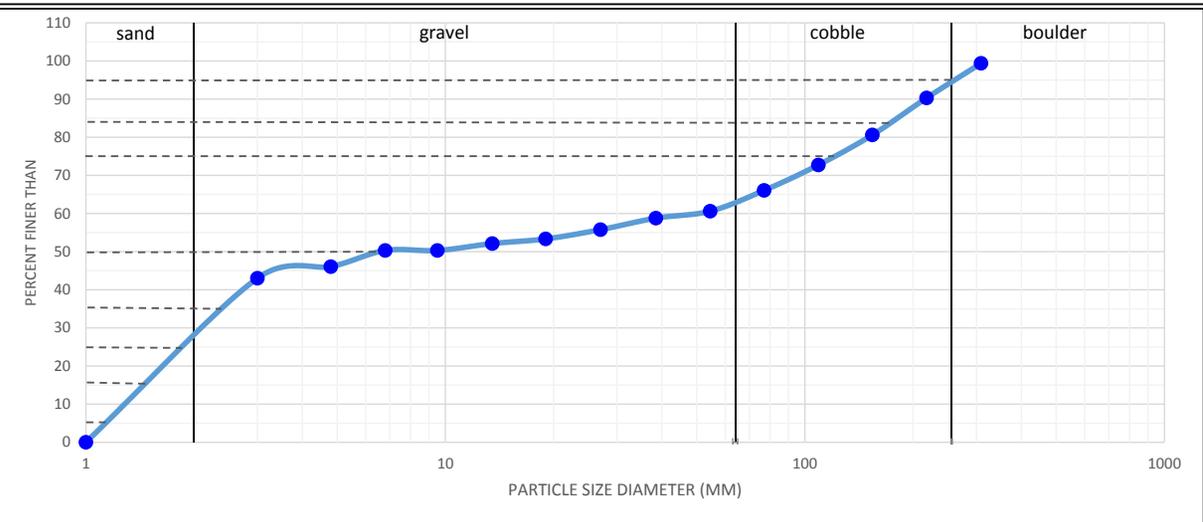
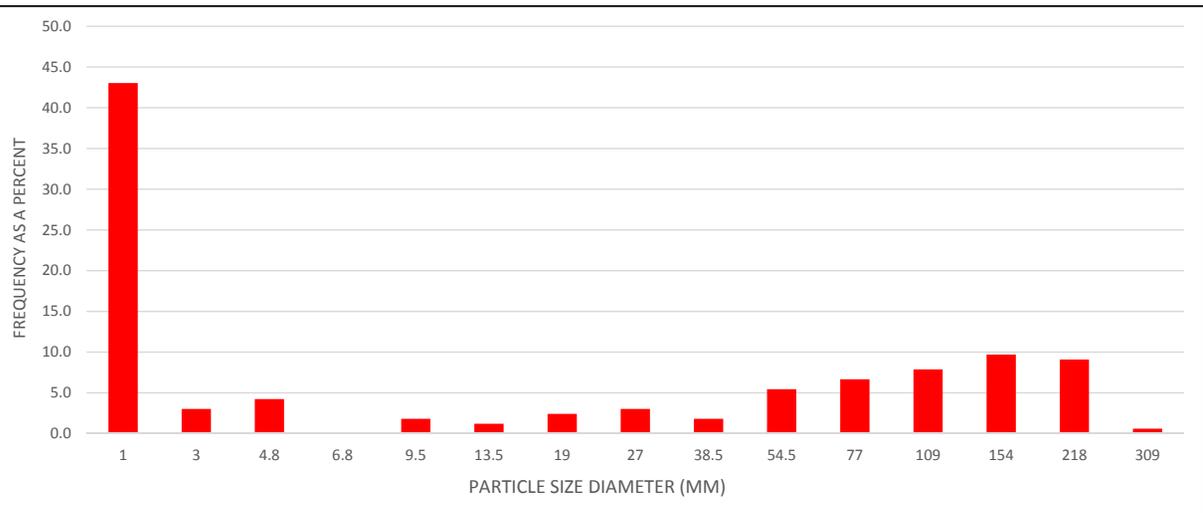
Appendix A

Pebble Counts and Sieve Results

Transect ID: 1		Describer: KK, AG
Date: May 20, 2016		Time: 9:40 am
Facies Type: SAND COBBLE GRAVEL		
Notes:		
Material	Size Range (mm)	Count
sand/silt/clay	less than 2	71
very fine gravel	2 - 4	5
fine gravel	4 - 5.6	7
fine gravel	5.6 - 8	0
medium gravel	8 - 11	3
medium gravel	11 - 16	2
coarse gravel	16 - 22	4
coarse gravel	22 - 32	5
very coarse gravel	32 - 45	3
very coarse gravel	45 - 64	9
small cobble	64 - 90	11
medium cobble	90 - 128	13
large cobble	128 - 180	16
very large cobble	180 - 256	15
boulder	greater than 256	1
Total Count:		165

% SAND	% GRAVEL	% COBBLE
43	23	33

% BOULDER
1



REPRESENTATIVE GRAIN SIZES (MM)

D5	1.2
D16	1.6
D25	1.8
D35	2.4
D50	6.4
D75	120
D84	175
D95	260

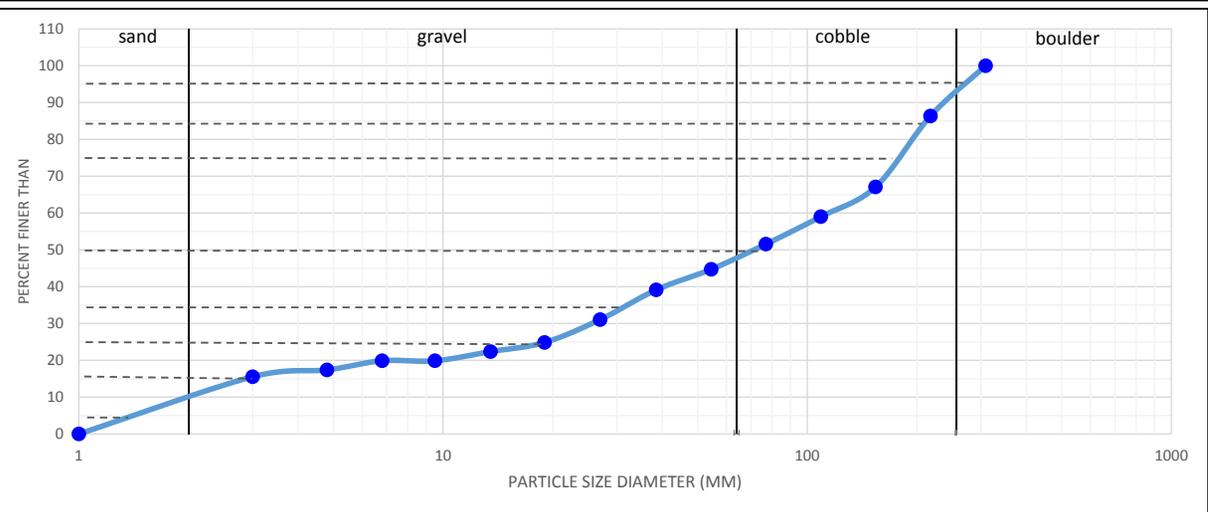
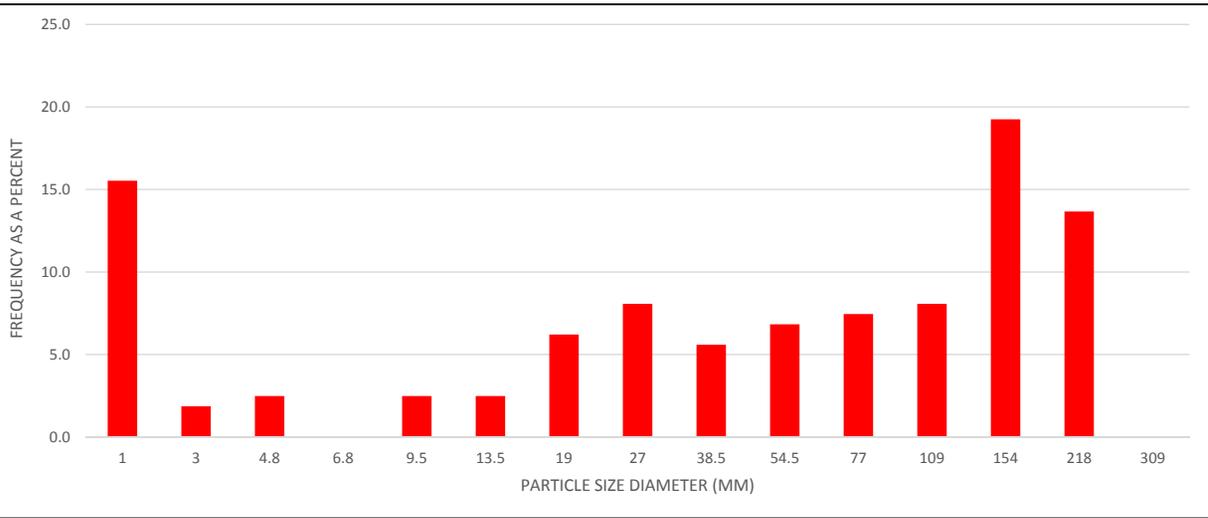
SUMMARY STATISTICS

Geometric Mean	13.9	<i>characterizes the central portion of distribution</i>
Standard Deviation	10.5	<i>width of distribution, also represents sorting</i>
Skewness	2.0	<i>a measure of deviation from symmetry to one side of average</i>
Kurtosis	0.0	<i>a measure of peakness or flatness of distribution</i>
Arithmetic Mean	61.0	
Standard Deviation	82.6	
Skewness	1.0	
Kurtosis	0.6	

Transect ID: 1		Describer: KK, AG
Date: May 20, 2016		Time: 10 am
Facies Type: COBBLE GRAVEL SAND		
Notes:		
Material	Size Range (mm)	Count
sand/silt/clay	less than 2	25
very fine gravel	2 - 4	3
fine gravel	4 - 5.6	4
fine gravel	5.6 - 8	0
medium gravel	8 - 11	4
medium gravel	11 - 16	4
coarse gravel	16 - 22	10
coarse gravel	22 - 32	13
very coarse gravel	32 - 45	9
very coarse gravel	45 - 64	11
small cobble	64 - 90	12
medium cobble	90 - 128	13
large cobble	128 - 180	31
very large cobble	180 - 256	22
boulders	greater than 256	0
Total Count:		161

% SAND	% GRAVEL	% COBBLE
16	36	48

% BOULDER
0



REPRESENTATIVE GRAIN SIZES (MM)

D5	1.4
D16	2.9
D25	18
D35	32
D50	70
D75	175
D84	205
D95	270

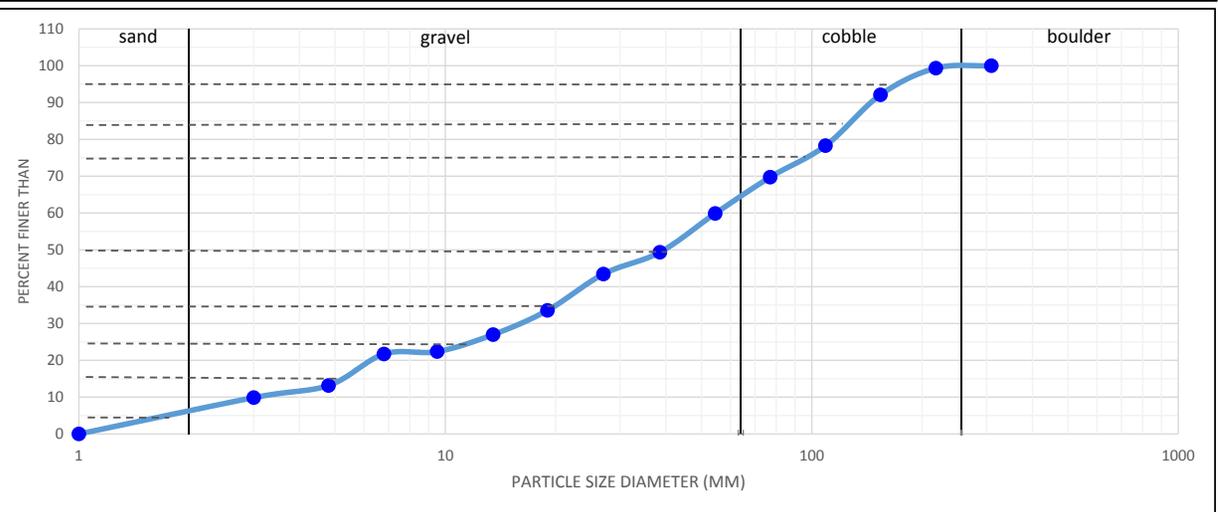
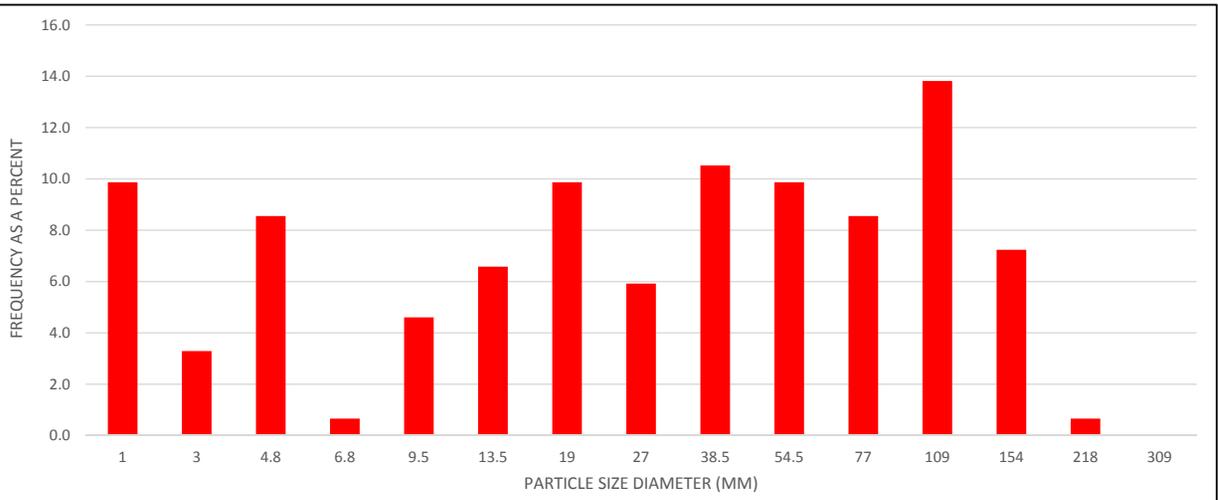
SUMMARY STATISTICS

Geometric Mean	24.4	<i>characterizes the central portion of distribution</i>
Standard Deviation	8.4	<i>width of distribution, also represents sorting</i>
Skewness	7.8	<i>a measure of deviation from symmetry</i>
Kurtosis	0.0	<i>a measure of peakness or flatness of distribution</i>
Arithmetic Mean	92.6	
Standard Deviation	91.2	
Skewness	0.4	
Kurtosis	0.0	

Transect ID: 3		Describer: AG, AM
Date: May 24, 2016		Time: 9:20 am
Facies Type: GRAVEL COBBLE SAND		
Notes:		
Material	Size Range (mm)	Count
sand/silt/clay	less than 2	15
very fine gravel	2 - 4	5
fine gravel	4 - 5.6	13
fine gravel	5.6 - 8	1
medium gravel	8 - 11	7
medium gravel	11 - 16	10
coarse gravel	16 - 22	15
coarse gravel	22 - 32	9
very coarse gravel	32 - 45	16
very coarse gravel	45 - 64	15
small cobble	64 - 90	13
medium cobble	90 - 128	21
large cobble	128 - 180	11
very large cobble	180 - 256	1
boulders	greater than 256	0
Total Count:		152

% SAND	% GRAVEL	% COBBLE
10	60	30

% BOULDER
0



REPRESENTATIVE GRAIN SIZES (MM)

D5	1.7
D16	5.4
D25	12
D35	20
D50	38
D75	96
D84	135
D95	165

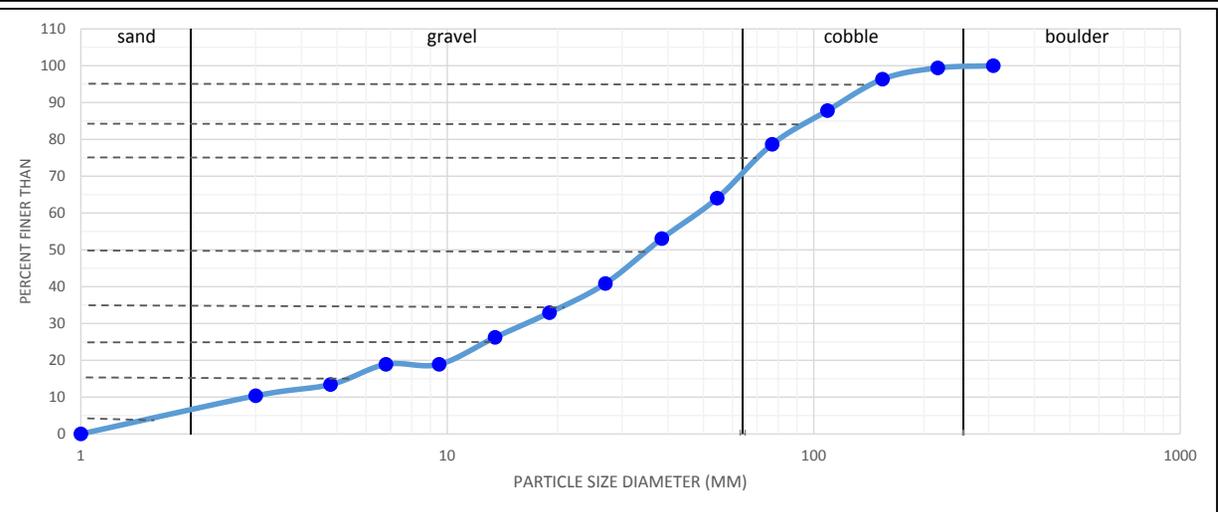
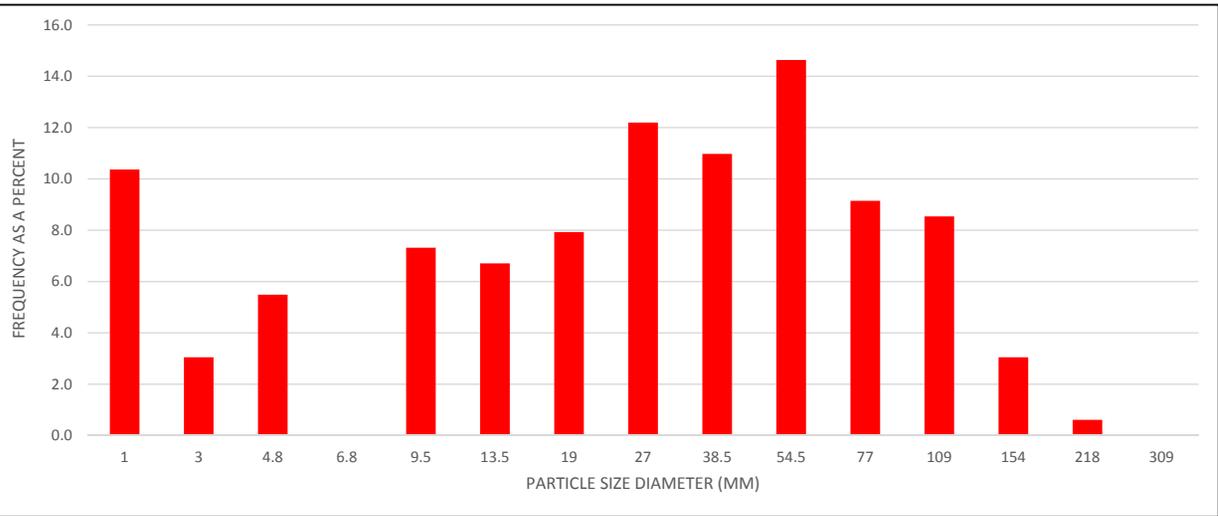
SUMMARY STATISTICS

Geometric Mean	27.0	<i>characterizes the central portion of distribution</i>
Standard Deviation	5.0	<i>width of distribution, also represents sorting</i>
Skewness	9.5	<i>a measure of deviation from symmetry</i>
Kurtosis	0.1	<i>a measure of peakness or flatness of distribution</i>
Arithmetic Mean	59.5	
Standard Deviation	57.1	
Skewness	0.5	
Kurtosis	0.1	

Transect ID: 4		Describer: AG, AM
Date: May 24, 2016		Time: 11:30 am
Facies Type: GRAVEL COBBLE SAND		
Notes:		
Material	Size Range (mm)	Count
sand/silt/clay	less than 2	17
very fine gravel	2 - 4	5
fine gravel	4 - 5.6	9
fine gravel	5.6 - 8	0
medium gravel	8 - 11	12
medium gravel	11 - 16	11
coarse gravel	16 - 22	13
coarse gravel	22 - 32	20
very coarse gravel	32 - 45	18
very coarse gravel	45 - 64	24
small cobble	64 - 90	15
medium cobble	90 - 128	14
large cobble	128 - 180	5
very large cobble	180 - 256	1
boulders	greater than 256	0
Total Count:		164

% SAND	% GRAVEL	% COBBLE
10	68	21

% BOULDER
0



REPRESENTATIVE GRAIN SIZES (MM)

D5	1.6
D16	5.3
D25	14
D35	21
D50	35
D75	70
D84	93
D95	140

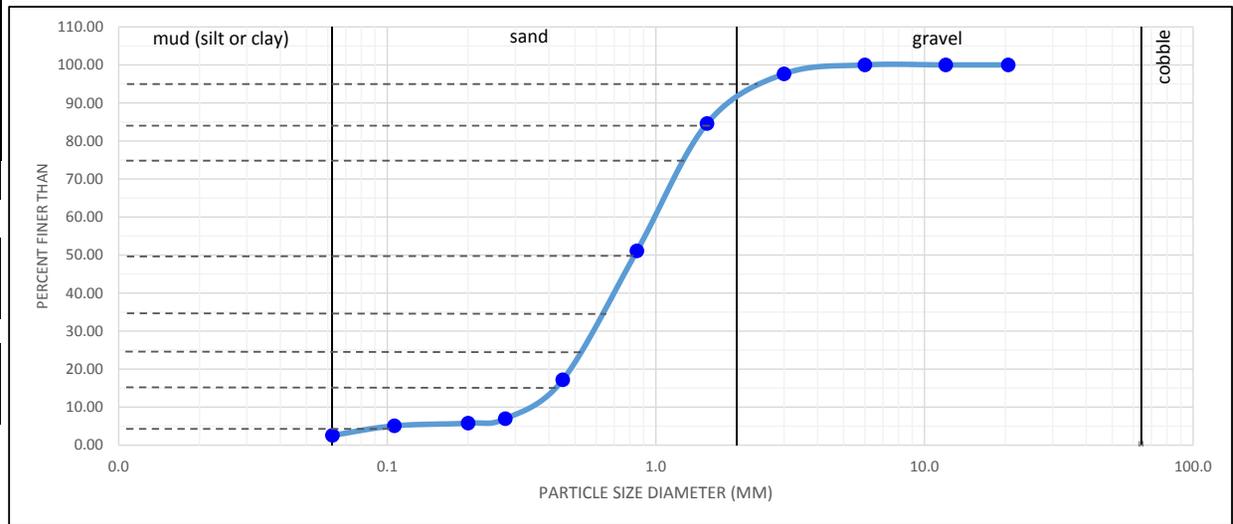
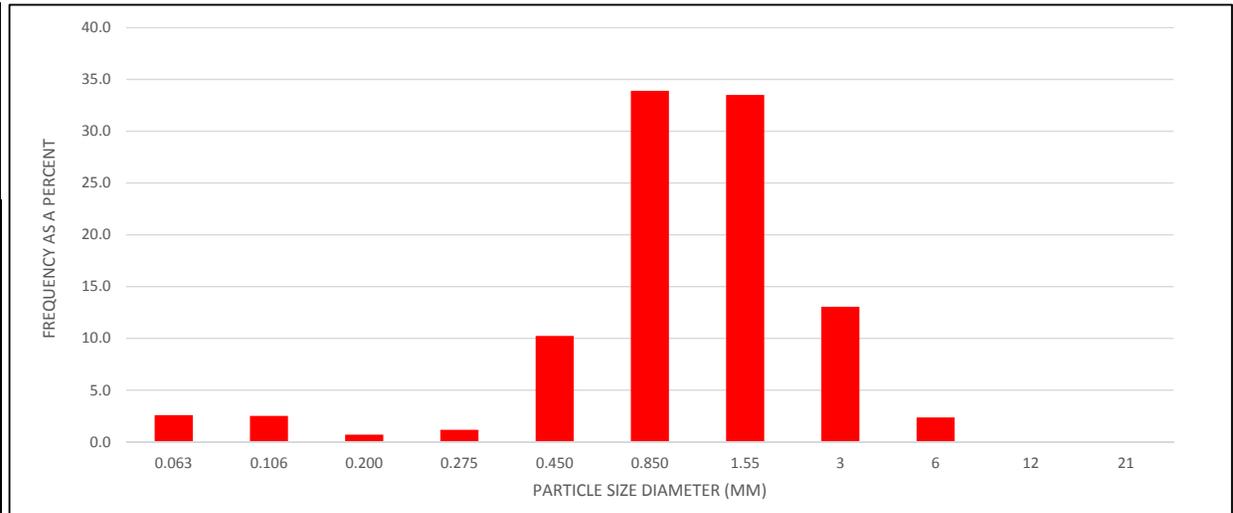
SUMMARY STATISTICS

Geometric Mean	22.2	<i>characterizes the central portion of distribution</i>
Standard Deviation	4.2	<i>width of distribution, also represents sorting</i>
Skewness	9.9	<i>a measure of deviation from symmetry</i>
Kurtosis	0.1	<i>a measure of peakness or flatness of distribution</i>
Arithmetic Mean	44.4	
Standard Deviation	42.9	
Skewness	0.4	
Kurtosis	0.1	

Transect ID: 4		Describer: AG, AM
Date: May 24, 2016		Time: 12 pm
Facies Type: SAND GRAVEL		
Notes:		
Material	Size Range (mm)	Mass (g)
coarse gravel	16 - 25	0.00
medium gravel	8 - 16	0.00
fine gravel	4 - 8	5.95
very fine gravel	2 - 4	32.92
very coarse sand	1.10 - 2	84.49
coarse sand	0.600 - 1.10	85.50
med to coarse sand	0.300 - 0.600	25.80
medium sand	0.250 - 0.300	2.94
fine sand	0.150 - 0.250	1.77
very fine sand	0.0625 - 0.150	6.32
mud (silt or clay)	< 0.0625	6.50
Total Mass (g):		252.19

% MUD	% SAND	% GRAVEL
2.6	82.0	15.4

FOLK CLASSIFICATION
GRAVELLY SAND



REPRESENTATIVE GRAIN SIZES (MM)

D5	0.09
D16	0.42
D25	0.54
D35	0.65
D50	0.85
D75	1.3
D84	1.6
D95	2.3

SUMMARY STATISTICS

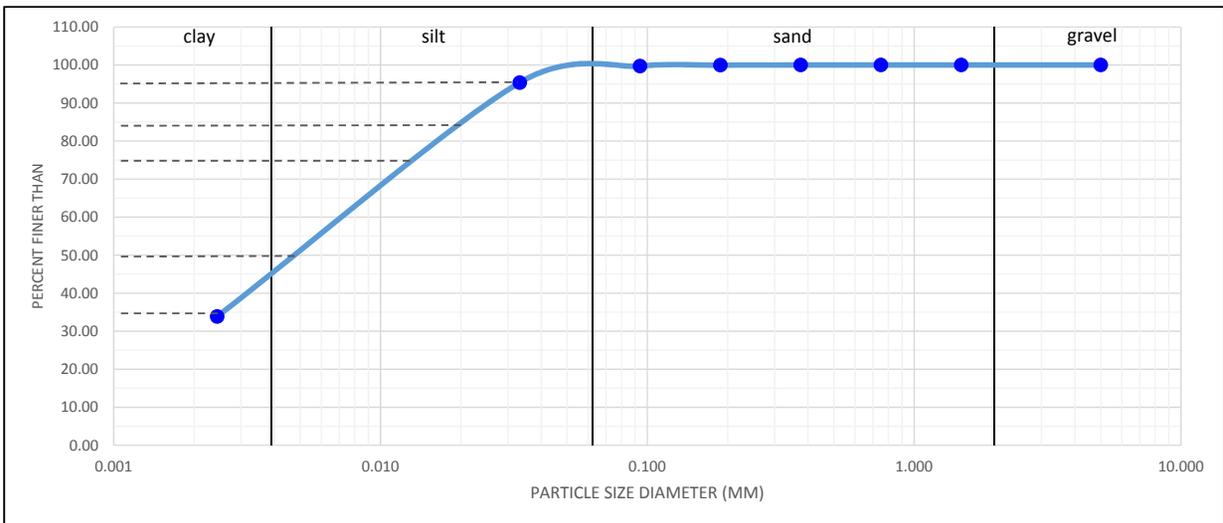
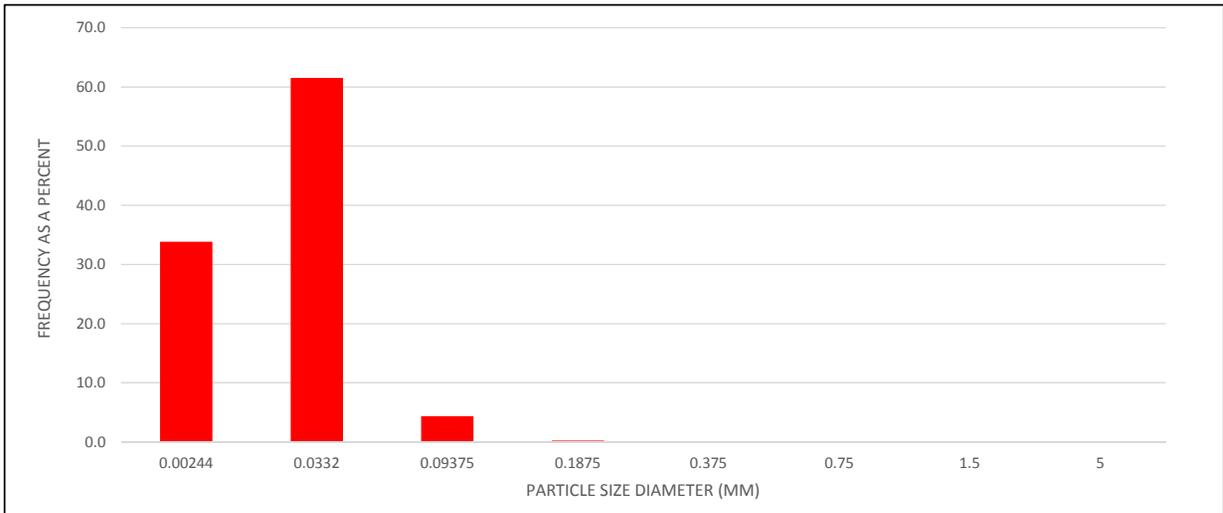
Geometric Mean	0.8	characterizes the central portion of distribution
Standard Deviation	2.0	width of distribution, also represents sorting
Skewness	0.5	a measure of deviation from symmetry
Kurtosis	0.3	a measure of peakness or flatness of distribution
Arithmetic Mean	1.0	
Standard Deviation	0.6	
Skewness	0.3	
Kurtosis	0.1	

Transect ID: 4		Describer: AG, AM
Date: May 24, 2016		Time: 12:15 pm
Facies Type: SILT CLAY		
Notes:		
Material	Size Range (mm)	Mass (g)
gravel	> 2	0.00
very coarse sand	1 - 2	0.00
coarse sand	0.5 - 1	0.00
medium sand	0.25 - 0.5	0.01
fine sand	0.125 - 0.25	0.05
very fine sand	0.0625 - 0.125	0.93
silt	0.0039 - 0.0625	13.14
clay	0.00098 - 0.0039	7.23
Total Mass (g):		21.36

% CLAY	% SILT	% SAND
33.8	61.5	4.6

% GRAVEL
0.0

FOLK CLASSIFICATION
MUD



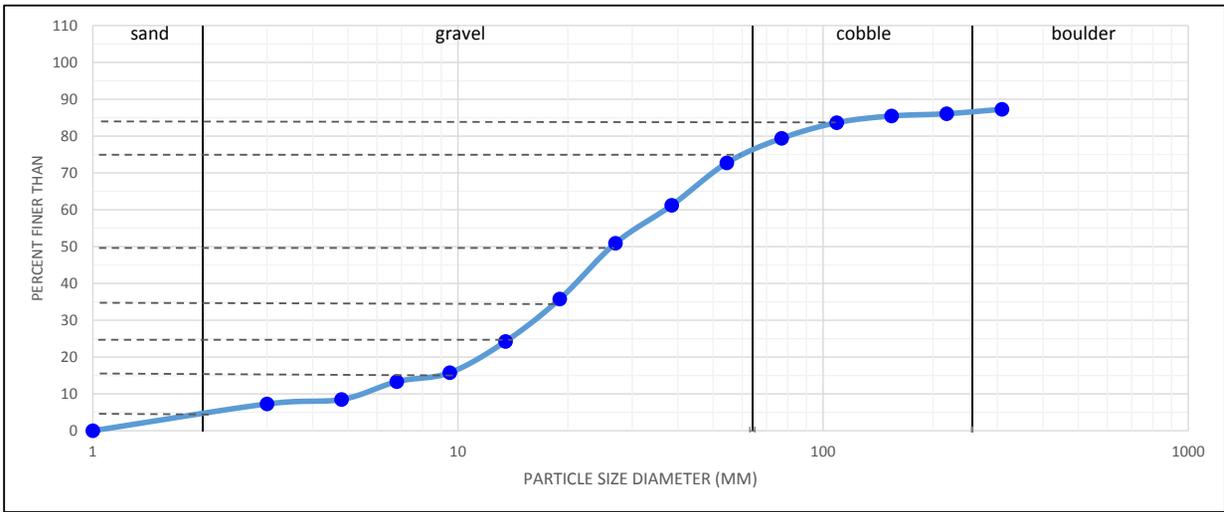
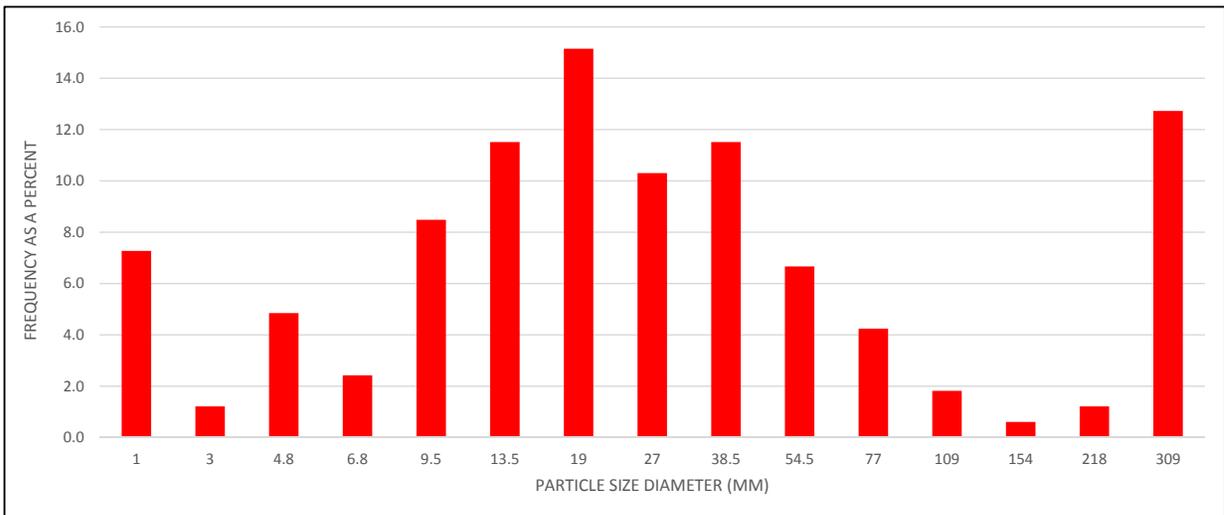
REPRESENTATIVE GRAIN SIZES (MM)

D5	--
D16	--
D25	--
D35	0.0025
D50	0.0048
D75	0.013
D84	0.020
D95	0.033

Transect ID: 6		Describer: ES
Date: May 26, 2016		Time: 9 am
Facies Type: GRAVEL BOULDER		
Notes:		
Material	Size Range (mm)	Count
sand/silt/clay	less than 2	12
very fine gravel	2 - 4	2
fine gravel	4 - 5.6	8
fine gravel	5.6 - 8	4
medium gravel	8 - 11	14
medium gravel	11 - 16	19
coarse gravel	16 - 22	25
coarse gravel	22 - 32	17
very coarse gravel	32 - 45	19
very coarse gravel	45 - 64	11
small cobble	64 - 90	7
medium cobble	90 - 128	3
large cobble	128 - 180	1
very large cobble	180 - 256	2
boulders	greater than 256	21
Total Count:		165

% SAND	% GRAVEL	% COBBLE
7	72	8

% BOULDER
13



REPRESENTATIVE GRAIN SIZES (MM)

D5	2.0
D16	9.3
D25	14
D35	18
D50	27
D75	58
D84	105
D95	--

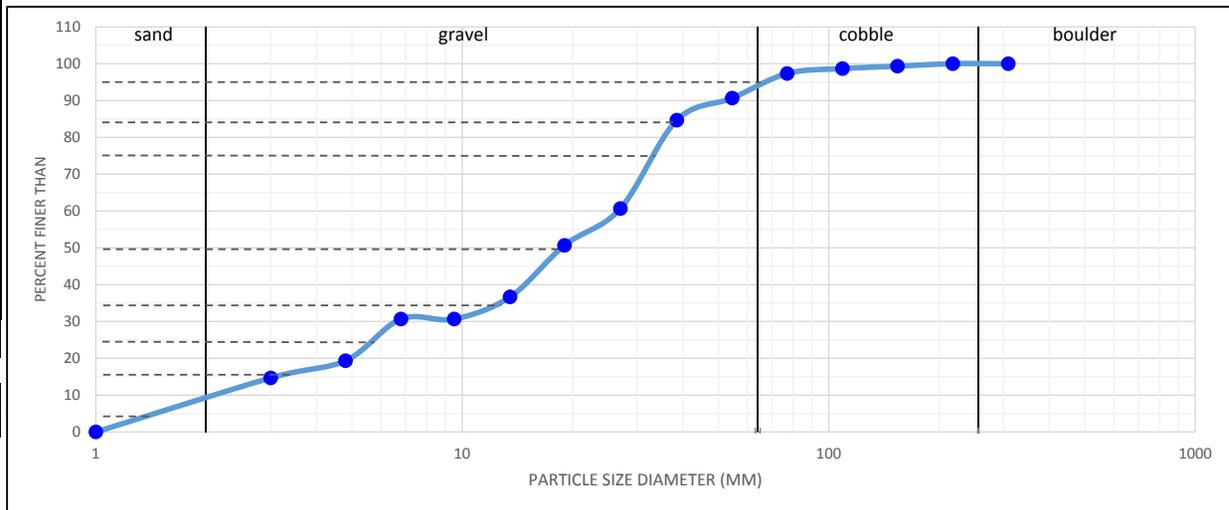
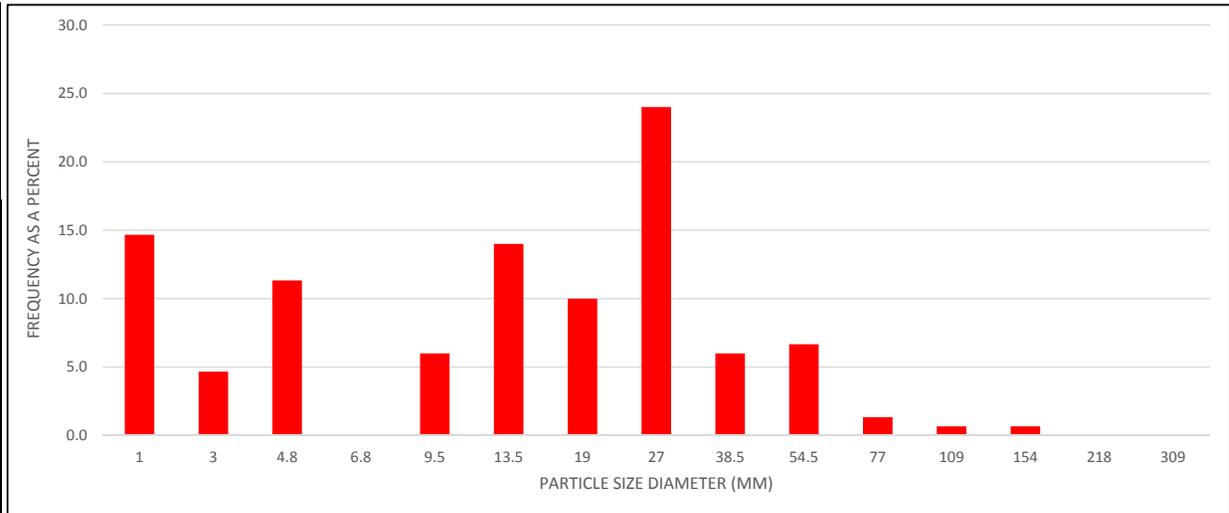
SUMMARY STATISTICS

Geometric Mean	31.2	<i>characterizes the central portion of distribution</i>
Standard Deviation	3.4	<i>width of distribution, also represents sorting</i>
Skewness	15.4	<i>a measure of deviation from symmetry</i>
Kurtosis	0.1	<i>a measure of peakness or flatness of distribution</i>
Arithmetic Mean	47.1	
Standard Deviation	--	
Skewness	--	
Kurtosis	--	

Transect ID: 6		Describer: ES
Date: May 26, 2016		Time: 9:30 am
Facies Type: GRAVEL SAND		
Notes:		
Material	Size Range (mm)	Count
sand/silt/clay	less than 2	22
very fine gravel	2 - 4	7
fine gravel	4 - 5.6	17
fine gravel	5.6 - 8	0
medium gravel	8 - 11	9
medium gravel	11 - 16	21
coarse gravel	16 - 22	15
coarse gravel	22 - 32	36
very coarse gravel	32 - 45	9
very coarse gravel	45 - 64	10
small cobble	64 - 90	2
medium cobble	90 - 128	1
large cobble	128 - 180	1
very large cobble	180 - 256	0
boulders	greater than 256	0
Total Count:		150

% SAND	% GRAVEL	% COBBLE
15	83	3

% BOULDER
0



REPRESENTATIVE GRAIN SIZES (MM)

D5	1.4
D16	3.3
D25	5.7
D35	13
D50	18
D75	33
D84	38
D95	65

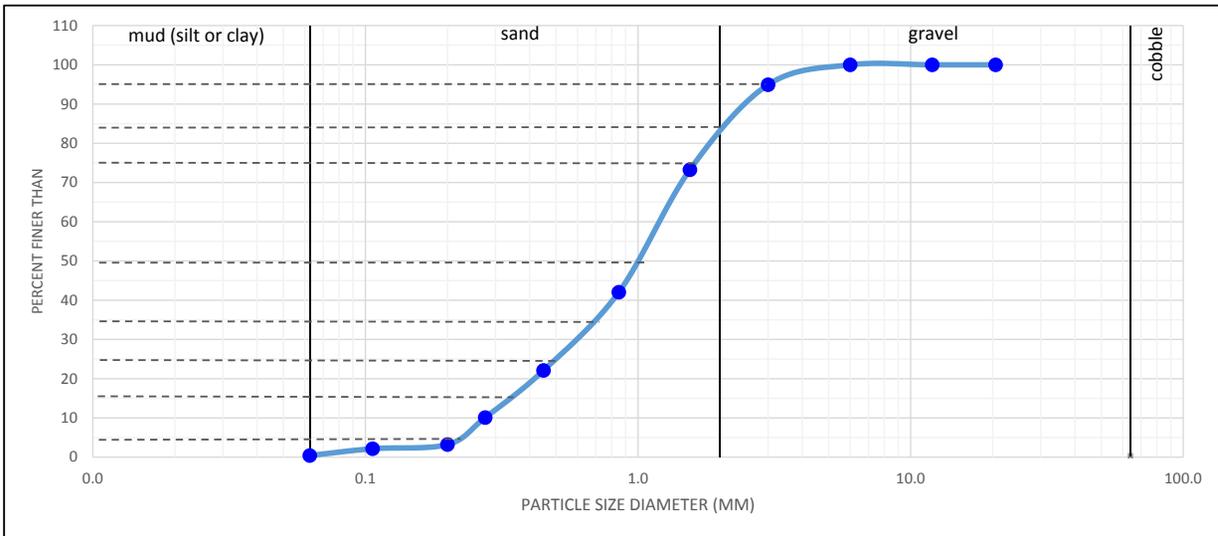
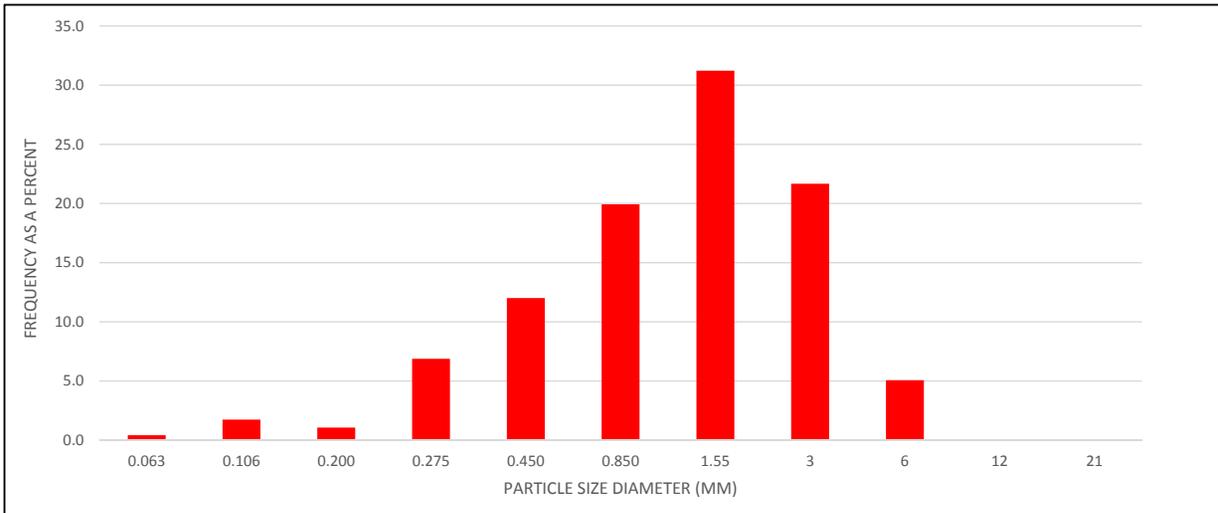
SUMMARY STATISTICS

Geometric Mean	11.2	<i>characterizes the central portion of distribution</i>
Standard Deviation	3.4	<i>width of distribution, also represents sorting</i>
Skewness	4.7	<i>a measure of deviation from symmetry</i>
Kurtosis	0.1	<i>a measure of peakness or flatness of distribution</i>
Arithmetic Mean	19.8	
Standard Deviation	18.3	
Skewness	0.3	
Kurtosis	0.2	

Transect ID: 7		Describer: KK, AG
Date: May 26, 2016		Time: 12 pm
Facies Type: SAND GRAVEL		
Notes:		
Material	Size Range (mm)	Mass (g)
coarse gravel	16 - 25	0.00
medium gravel	8 - 16	0.00
fine gravel	4 - 8	13.98
very fine gravel	2 - 4	59.77
very coarse sand	1.10 - 2	86.11
coarse sand	0.600 - 1.10	54.97
med to coarse sand	0.300 - 0.600	33.13
medium sand	0.250 - 0.300	18.96
fine sand	0.150 - 0.250	2.94
very fine sand	0.0625 - 0.150	4.79
mud (silt or clay)	< 0.0625	1.16
Total Mass (g):		275.81

% MUD	% SAND	% GRAVEL
0.4	72.8	26.7

FOLK CLASSIFICATION
GRAVELLY SAND



REPRESENTATIVE GRAIN SIZES (MM)

D5	0.22
D16	0.35
D25	0.50
D35	0.72
D50	1.0
D75	1.7
D84	2.1
D95	2.9

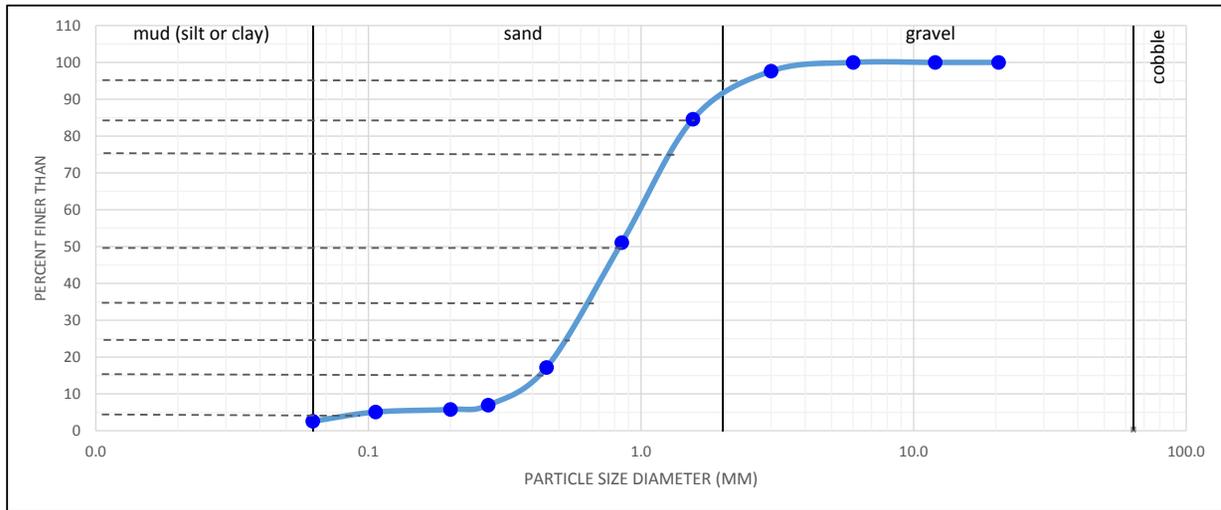
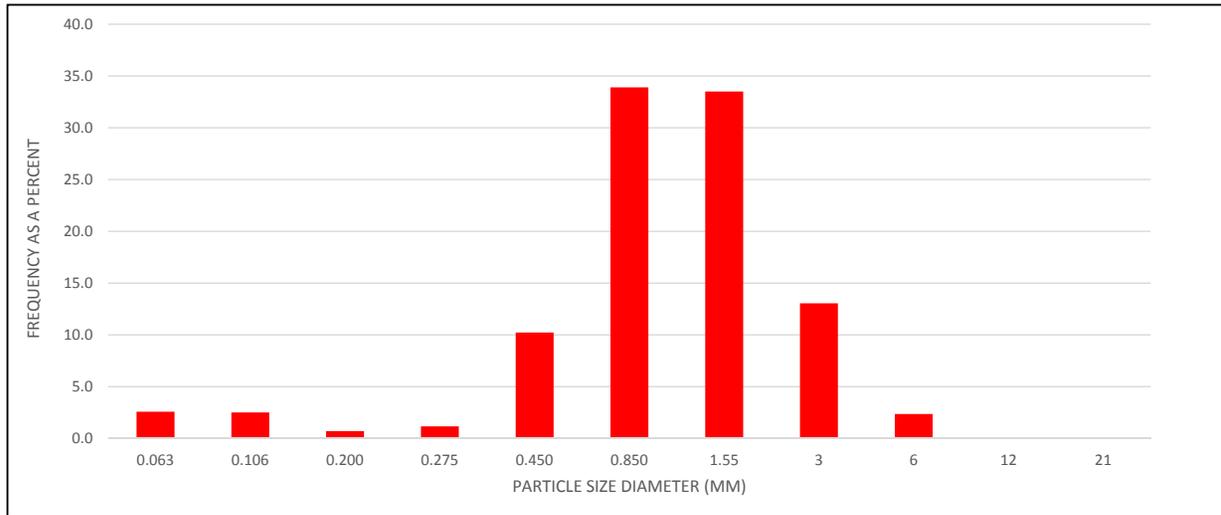
SUMMARY STATISTICS

Geometric Mean	0.9	<i>characterizes the central portion of distribution</i>
Standard Deviation	2.4	<i>width of distribution, also represents sorting</i>
Skewness	0.5	<i>a measure of deviation from symmetry</i>
Kurtosis	0.2	<i>a measure of peakness or flatness of distribution</i>
Arithmetic Mean	1.2	
Standard Deviation	0.8	
Skewness	0.3	
Kurtosis	0.3	

Transect ID: 7		Describer: KK, AG
Date: May 26, 2016		Time: 12:30 pm
Facies Type: SAND		
Notes:		
Material	Size Range (mm)	Mass (g)
coarse gravel	16 - 25	0.00
medium gravel	8 - 16	0.00
fine gravel	4 - 8	0.00
very fine gravel	2 - 4	0.00
very coarse sand	1.10 - 2	7.20
coarse sand	0.600 - 1.10	34.88
med to coarse sand	0.300 - 0.600	127.75
medium sand	0.250 - 0.300	57.75
fine sand	0.150 - 0.250	1.86
very fine sand	0.0625 - 0.150	1.27
mud (silt or clay)	< 0.0625	0.52
Total Mass (g):		231.23

% MUD	% SAND	% GRAVEL
0.2	99.8	0.0

FOLK CLASSIFICATION
SAND



REPRESENTATIVE GRAIN SIZES (MM)

D5	0.09
D16	0.43
D25	0.53
D35	0.65
D50	0.85
D75	1.3
D84	1.6
D95	2.3

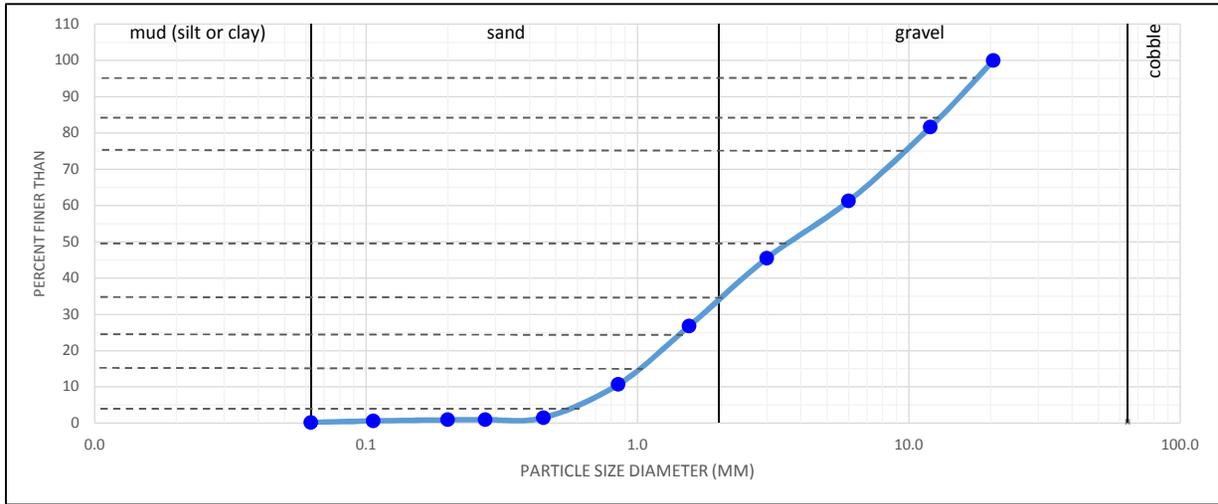
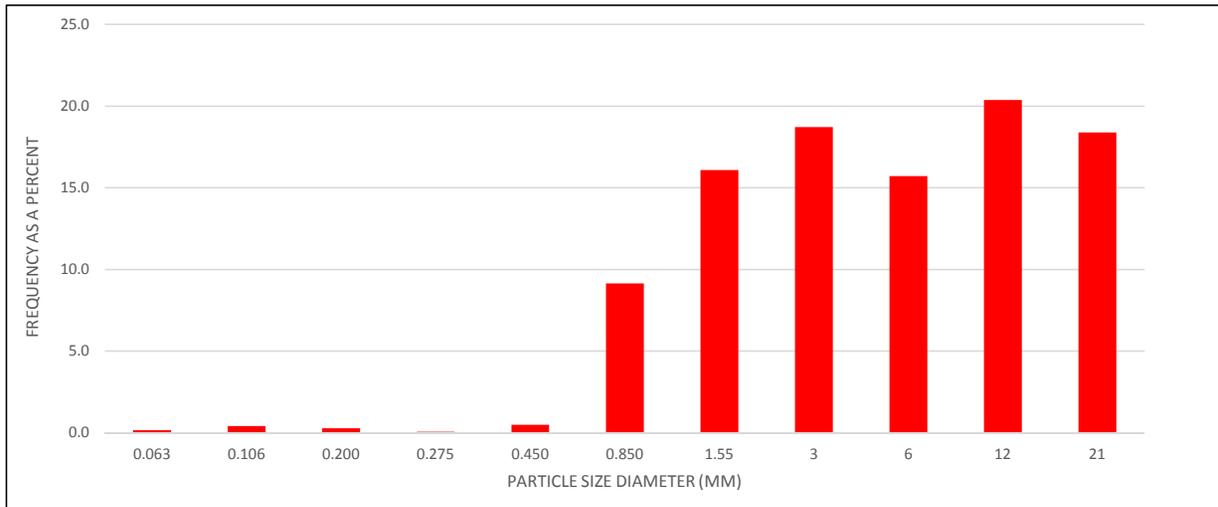
SUMMARY STATISTICS

Geometric Mean	0.8	<i>characterizes the central portion of distribution</i>
Standard Deviation	1.9	<i>width of distribution, also represents sorting</i>
Skewness	0.5	<i>a measure of deviation from symmetry</i>
Kurtosis	0.3	<i>a measure of peakness or flatness of distribution</i>
Arithmetic Mean	1.0	
Standard Deviation	0.6	
Skewness	0.3	
Kurtosis	0.1	

Transect ID: 8		Describer: KK, AG
Date: May 26, 2016		Time: 4:30 pm
Facies Type: GRAVEL SAND		
Notes:		
Material	Size Range (mm)	Mass (g)
coarse gravel	16 - 25	46.41
medium gravel	8 - 16	51.46
fine gravel	4 - 8	39.69
very fine gravel	2 - 4	47.28
very coarse sand	1.10 - 2	40.63
coarse sand	0.600 - 1.10	23.11
med to coarse sand	0.300 - 0.600	1.30
medium sand	0.250 - 0.300	0.18
fine sand	0.150 - 0.250	0.74
very fine sand	0.0625 - 0.150	1.08
mud (silt or clay)	< 0.0625	0.46
Total Mass (g):		252.34

% MUD	% SAND	% GRAVEL
0.2	26.6	73.3

FOLK CLASSIFICATION
SANDY GRAVEL



REPRESENTATIVE GRAIN SIZES (MM)

D5	0.60
D16	1.1
D25	1.5
D35	2.0
D50	3.7
D75	9.8
D84	13
D95	18

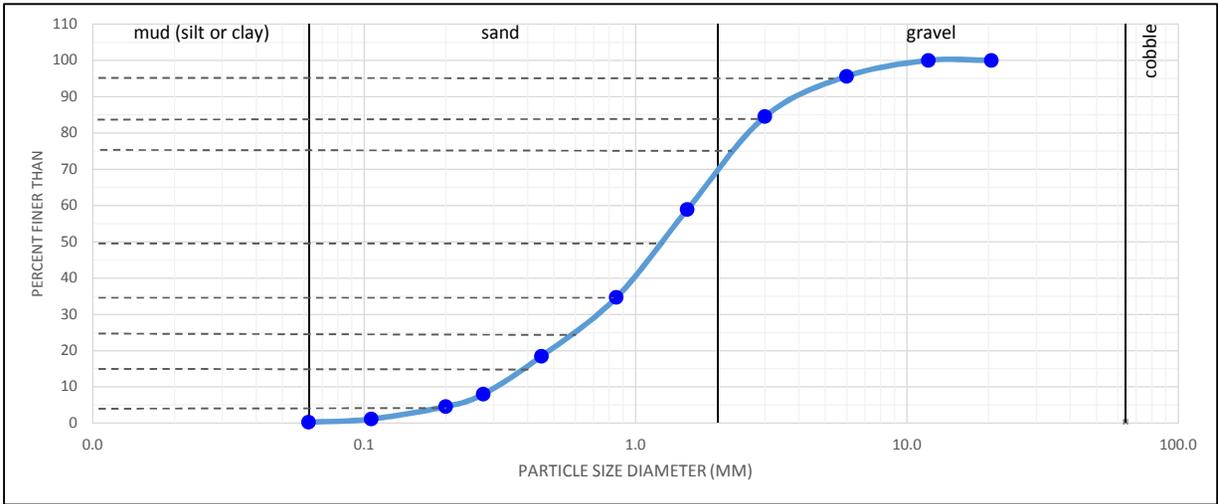
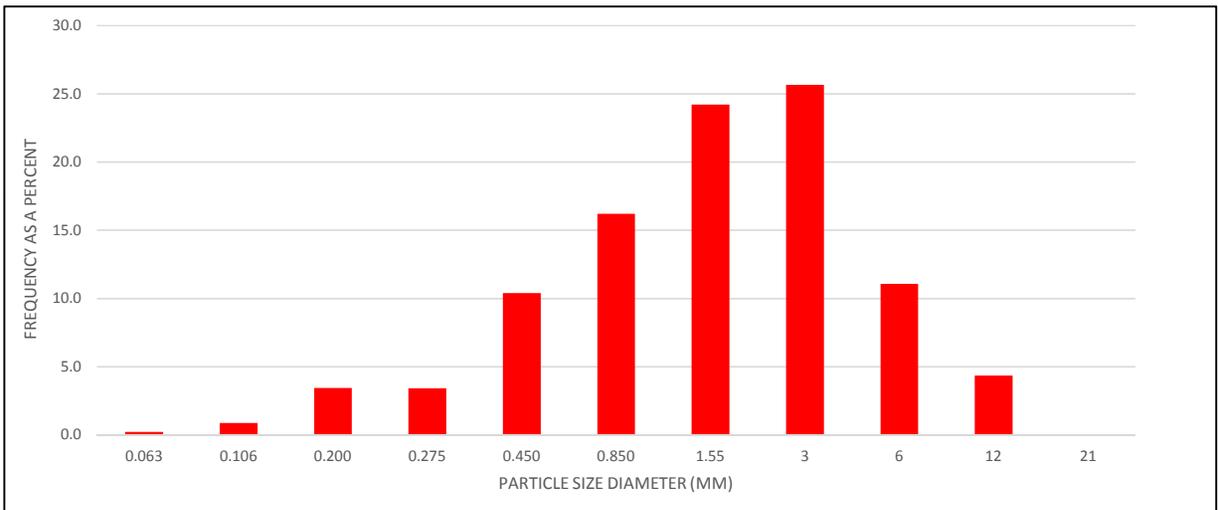
SUMMARY STATISTICS

Geometric Mean	3.8	characterizes the central portion of distribution
Standard Deviation	3.4	width of distribution, also represents sorting
Skewness	1.5	a measure of deviation from symmetry
Kurtosis	0.1	a measure of peakness or flatness of distribution
Arithmetic Mean	5.9	
Standard Deviation	5.6	
Skewness	0.6	
Kurtosis	0.3	

Transect ID: 8		Describer: KK, AG
Date: May 26, 2016		Time: 4:45 pm
Facies Type: SAND GRAVEL		
Notes:		
Material	Size Range (mm)	Mass (g)
coarse gravel	16 - 25	0.00
medium gravel	8 - 16	8.52
fine gravel	4 - 8	21.59
very fine gravel	2 - 4	50.01
very coarse sand	1.10 - 2	47.18
coarse sand	0.600 - 1.10	31.59
med to coarse sand	0.300 - 0.600	20.26
medium sand	0.250 - 0.300	6.68
fine sand	0.150 - 0.250	6.73
very fine sand	0.0625 - 0.150	1.74
mud (silt or clay)	< 0.0625	0.44
Total Mass (g):		194.74

% MUD	% SAND	% GRAVEL
0.2	58.6	41.1

FOLK CLASSIFICATION
SANDY GRAVEL



REPRESENTATIVE GRAIN SIZES (MM)

D5	0.20
D16	0.40
D25	0.60
D35	0.85
D50	1.3
D75	2.2
D84	2.9
D95	5.5

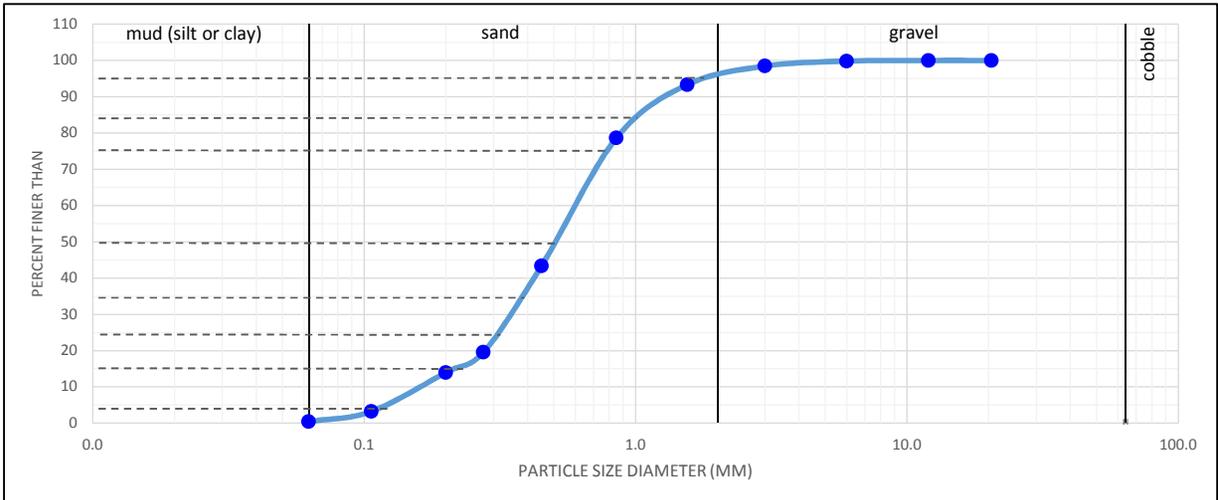
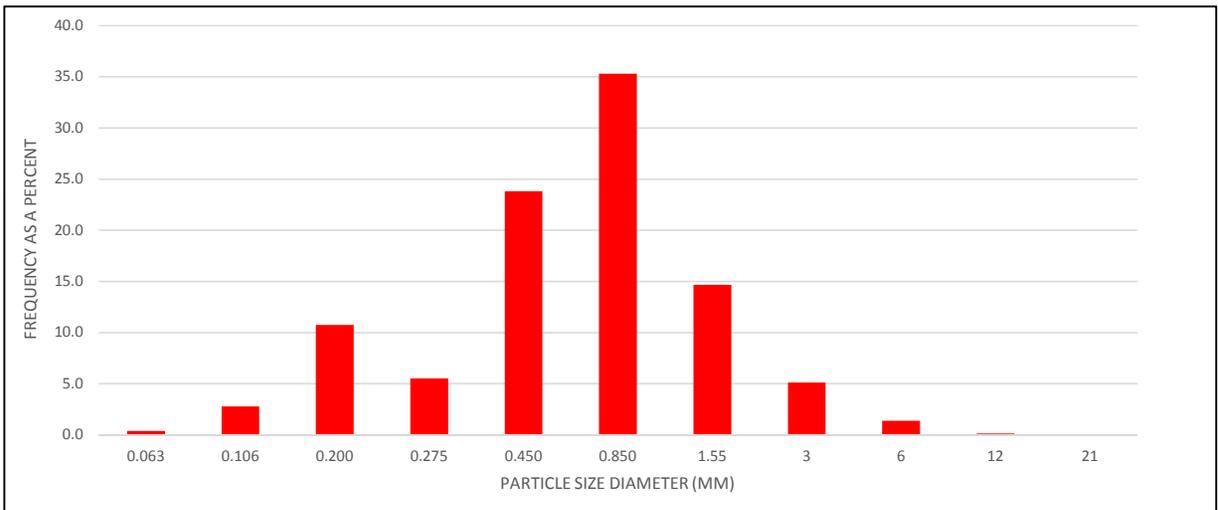
SUMMARY STATISTICS

Geometric Mean	1.1	characterizes the central portion of distribution
Standard Deviation	2.7	width of distribution, also represents sorting
Skewness	0.6	a measure of deviation from symmetry
Kurtosis	0.2	a measure of peakness or flatness of distribution
Arithmetic Mean	1.5	
Standard Deviation	1.4	
Skewness	0.4	
Kurtosis	0.3	

Transect ID: 8		Describer: KK, AG
Date: May 26, 2016		Time: 5 pm
Facies Type: SAND		
Notes:		
Material	Size Range (mm)	Mass (g)
coarse gravel	16 - 25	0.00
medium gravel	8 - 16	0.31
fine gravel	4 - 8	2.66
very fine gravel	2 - 4	9.77
very coarse sand	1.10 - 2	28.00
coarse sand	0.600 - 1.10	67.32
med to coarse sand	0.300 - 0.600	45.46
medium sand	0.250 - 0.300	10.59
fine sand	0.150 - 0.250	20.52
very fine sand	0.0625 - 0.150	5.37
mud (silt or clay)	< 0.0625	0.75
Total Mass (g):		190.75

% MUD	% SAND	% GRAVEL
0.4	92.9	6.7

FOLK CLASSIFICATION
GRAVELLY SAND



REPRESENTATIVE GRAIN SIZES (MM)

D5	0.12
D16	0.22
D25	0.31
D35	0.39
D50	0.50
D75	0.79
D84	1.0
D95	1.8

SUMMARY STATISTICS

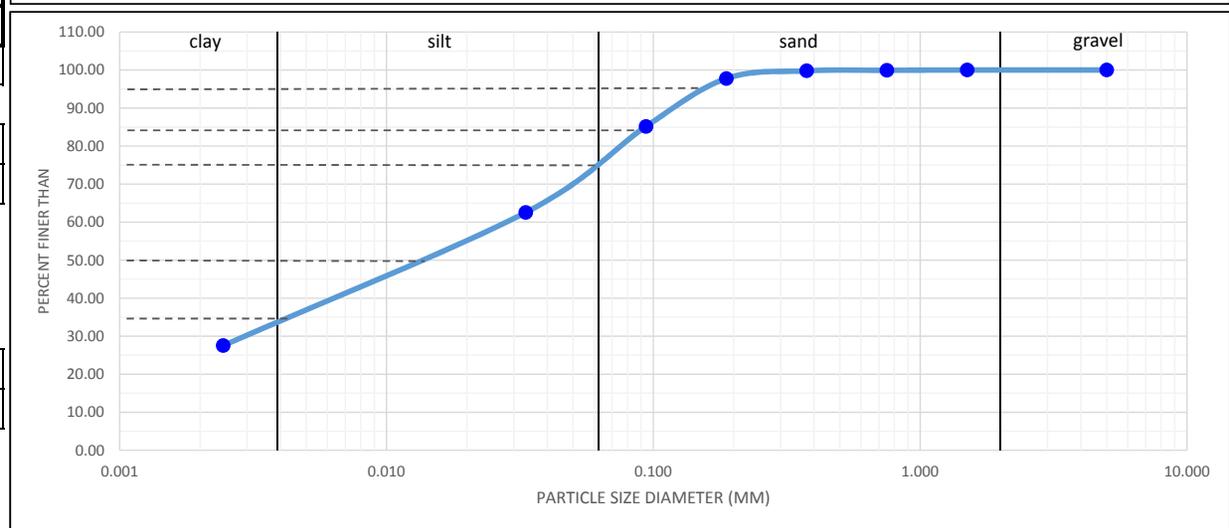
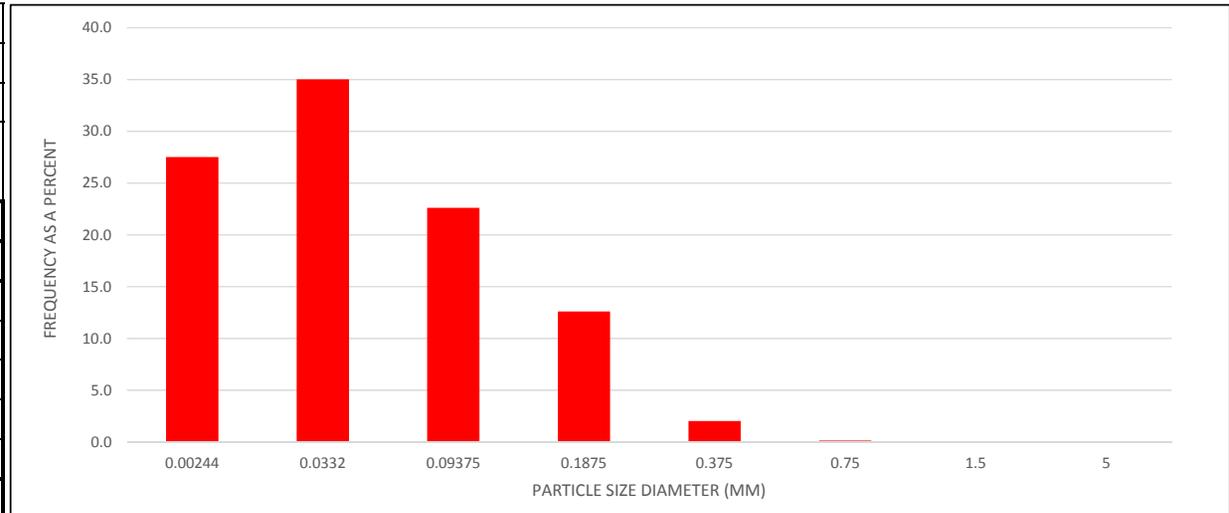
Geometric Mean	0.5	characterizes the central portion of distribution
Standard Deviation	2.1	width of distribution, also represents sorting
Skewness	0.3	a measure of deviation from symmetry
Kurtosis	0.3	a measure of peakness or flatness of distribution
Arithmetic Mean	0.6	
Standard Deviation	0.4	
Skewness	0.4	
Kurtosis	0.4	

Transect ID: 8		Describer: KK, AG
Date: May 26, 2016		Time: 5:15pm
Facies Type: SAND SILT CLAY		
Notes:		
Material	Size Range (mm)	Mass (g)
gravel	> 2	0.00
very coarse sand	1 - 2	0.01
coarse sand	0.5 - 1	0.02
medium sand	0.25 - 0.5	0.29
fine sand	0.125 - 0.25	1.80
very fine sand	0.0625 - 0.125	3.23
silt	0.0039 - 0.0625	5.00
clay	0.00098 - 0.0039	3.93
Total Mass (g):		14.28

% CLAY	% SILT	% SAND
27.5	35.0	37.5

% GRAVEL
0.0

FOLK CLASSIFICATION
SANDY MUD



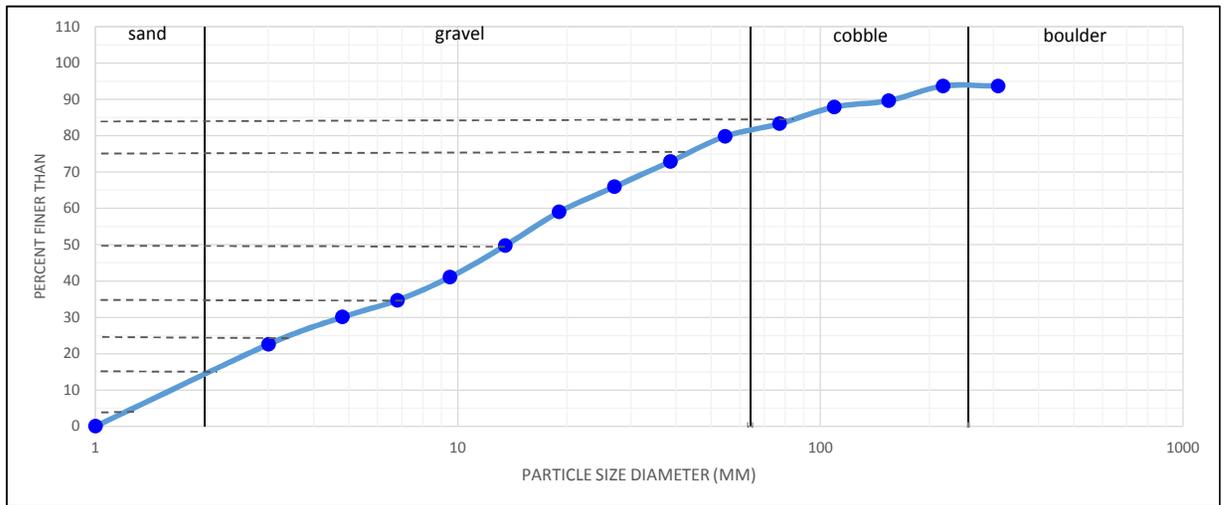
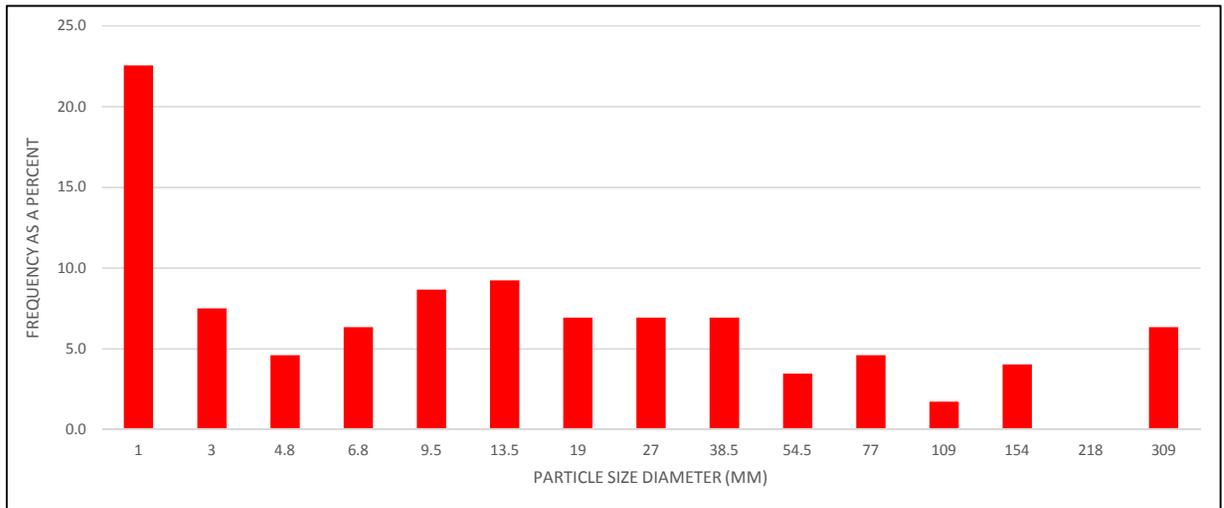
REPRESENTATIVE GRAIN SIZES (MM)

D5	--
D16	--
D25	--
D35	0.0042
D50	0.013
D75	0.061
D84	0.090
D95	0.15

Transect ID: 10		Describer: AM, AG, KK
Date: May 18, 2016		Time: 10:30 am
Facies Type: GRAVEL SAND COBBLE		
Notes:		
Material	Size Range (mm)	Count
sand/silt/clay	less than 2	39
very fine gravel	2 - 4	13
fine gravel	4 - 5.6	8
fine gravel	5.6 - 8	11
medium gravel	8 - 11	15
medium gravel	11 - 16	16
coarse gravel	16 - 22	12
coarse gravel	22 - 32	12
very coarse gravel	32 - 45	12
very coarse gravel	45 - 64	6
small cobble	64 - 90	8
medium cobble	90 - 128	3
large cobble	128 - 180	7
very large cobble	180 - 256	0
boulders	greater than 256	11
Total Count:		173

% SAND	% GRAVEL	% COBBLE
23	61	10

% BOULDER
6



REPRESENTATIVE GRAIN SIZES (MM)

D5	1.3
D16	2.1
D25	3.3
D35	6.8
D50	14
D75	43
D84	85
D95	--

SUMMARY STATISTICS

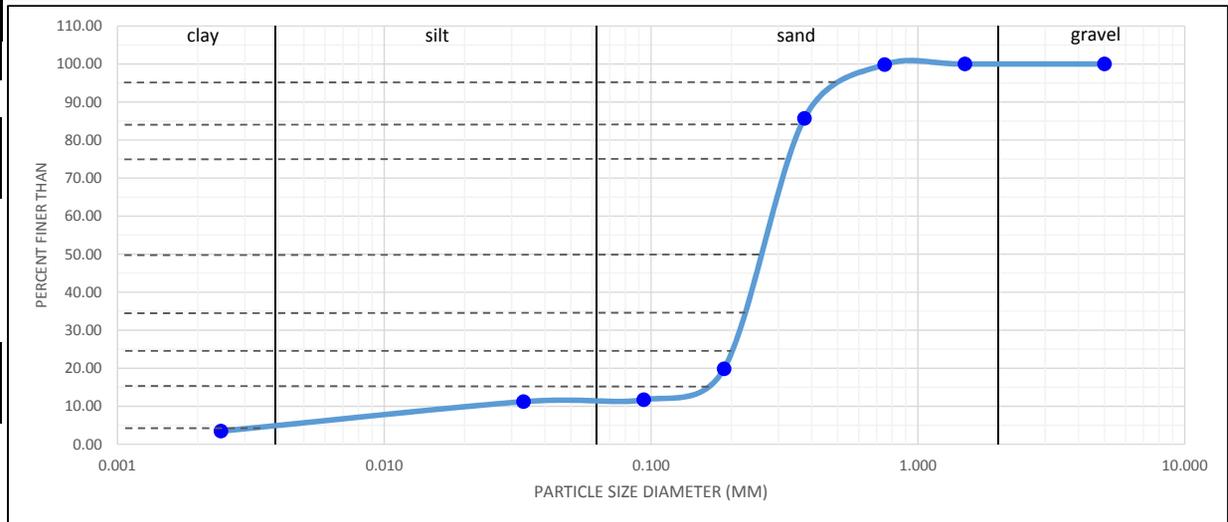
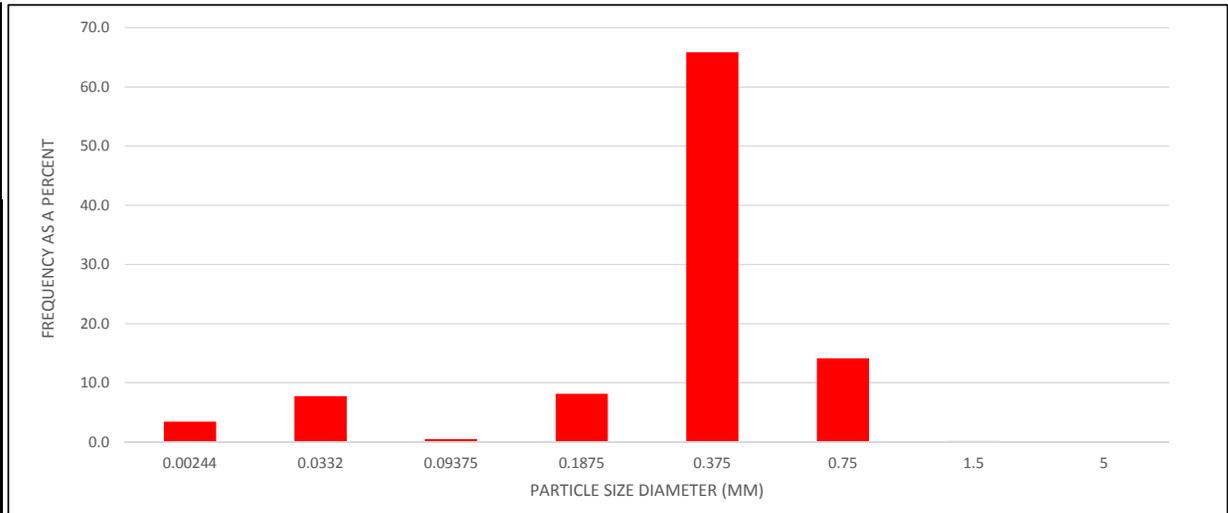
Geometric Mean	13.4	characterizes the central portion of distribution
Standard Deviation	6.4	width of distribution, also represents sorting
Skewness	3.7	a measure of deviation from symmetry
Kurtosis	0.0	a measure of peakness or flatness of distribution
Arithmetic Mean	33.7	
Standard Deviation	--	
Skewness	--	
Kurtosis	--	

Transect ID: 10		Describer: AM, AG, KK
Date: May 18, 2016		Time: 10:45 am
Facies Type: SAND		
Notes:		
Material	Size Range (mm)	Mass (g)
gravel	> 2	0.00
very coarse sand	1 - 2	0.06
coarse sand	0.5 - 1	4.91
medium sand	0.25 - 0.5	22.86
fine sand	0.125 - 0.25	2.83
very fine sand	0.0625 - 0.125	0.17
silt	0.0039 - 0.0625	2.69
clay	0.00098 - 0.0039	1.20
Total Mass (g):		34.72

% CLAY	% SILT	% SAND
3.5	7.7	88.8

% GRAVEL
0.0

FOLK CLASSIFICATION
MUDDY SAND



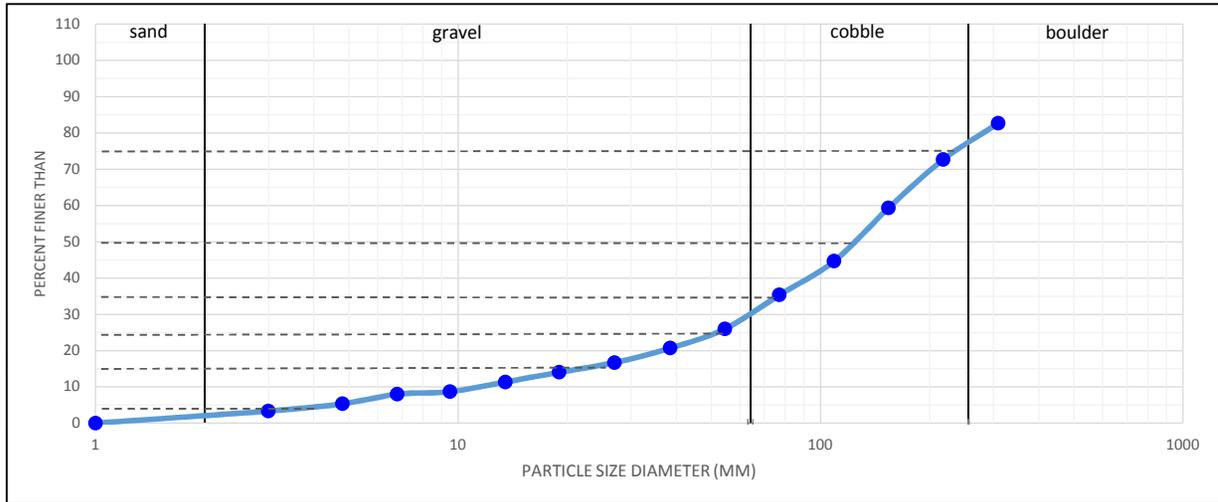
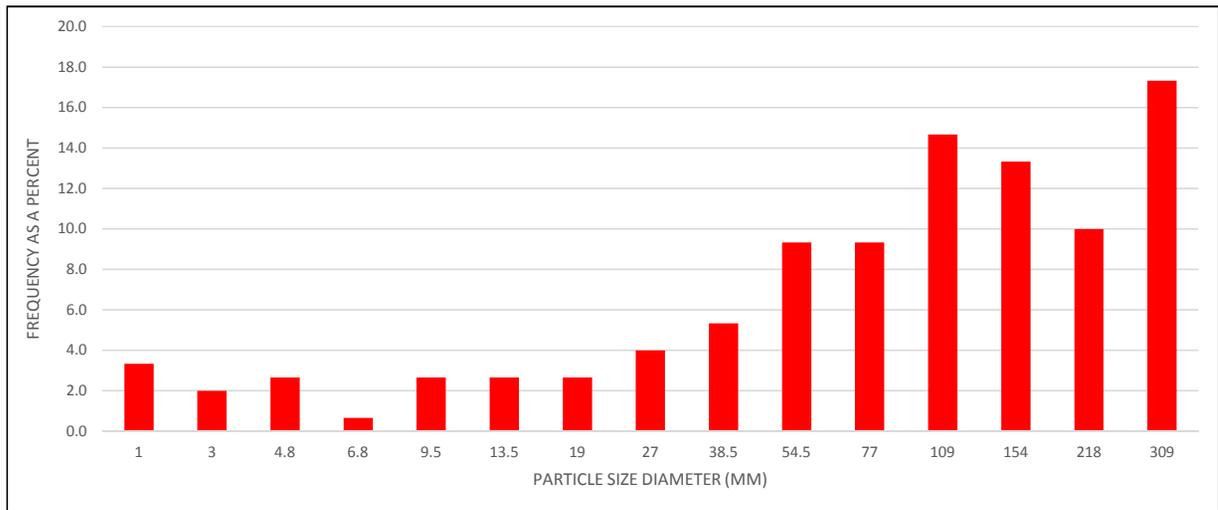
REPRESENTATIVE GRAIN SIZES (MM)

D5	0.0035
D16	0.17
D25	0.20
D35	0.23
D50	0.26
D75	0.32
D84	0.37
D95	0.50

Transect ID: 11		Describer: CC, AG, KK
Date: May 17, 2016		Time: 9 am
Facies Type: COBBLE GRAVEL BOULDER		
Notes:		
Material	Size Range (mm)	Count
sand/silt/clay	less than 2	5
very fine gravel	2 - 4	3
fine gravel	4 - 5.6	4
fine gravel	5.6 - 8	1
medium gravel	8 - 11	4
medium gravel	11 - 16	4
coarse gravel	16 - 22	4
coarse gravel	22 - 32	6
very coarse gravel	32 - 45	8
very coarse gravel	45 - 64	14
small cobble	64 - 90	14
medium cobble	90 - 128	22
large cobble	128 - 180	20
very large cobble	180 - 256	15
boulders	greater than 256	26
Total Count:		150

% SAND	% GRAVEL	% COBBLE
3	32	47

% BOULDER
17



REPRESENTATIVE GRAIN SIZES (MM)

D5	4.2
D16	25
D25	53
D35	76
D50	125
D75	225
D84	--
D95	--

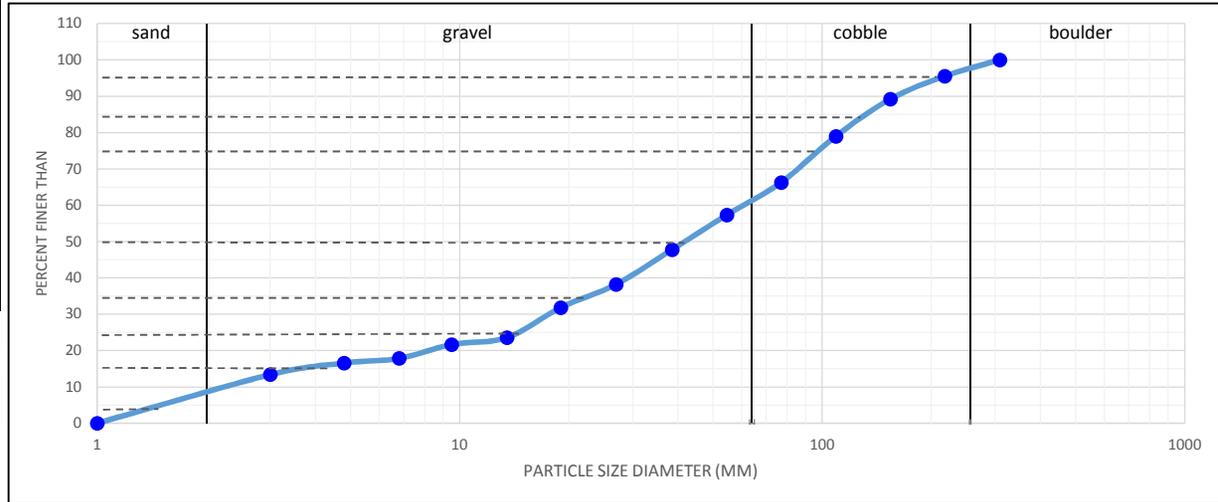
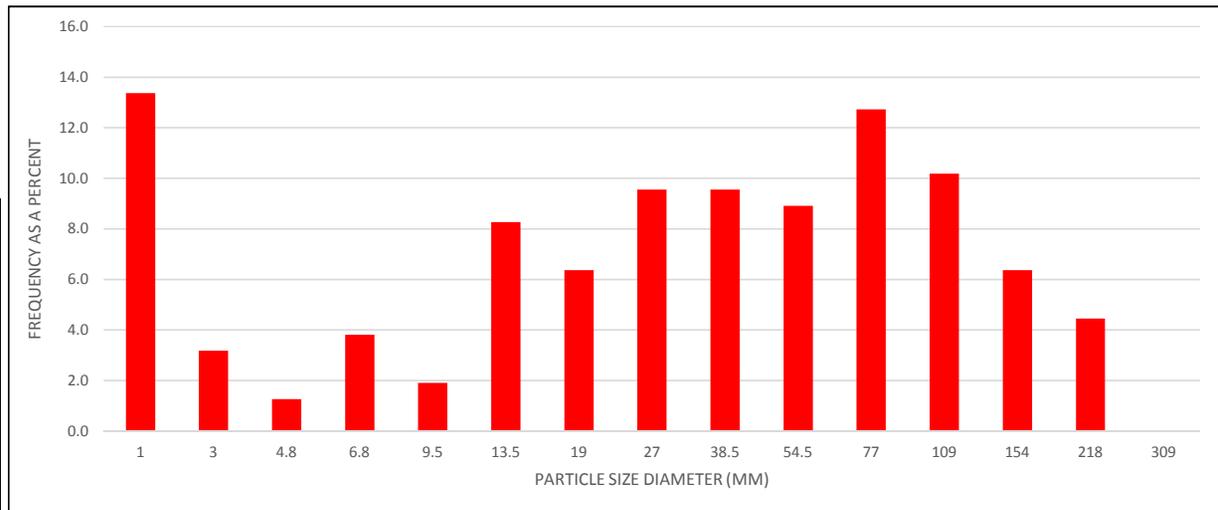
SUMMARY STATISTICS

Geometric Mean	--	characterizes the central portion of distribution
Standard Deviation	--	width of distribution, also represents sorting
Skewness	--	a measure of deviation from symmetry
Kurtosis	--	a measure of peakness or flatness of distribution
Arithmetic Mean	--	
Standard Deviation	--	
Skewness	--	
Kurtosis	--	

Transect ID: 11		Describer: CC, AG, KK
Date: May 17, 2016		Time: 9:30 am
Facies Type: GRAVEL COBBLE SAND		
Notes:		
Material	Size Range (mm)	Count
sand/silt/clay	less than 2	21
very fine gravel	2 - 4	5
fine gravel	4 - 5.6	2
fine gravel	5.6 - 8	6
medium gravel	8 - 11	3
medium gravel	11 - 16	13
coarse gravel	16 - 22	10
coarse gravel	22 - 32	15
very coarse gravel	32 - 45	15
very coarse gravel	45 - 64	14
small cobble	64 - 90	20
medium cobble	90 - 128	16
large cobble	128 - 180	10
very large cobble	180 - 256	7
boulders	greater than 256	0
Total Count:		157

% SAND	% GRAVEL	% COBBLE
13	53	34

% BOULDER
0



REPRESENTATIVE GRAIN SIZES (MM)

D5	1.5
D16	4.0
D25	16
D35	22
D50	41
D75	98
D84	130
D95	210

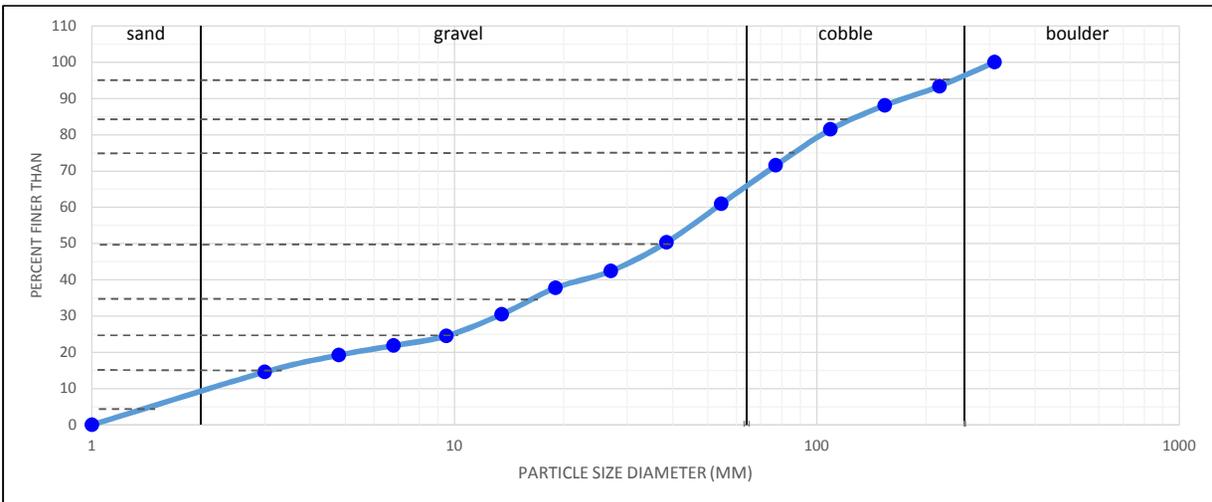
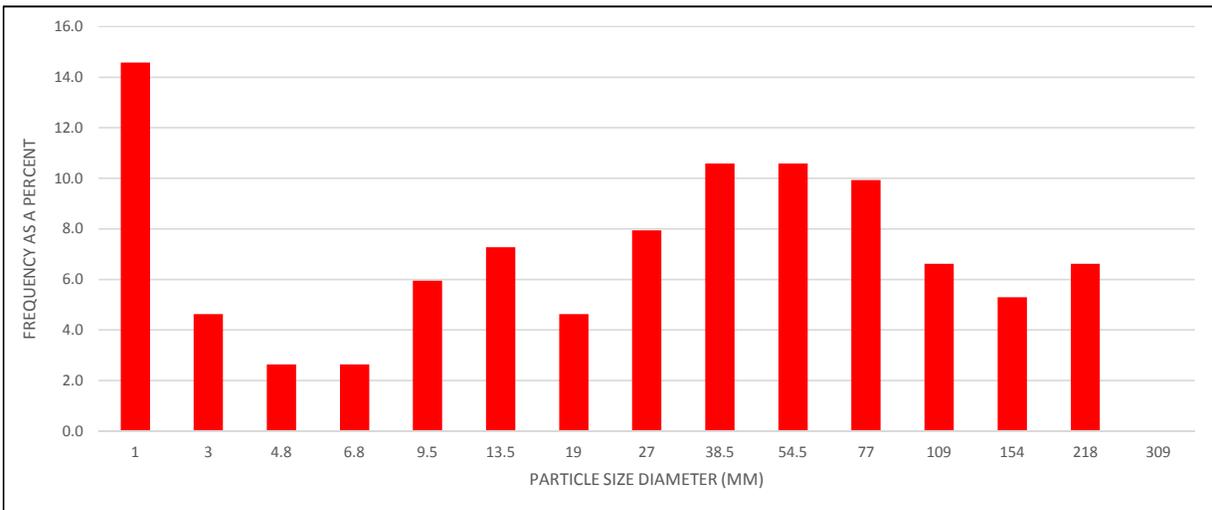
SUMMARY STATISTICS

Geometric Mean	22.8	<i>characterizes the central portion of distribution</i>
Standard Deviation	5.7	<i>width of distribution, also represents sorting</i>
Skewness	9.2	<i>a measure of deviation from symmetry</i>
Kurtosis	0.1	<i>a measure of peakness or flatness of distribution</i>
Arithmetic Mean	58.3	
Standard Deviation	63.1	
Skewness	0.5	
Kurtosis	0.1	

Transect ID: 11 (DUPLICATE)		Describer: CC, AG
Date: May 31, 2016		Time: Unknown
Facies Type: GRAVEL COBBLE SAND		
Notes:		
Material	Size Range (mm)	Count
sand/silt/clay	less than 2	22
very fine gravel	2 - 4	7
fine gravel	4 - 5.6	4
fine gravel	5.6 - 8	4
medium gravel	8 - 11	9
medium gravel	11 - 16	11
coarse gravel	16 - 22	7
coarse gravel	22 - 32	12
very coarse gravel	32 - 45	16
very coarse gravel	45 - 64	16
small cobble	64 - 90	15
medium cobble	90 - 128	10
large cobble	128 - 180	8
very large cobble	180 - 256	10
boulders	greater than 256	0
Total Count:		151

% SAND	% GRAVEL	% COBBLE
15	57	28

% BOULDER
0



REPRESENTATIVE GRAIN SIZES (MM)

D5	1.5
D16	3.0
D25	10
D35	17
D50	38
D75	88
D84	130
D95	235

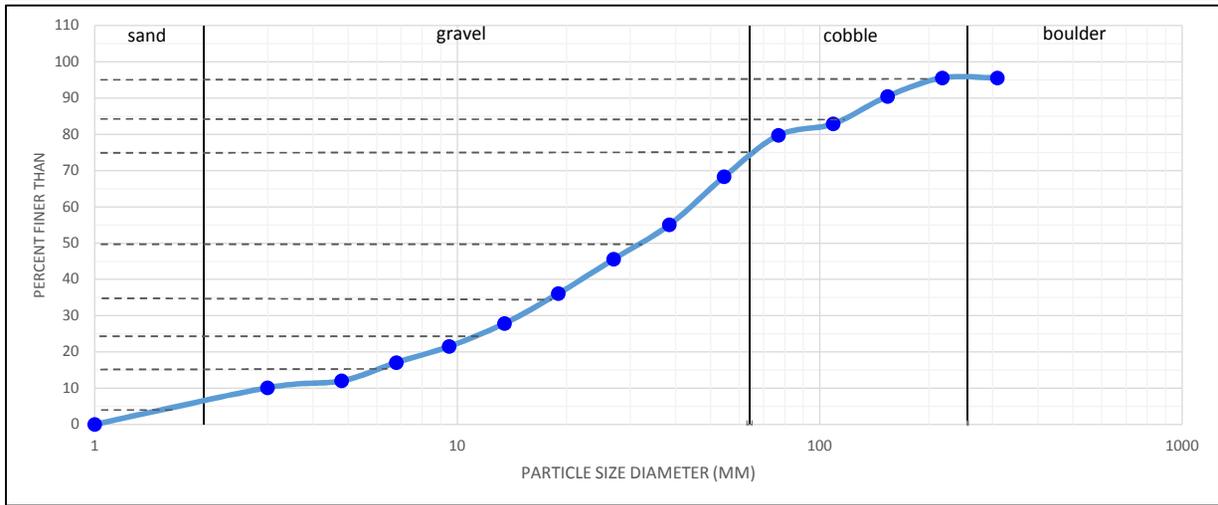
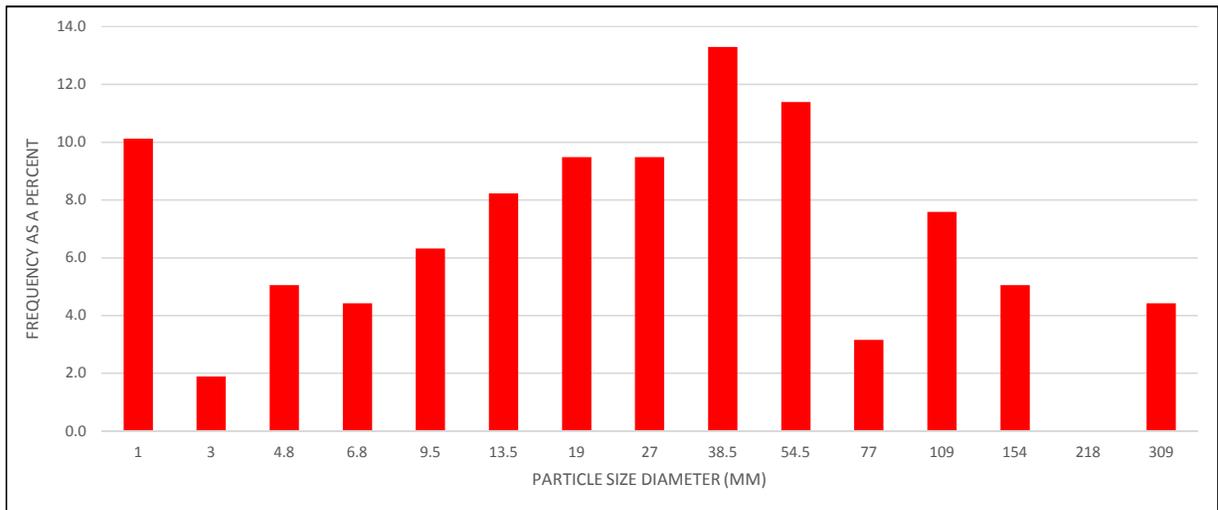
SUMMARY STATISTICS

Geometric Mean	19.7	<i>characterizes the central portion of distribution</i>
Standard Deviation	6.6	<i>width of distribution, also represents sorting</i>
Skewness	6.7	<i>a measure of deviation from symmetry</i>
Kurtosis	0.1	<i>a measure of peakness or flatness of distribution</i>
Arithmetic Mean	57.0	
Standard Deviation	67.1	
Skewness	0.6	
Kurtosis	0.2	

Transect ID: 12		Describer: AG, KK
Date: May 17, 2016		Time: 11:20 am
Facies Type: GRAVEL COBBLE SAND		
Notes:		
Material	Size Range (mm)	Count
sand/silt/clay	less than 2	16
very fine gravel	2 - 4	3
fine gravel	4 - 5.6	8
fine gravel	5.6 - 8	7
medium gravel	8 - 11	10
medium gravel	11 - 16	13
coarse gravel	16 - 22	15
coarse gravel	22 - 32	15
very coarse gravel	32 - 45	21
very coarse gravel	45 - 64	18
small cobble	64 - 90	5
medium cobble	90 - 128	12
large cobble	128 - 180	8
very large cobble	180 - 256	0
boulders	greater than 256	7
Total Count:		158

% SAND	% GRAVEL	% COBBLE
10	70	16

% BOULDER
4



REPRESENTATIVE GRAIN SIZES (MM)

D5	1.6
D16	6.3
D25	12
D35	18
D50	32
D75	65
D84	115
D95	210

SUMMARY STATISTICS

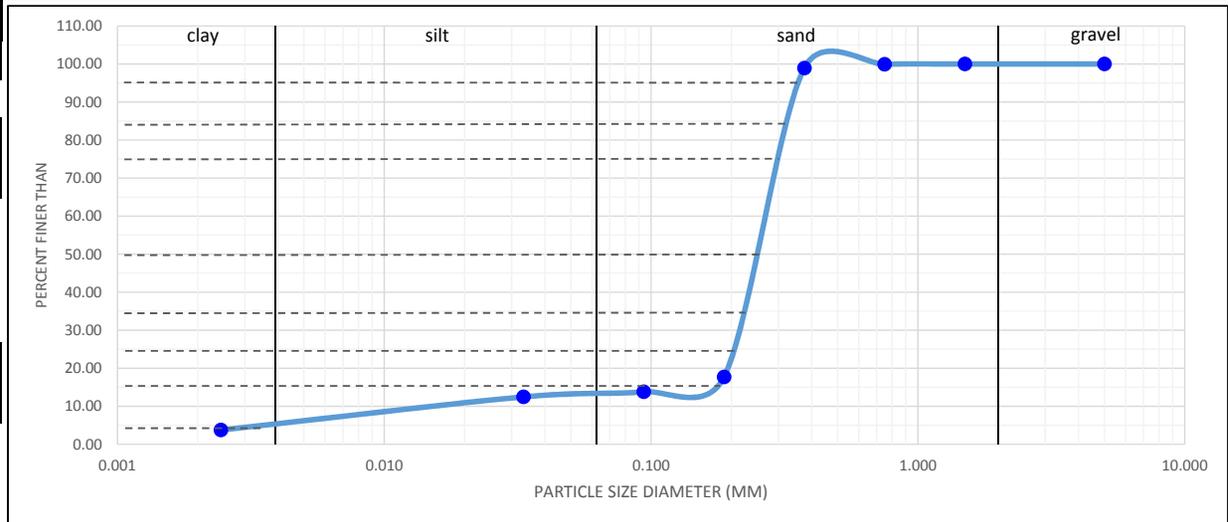
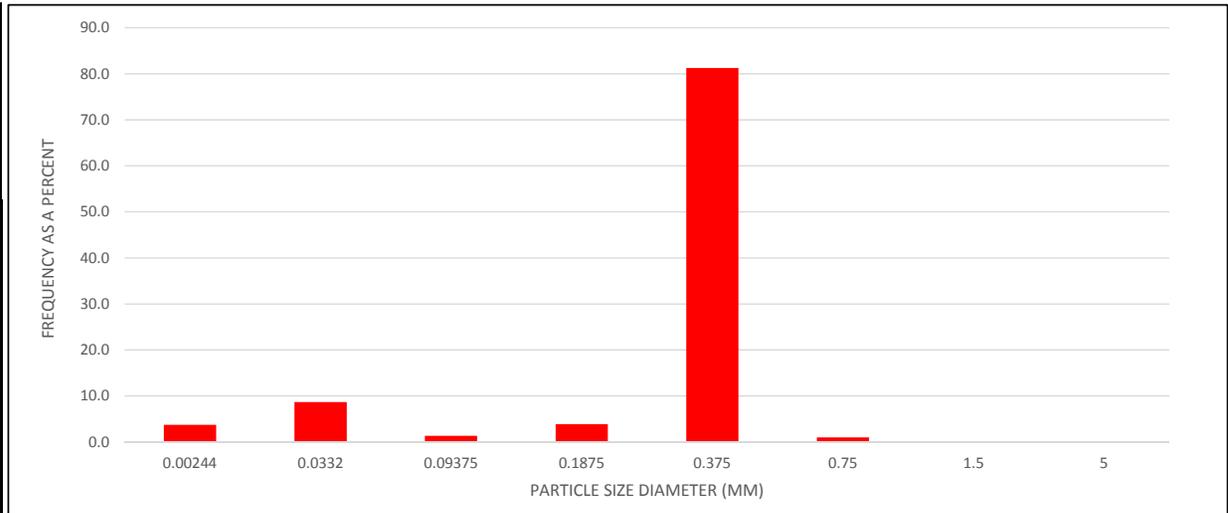
Geometric Mean	26.9	characterizes the central portion of distribution
Standard Deviation	4.3	width of distribution, also represents sorting
Skewness	11.6	a measure of deviation from symmetry
Kurtosis	0.1	a measure of peakness or flatness of distribution
Arithmetic Mean	51.1	
Standard Deviation	58.8	
Skewness	0.6	
Kurtosis	0.2	

Transect ID: 12		Describer: AG, KK
Date: May 17, 2016		Time: 11:45 am
Facies Type: SAND		
Notes:		
Material	Size Range (mm)	Mass (g)
gravel	> 2	0.00
very coarse sand	1 - 2	0.02
coarse sand	0.5 - 1	0.31
medium sand	0.25 - 0.5	25.31
fine sand	0.125 - 0.25	1.21
very fine sand	0.0625 - 0.125	0.42
silt	0.0039 - 0.0625	2.71
clay	0.00098 - 0.0039	1.17
Total Mass (g):		31.15

% CLAY	% SILT	% SAND
3.8	8.7	87.5

% GRAVEL
0.0

FOLK CLASSIFICATION
MUDDY SAND



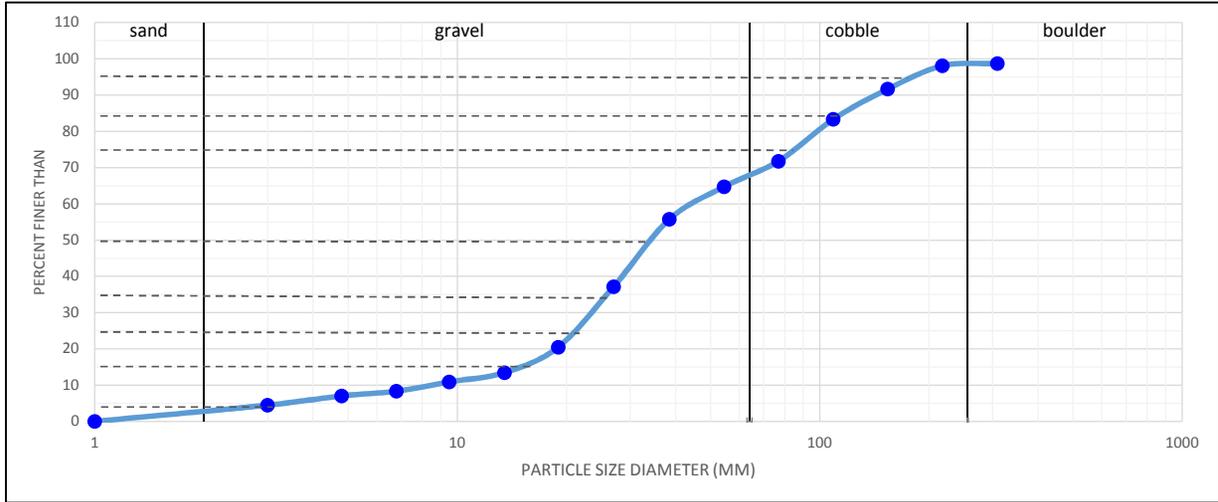
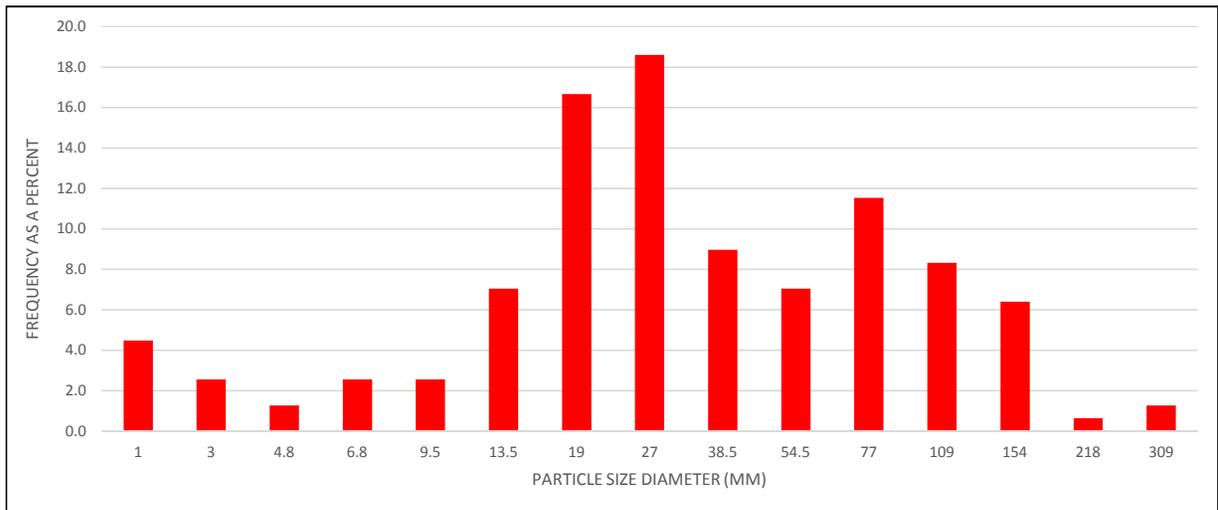
REPRESENTATIVE GRAIN SIZES (MM)

D5	0.0035
D16	0.18
D25	0.20
D35	0.23
D50	0.25
D75	0.30
D84	0.32
D95	0.35

Transect ID: 13		Describer: AG, KK
Date: May 17, 2016		Time: 2:15 pm
Facies Type: GRAVEL COBBLE		
Notes:		
Material	Size Range (mm)	Count
sand/silt/clay	less than 2	7
very fine gravel	2 - 4	4
fine gravel	4 - 5.6	2
fine gravel	5.6 - 8	4
medium gravel	8 - 11	4
medium gravel	11 - 16	11
coarse gravel	16 - 22	26
coarse gravel	22 - 32	29
very coarse gravel	32 - 45	14
very coarse gravel	45 - 64	11
small cobble	64 - 90	18
medium cobble	90 - 128	13
large cobble	128 - 180	10
very large cobble	180 - 256	1
boulders	greater than 256	2
Total Count:		156

% SAND	% GRAVEL	% COBBLE
4	67	27

% BOULDER
1



REPRESENTATIVE GRAIN SIZES (MM)

D5	3.0
D16	17
D25	22
D35	26
D50	33
D75	85
D84	115
D95	170

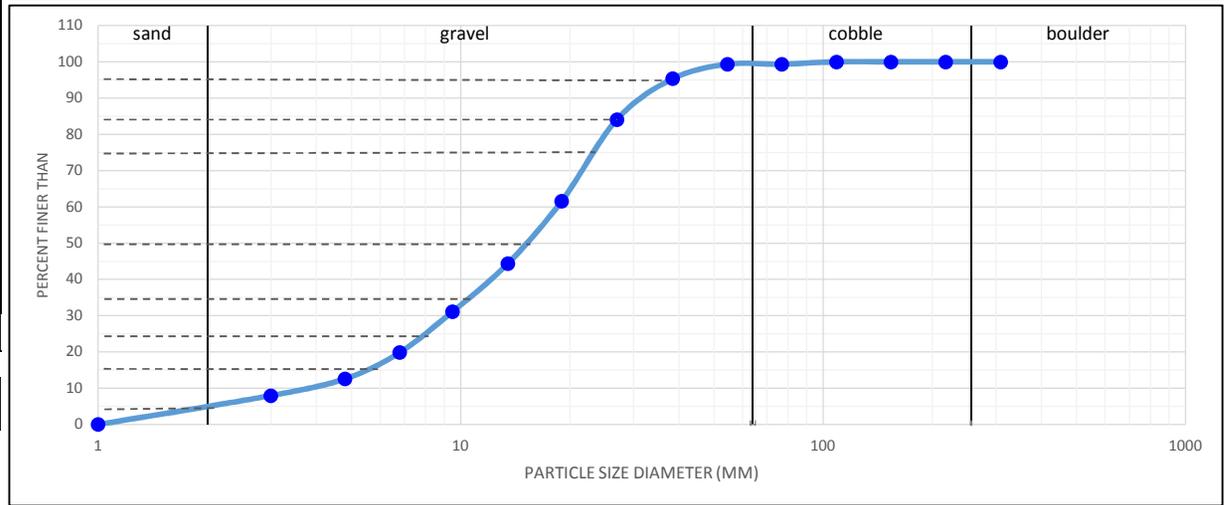
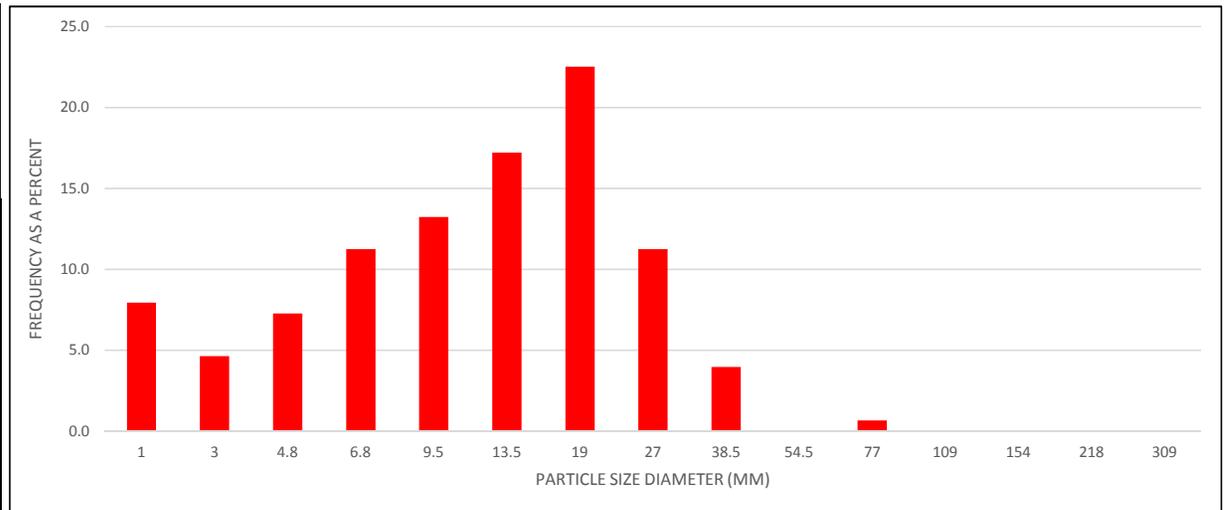
SUMMARY STATISTICS

Geometric Mean	44.2	characterizes the central portion of distribution
Standard Deviation	2.6	width of distribution, also represents sorting
Skewness	22.5	a measure of deviation from symmetry
Kurtosis	0.2	a measure of peakness or flatness of distribution
Arithmetic Mean	55.0	
Standard Deviation	49.8	
Skewness	0.7	
Kurtosis	0.1	

Transect ID: 13		Describer: KK, AG, CC
Date: May 17, 2016		Time: 2:45 pm
Facies Type: GRAVEL		
Notes:		
Material	Size Range (mm)	Count
sand/silt/clay	less than 2	12
very fine gravel	2 - 4	7
fine gravel	4 - 5.6	11
fine gravel	5.6 - 8	17
medium gravel	8 - 11	20
medium gravel	11 - 16	26
coarse gravel	16 - 22	34
coarse gravel	22 - 32	17
very coarse gravel	32 - 45	6
very coarse gravel	45 - 64	0
small cobble	64 - 90	1
medium cobble	90 - 128	0
large cobble	128 - 180	0
very large cobble	180 - 256	0
boulders	greater than 256	0
Total Count:		151

% SAND	% GRAVEL	% COBBLE
8	91	1

% BOULDER
0



REPRESENTATIVE GRAIN SIZES (MM)

D5	2.1
D16	5.8
D25	8.0
D35	11
D50	16
D75	23
D84	27
D95	38

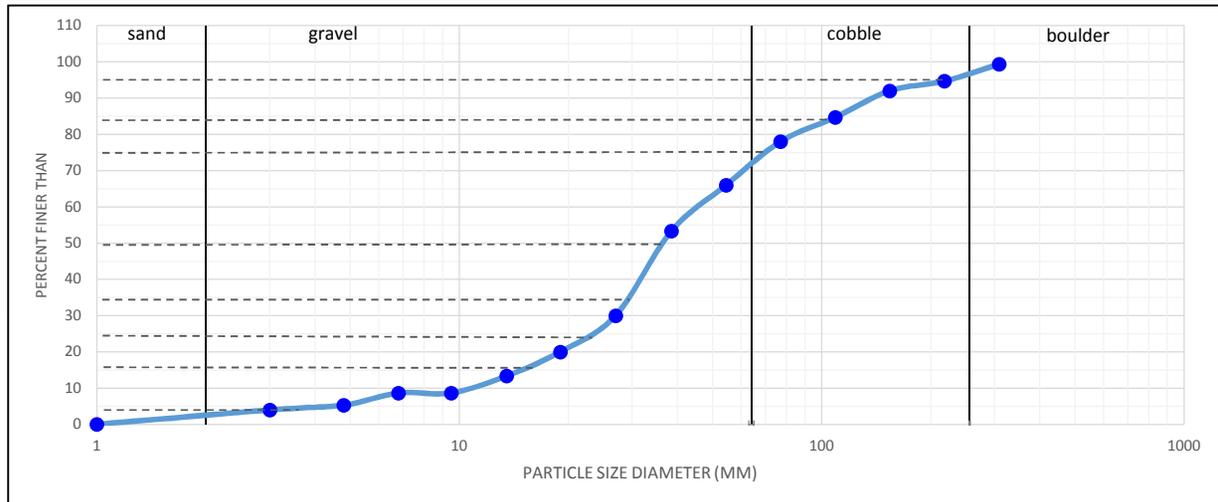
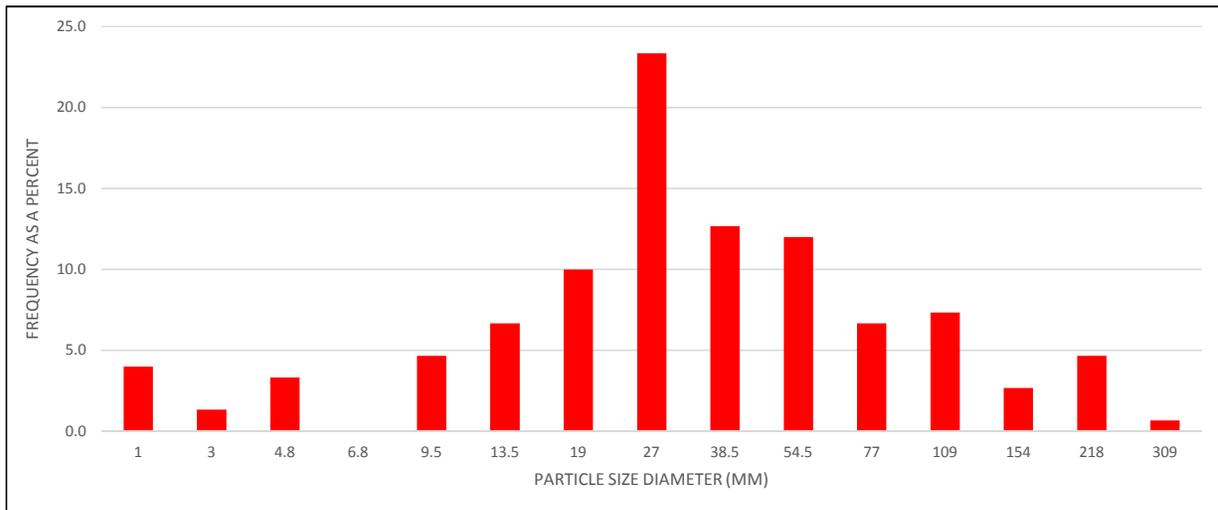
SUMMARY STATISTICS

Geometric Mean	12.5	<i>characterizes the central portion of distribution</i>
Standard Deviation	2.2	<i>width of distribution, also represents sorting</i>
Skewness	7.4	<i>a measure of deviation from symmetry</i>
Kurtosis	0.3	<i>a measure of peakness or flatness of distribution</i>
Arithmetic Mean	16.3	
Standard Deviation	10.7	
Skewness	0.1	
Kurtosis	0.2	

Transect ID: 14		Describer: KK
Date: May 9, 2016		Time: 11 am
Facies Type: GRAVEL COBBLE		
Notes:		
Material	Size Range (mm)	Count
sand/silt/clay	less than 2	6
very fine gravel	2 - 4	2
fine gravel	4 - 5.6	5
fine gravel	5.6 - 8	0
medium gravel	8 - 11	7
medium gravel	11 - 16	10
coarse gravel	16 - 22	15
coarse gravel	22 - 32	35
very coarse gravel	32 - 45	19
very coarse gravel	45 - 64	18
small cobble	64 - 90	10
medium cobble	90 - 128	11
large cobble	128 - 180	4
very large cobble	180 - 256	7
boulders	greater than 256	1
Total Count:		150

% SAND	% GRAVEL	% COBBLE
4	74	21

% BOULDER
1



REPRESENTATIVE GRAIN SIZES (MM)

D5	3.0
D16	16
D25	23
D35	30
D50	36
D75	70
D84	105
D95	215

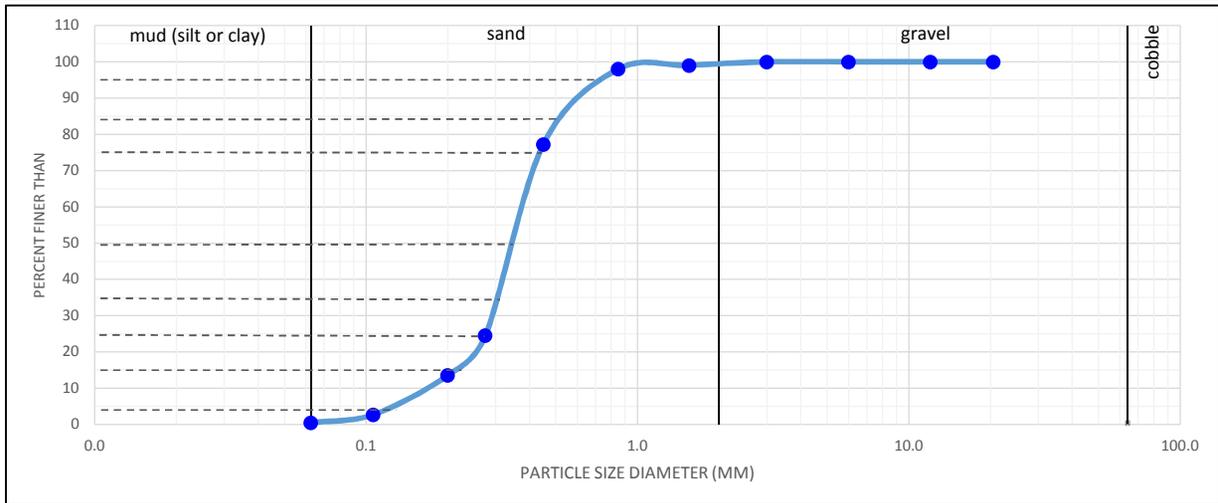
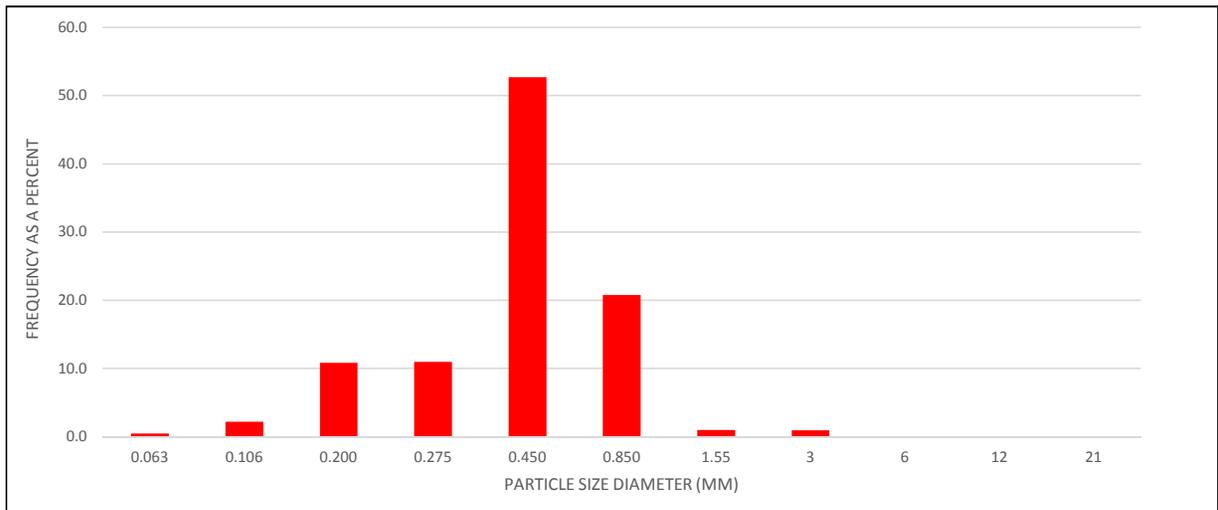
SUMMARY STATISTICS

Geometric Mean	41.0	characterizes the central portion of distribution
Standard Deviation	2.6	width of distribution, also represents sorting
Skewness	23.5	a measure of deviation from symmetry
Kurtosis	0.2	a measure of peakness or flatness of distribution
Arithmetic Mean	52.3	
Standard Deviation	54.4	
Skewness	0.6	
Kurtosis	0.2	

Transect ID: 14		Describer: KK
Date: May 9, 2016		Time: 11:15 am
Facies Type: SAND		
Notes:		
Material	Size Range (mm)	Mass (g)
coarse gravel	16 - 25	0.00
medium gravel	8 - 16	0.00
fine gravel	4 - 8	0.00
very fine gravel	2 - 4	2.18
very coarse sand	1.10 - 2	2.30
coarse sand	0.600 - 1.10	46.82
med to coarse sand	0.300 - 0.600	118.78
medium sand	0.250 - 0.300	24.71
fine sand	0.150 - 0.250	24.40
very fine sand	0.0625 - 0.150	5.00
mud (silt or clay)	< 0.0625	1.04
Total Mass (g):		225.23

% MUD	% SAND	% GRAVEL
0.5	98.6	1.0

FOLK CLASSIFICATION
SAND



REPRESENTATIVE GRAIN SIZES (MM)

D5	0.13
D16	0.22
D25	0.28
D35	0.31
D50	0.34
D75	0.43
D84	0.51
D95	0.71

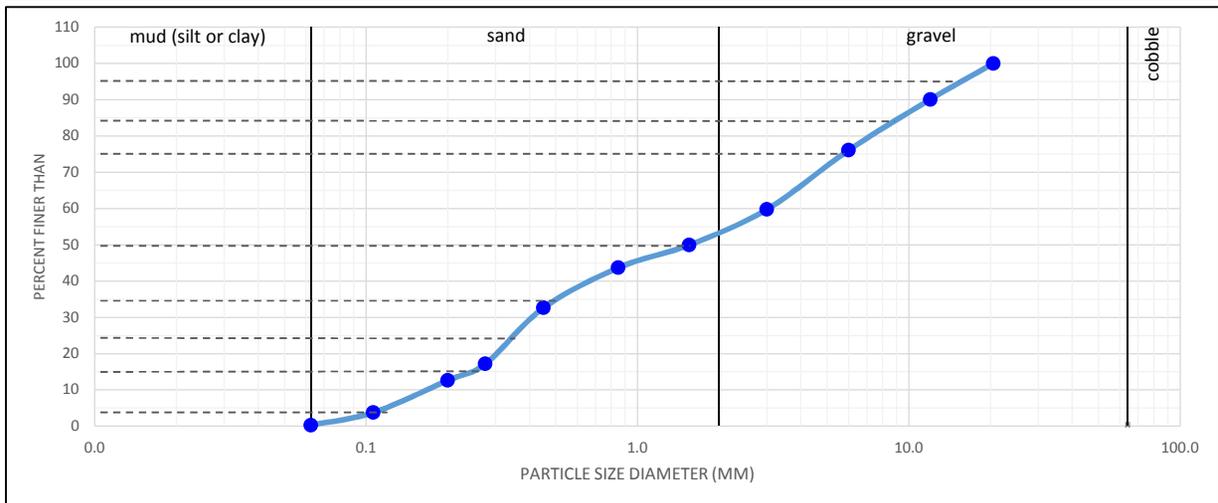
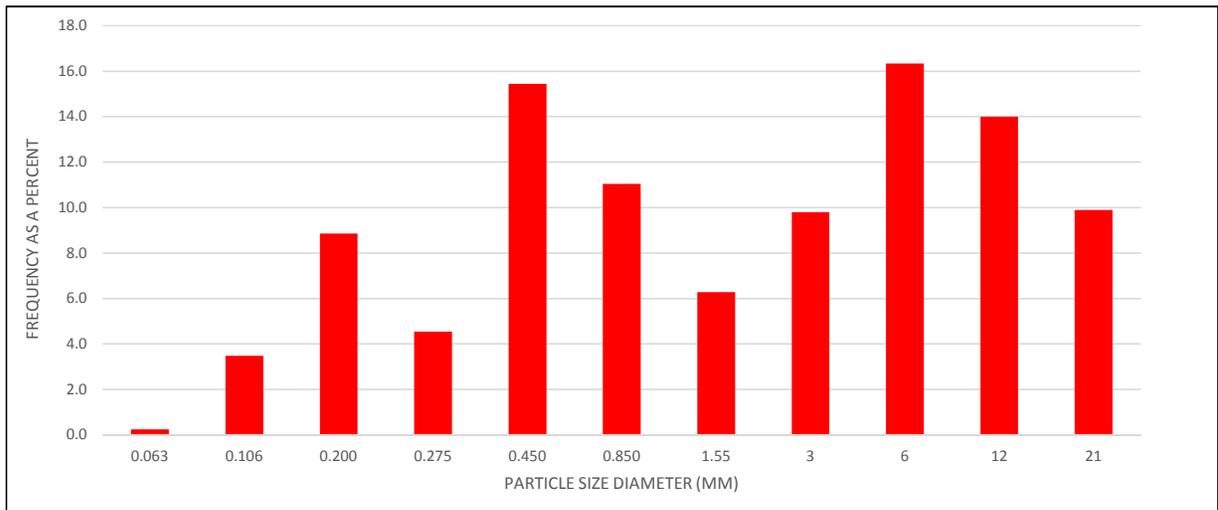
SUMMARY STATISTICS

Geometric Mean	0.3	<i>characterizes the central portion of distribution</i>
Standard Deviation	1.5	<i>width of distribution, also represents sorting</i>
Skewness	0.3	<i>a measure of deviation from symmetry</i>
Kurtosis	0.5	<i>a measure of peakness or flatness of distribution</i>
Arithmetic Mean	0.4	
Standard Deviation	0.2	
Skewness	0.2	
Kurtosis	0.3	

Transect ID: 14		Describer: KK
Date: May 9, 2016		Time: 11:30 am
Facies Type: GRAVEL SAND		
Notes:		
Material	Size Range (mm)	Mass (g)
coarse gravel	16 - 25	26.35
medium gravel	8 - 16	37.24
fine gravel	4 - 8	43.43
very fine gravel	2 - 4	26.09
very coarse sand	1.10 - 2	16.73
coarse sand	0.600 - 1.10	29.40
med to coarse sand	0.300 - 0.600	41.07
medium sand	0.250 - 0.300	12.11
fine sand	0.150 - 0.250	23.59
very fine sand	0.0625 - 0.150	9.27
mud (silt or clay)	< 0.0625	0.69
Total Mass (g):		265.97

% MUD	% SAND	% GRAVEL
0.3	49.7	50.0

FOLK CLASSIFICATION
SANDY GRAVEL



REPRESENTATIVE GRAIN SIZES (MM)

D5	0.12
D16	0.26
D25	0.35
D35	0.50
D50	1.6
D75	5.9
D84	8.7
D95	16

SUMMARY STATISTICS

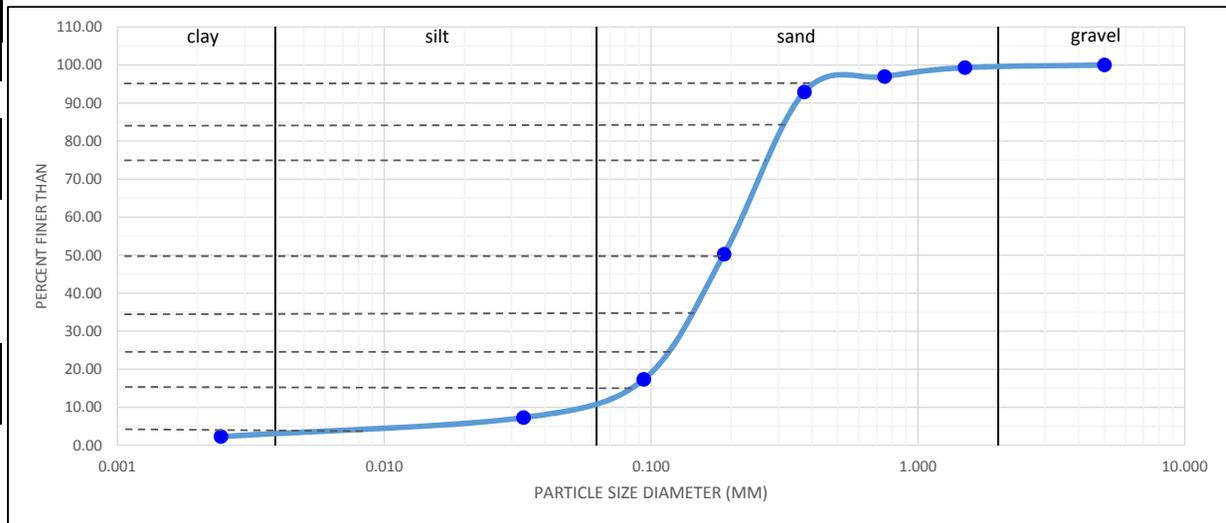
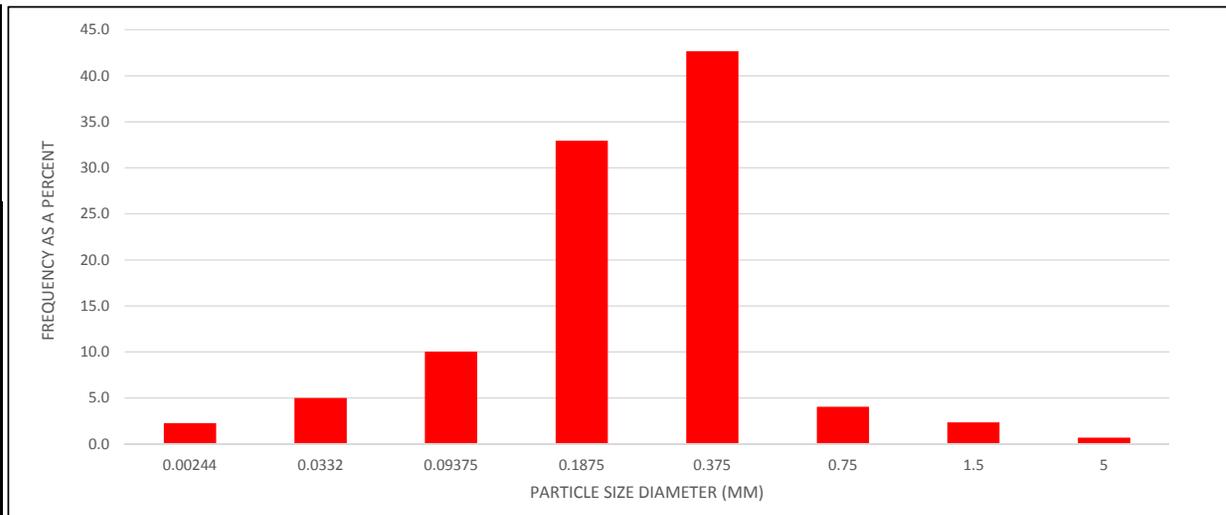
Geometric Mean	1.5	characterizes the central portion of distribution
Standard Deviation	5.8	width of distribution, also represents sorting
Skewness	0.4	a measure of deviation from symmetry
Kurtosis	0.0	a measure of peakness or flatness of distribution
Arithmetic Mean	3.5	
Standard Deviation	4.5	
Skewness	0.7	
Kurtosis	0.4	

Transect ID: 14		Describer: KK
Date: May 9, 2016		Time: 11:45 am
Facies Type: SAND		
Notes:		
Material	Size Range (mm)	Mass (g)
gravel	> 2	0.24
very coarse sand	1 - 2	0.82
coarse sand	0.5 - 1	1.41
medium sand	0.25 - 0.5	14.84
fine sand	0.125 - 0.25	11.46
very fine sand	0.0625 - 0.125	3.49
silt	0.0039 - 0.0625	1.74
clay	0.00098 - 0.0039	0.79
Total Mass (g):		34.79

% CLAY	% SILT	% SAND
2.3	5.0	92.0

% GRAVEL
0.7

FOLK CLASSIFICATION
SAND



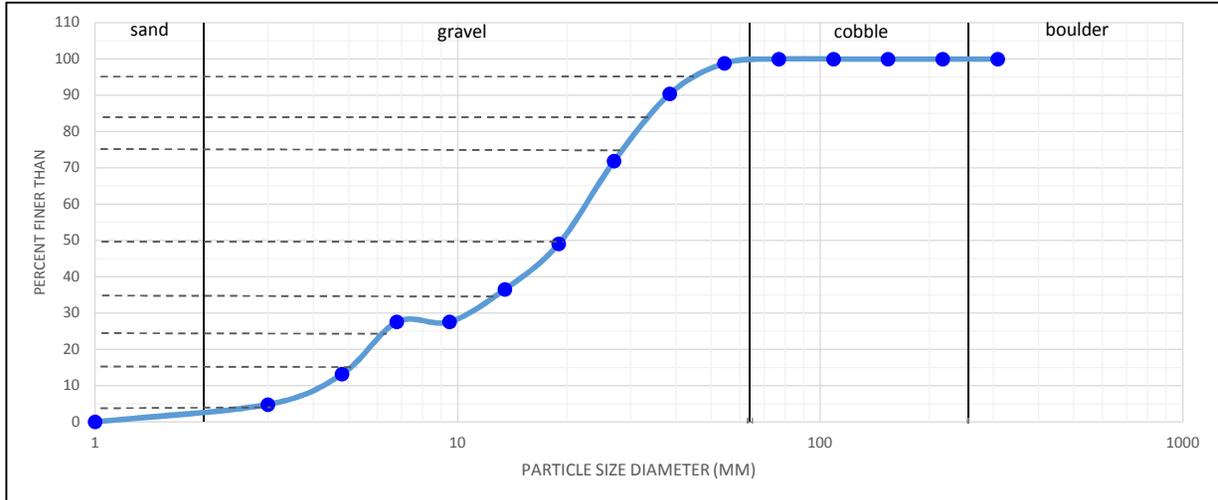
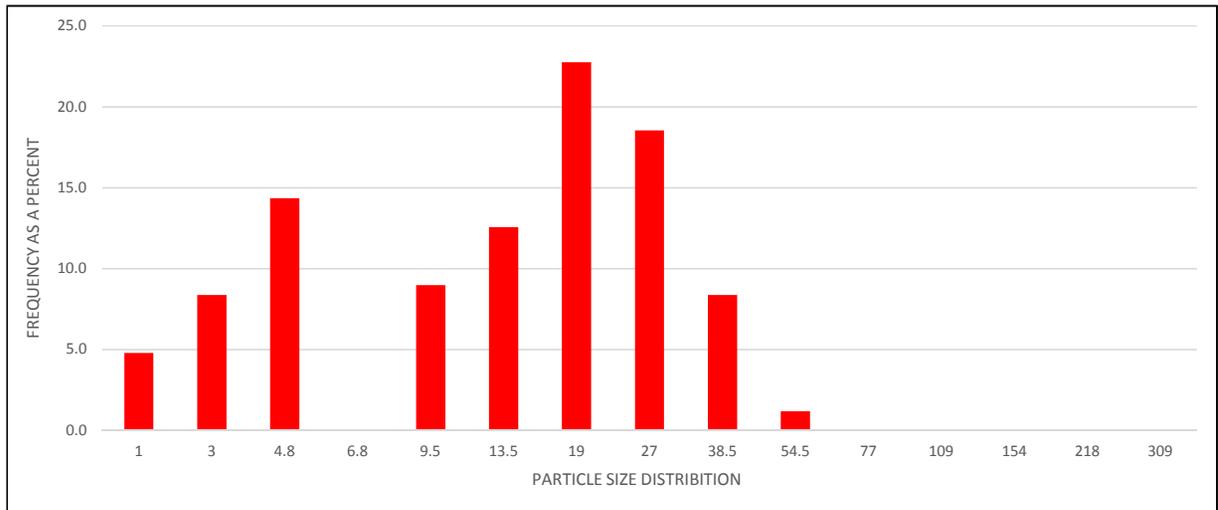
REPRESENTATIVE GRAIN SIZES (MM)

D5	0.0080
D16	0.088
D25	0.13
D35	0.15
D50	0.19
D75	0.28
D84	0.31
D95	0.40

Transect ID: 15		Describer: KK, RKA
Date: May 9, 2016		Time: 2 pm
Facies Type: GRAVEL		
Notes:		
Material	Size Range (mm)	Count
sand/silt/clay	less than 2	8
very fine gravel	2 - 4	14
fine gravel	4 - 5.6	24
fine gravel	5.6 - 8	0
medium gravel	8 - 11	15
medium gravel	11 - 16	21
coarse gravel	16 - 22	38
coarse gravel	22 - 32	31
very coarse gravel	32 - 45	14
very coarse gravel	45 - 64	2
small cobble	64 - 90	0
medium cobble	90 - 128	0
large cobble	128 - 180	0
very large cobble	180 - 256	0
boulders	greater than 256	0
Total Count:		167

% SAND	% GRAVEL	% COBBLE
5	95	0

% BOULDER
0



REPRESENTATIVE GRAIN SIZES (MM)

D5	2.0
D16	5.2
D25	6.2
D35	14
D50	19
D75	28
D84	33
D95	44

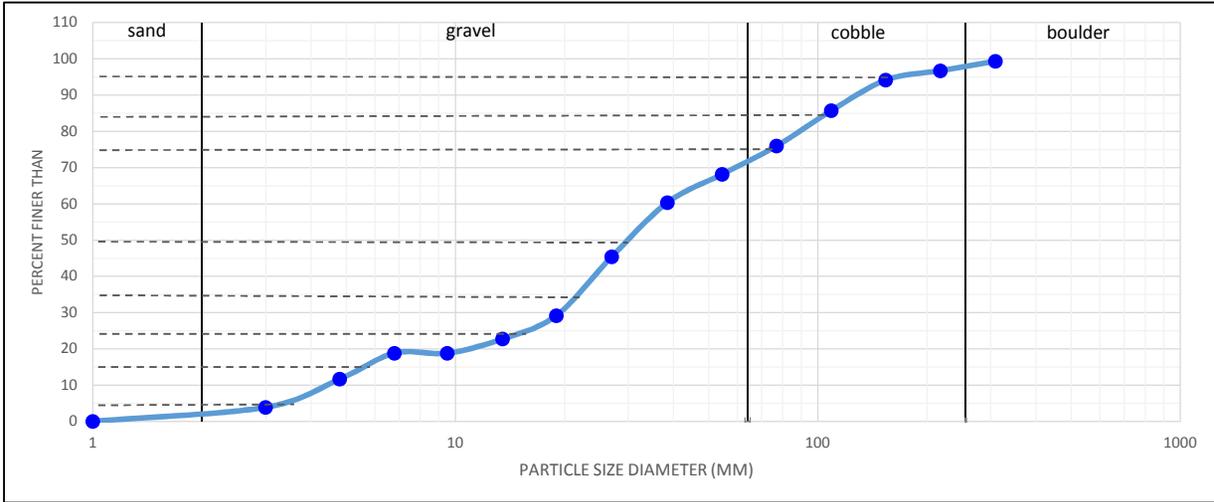
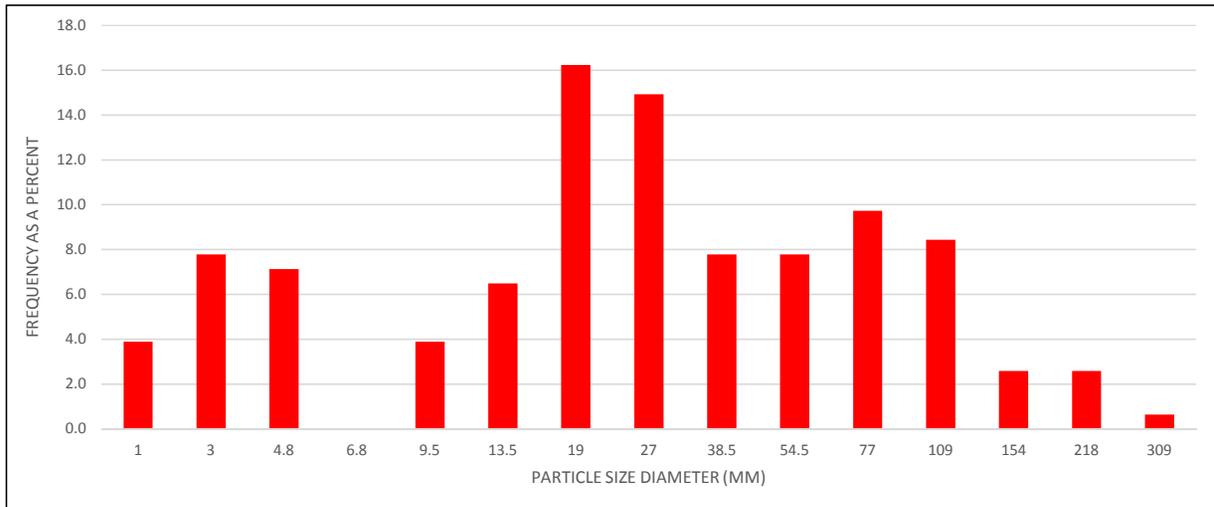
SUMMARY STATISTICS

Geometric Mean	13.1	<i>characterizes the central portion of distribution</i>
Standard Deviation	2.5	<i>width of distribution, also represents sorting</i>
Skewness	6.2	<i>a measure of deviation from symmetry</i>
Kurtosis	0.2	<i>a measure of peakness or flatness of distribution</i>
Arithmetic Mean	19.1	
Standard Deviation	13.3	
Skewness	0.1	
Kurtosis	0.2	

Transect ID: 15		Describer: KK, RKA
Date: May 9, 2016		Time: 2:30 pm
Facies Type: GRAVEL COBBLE		
Notes:		
Material	Size Range (mm)	Count
sand/silt/clay	less than 2	6
very fine gravel	2 - 4	12
fine gravel	4 - 5.6	11
fine gravel	5.6 - 8	0
medium gravel	8 - 11	6
medium gravel	11 - 16	10
coarse gravel	16 - 22	25
coarse gravel	22 - 32	23
very coarse gravel	32 - 45	12
very coarse gravel	45 - 64	12
small cobble	64 - 90	15
medium cobble	90 - 128	13
large cobble	128 - 180	4
very large cobble	180 - 256	4
boulders	greater than 256	1
Total Count:		154

% SAND	% GRAVEL	% COBBLE
4	72	23

% BOULDER
1



REPRESENTATIVE GRAIN SIZES (MM)

D5	3.5
D16	5.5
D25	16
D35	22
D50	30
D75	75
D84	110
D95	160

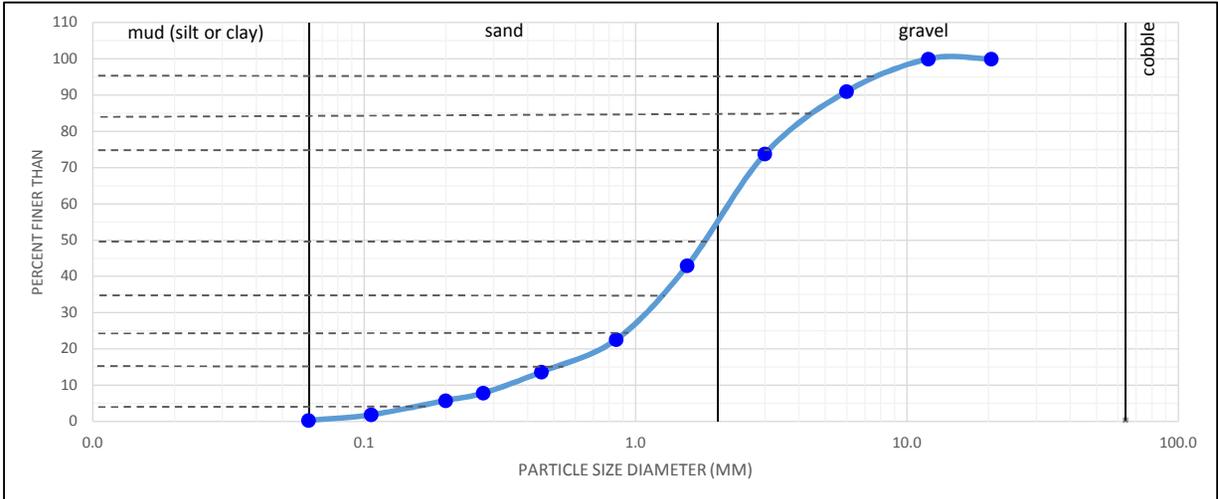
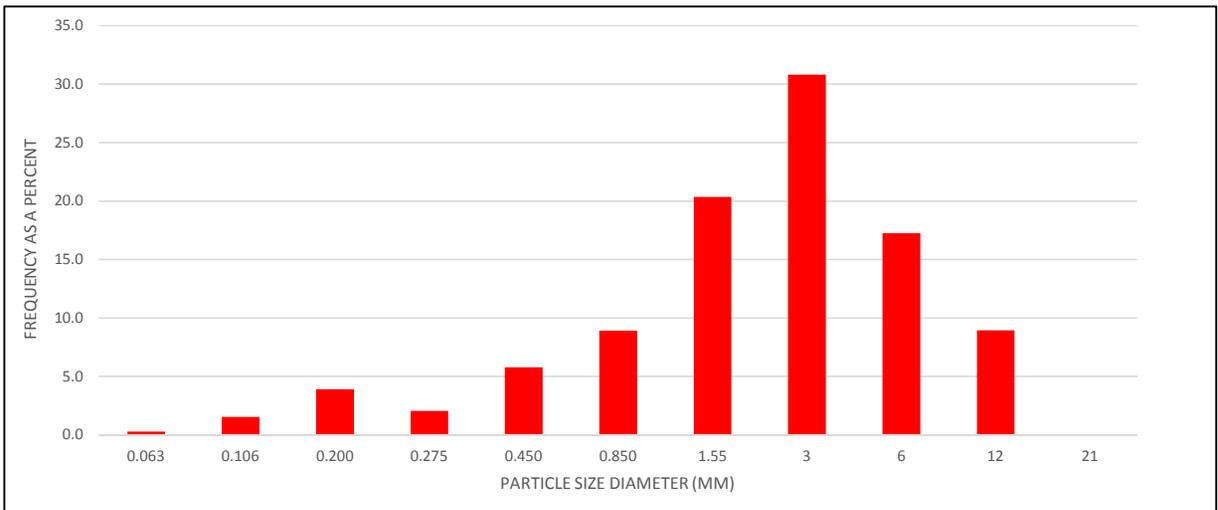
SUMMARY STATISTICS

Geometric Mean	24.6	characterizes the central portion of distribution
Standard Deviation	4.5	width of distribution, also represents sorting
Skewness	11.4	a measure of deviation from symmetry
Kurtosis	0.1	a measure of peakness or flatness of distribution
Arithmetic Mean	48.5	
Standard Deviation	49.8	
Skewness	0.6	
Kurtosis	0.2	

Transect ID: 15		Describer: KK, RKA
Date: May 9, 2016		Time: 2:45 pm
Facies Type: GRAVEL SAND		
Notes:		
Material	Size Range (mm)	Mass (g)
coarse gravel	16 - 25	0.00
medium gravel	8 - 16	23.66
fine gravel	4 - 8	45.56
very fine gravel	2 - 4	81.32
very coarse sand	1.10 - 2	53.76
coarse sand	0.600 - 1.10	23.61
med to coarse sand	0.300 - 0.600	15.33
medium sand	0.250 - 0.300	5.45
fine sand	0.150 - 0.250	10.37
very fine sand	0.0625 - 0.150	4.07
mud (silt or clay)	< 0.0625	0.79
Total Mass (g):		263.92

% MUD	% SAND	% GRAVEL
0.3	42.7	57.0

FOLK CLASSIFICATION
SANDY GRAVEL



REPRESENTATIVE GRAIN SIZES (MM)

D5	0.17
D16	0.53
D25	0.94
D35	1.3
D50	1.8
D75	3.1
D84	4.5
D95	7.6

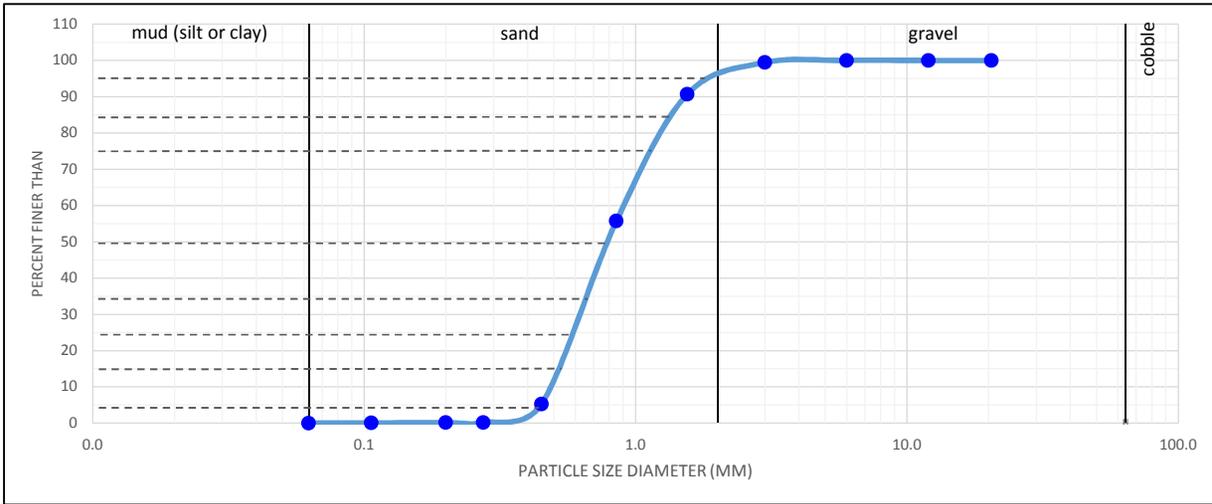
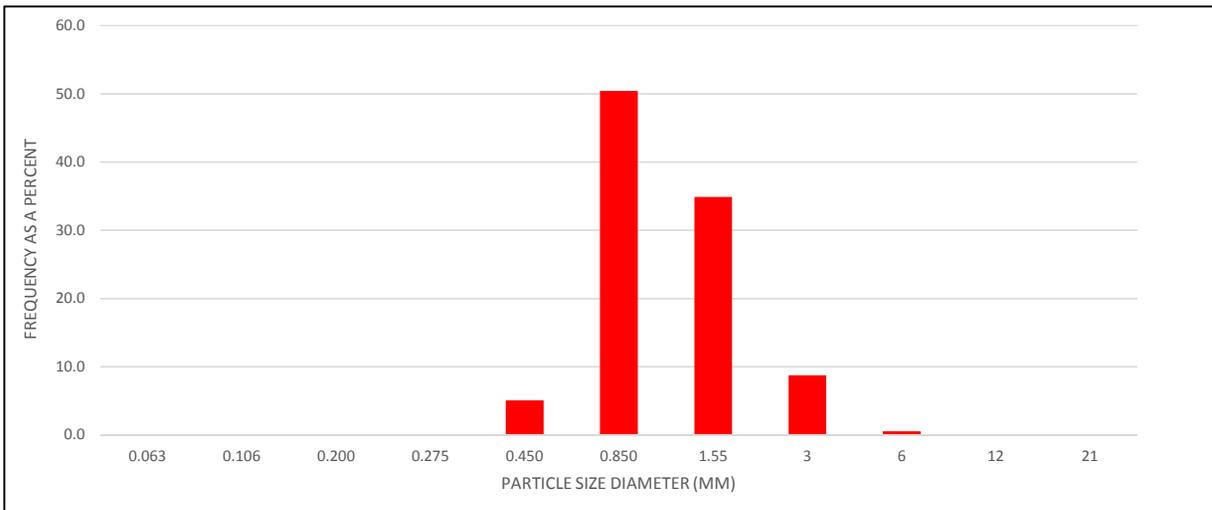
SUMMARY STATISTICS

Geometric Mean	1.5	characterizes the central portion of distribution
Standard Deviation	2.9	width of distribution, also represents sorting
Skewness	0.9	a measure of deviation from symmetry
Kurtosis	0.2	a measure of peakness or flatness of distribution
Arithmetic Mean	2.3	
Standard Deviation	2.1	
Skewness	0.5	
Kurtosis	0.2	

Transect ID: 16		Describer: KK, RKA
Date: May 9, 2016		Time: 3:45 pm
Facies Type: SAND		
Notes:		
Material	Size Range (mm)	Mass (g)
coarse gravel	16 - 25	0.00
medium gravel	8 - 16	0.00
fine gravel	4 - 8	1.40
very fine gravel	2 - 4	21.70
very coarse sand	1.10 - 2	86.22
coarse sand	0.600 - 1.10	124.56
med to coarse sand	0.300 - 0.600	12.54
medium sand	0.250 - 0.300	0.09
fine sand	0.150 - 0.250	0.19
very fine sand	0.0625 - 0.150	0.14
mud (silt or clay)	< 0.0625	0.02
Total Mass (g):		246.86

% MUD	% SAND	% GRAVEL
0.0	90.6	9.4

FOLK CLASSIFICATION
GRAVELLY SAND



REPRESENTATIVE GRAIN SIZES (MM)

D5	0.45
D16	0.52
D25	0.59
D35	0.66
D50	0.80
D75	1.2
D84	1.4
D95	1.8

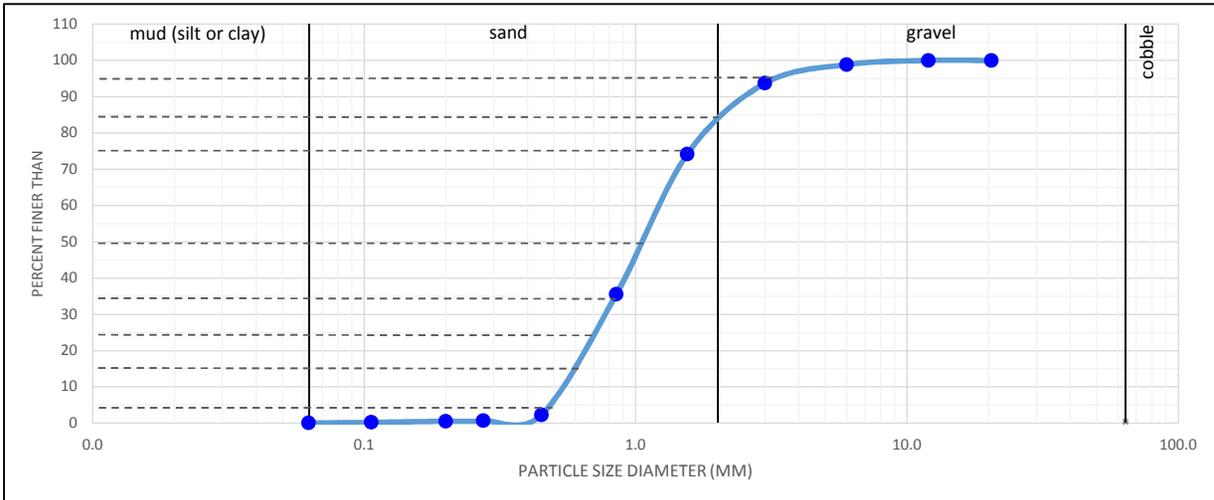
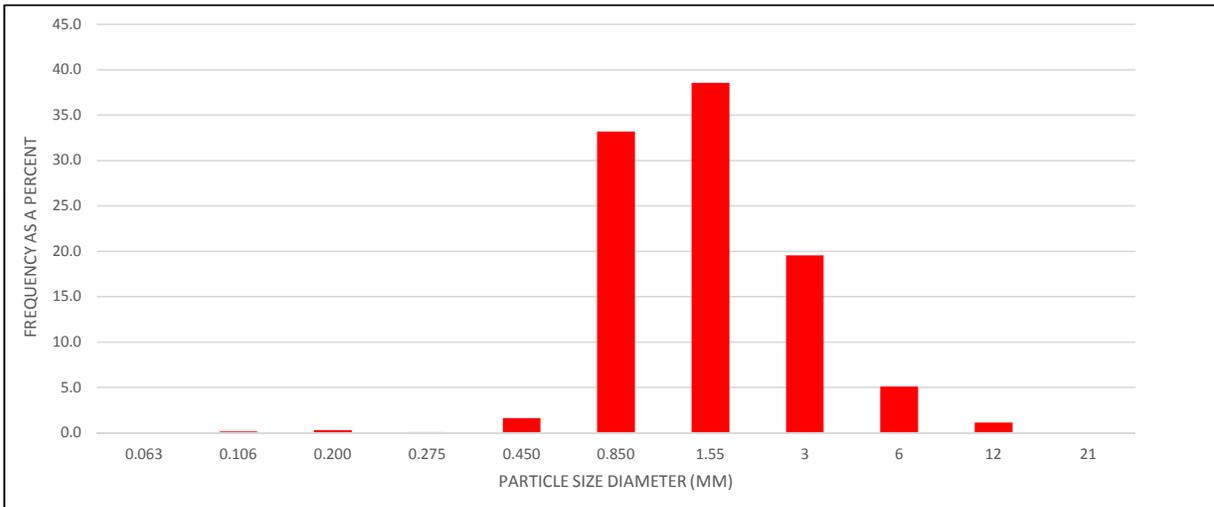
SUMMARY STATISTICS

Geometric Mean	0.9	characterizes the central portion of distribution
Standard Deviation	1.6	width of distribution, also represents sorting
Skewness	0.6	a measure of deviation from symmetry
Kurtosis	0.4	a measure of peakness or flatness of distribution
Arithmetic Mean	0.9	
Standard Deviation	0.4	
Skewness	0.4	
Kurtosis	0.5	

Transect ID: 16		Describer: KK, RKA
Date: May 9, 2016		Time: 4 pm
Facies Type: SAND GRAVEL		
Notes:		
Material	Size Range (mm)	Mass (g)
coarse gravel	16 - 25	0.00
medium gravel	8 - 16	2.89
fine gravel	4 - 8	12.88
very fine gravel	2 - 4	49.09
very coarse sand	1.10 - 2	96.73
coarse sand	0.600 - 1.10	83.28
med to coarse sand	0.300 - 0.600	4.13
medium sand	0.250 - 0.300	0.31
fine sand	0.150 - 0.250	0.78
very fine sand	0.0625 - 0.150	0.43
mud (silt or clay)	< 0.0625	0.08
Total Mass (g):		250.60

% MUD	% SAND	% GRAVEL
0.0	74.1	25.9

FOLK CLASSIFICATION
GRAVELLY SAND



REPRESENTATIVE GRAIN SIZES (MM)

D5	0.49
D16	0.61
D25	0.70
D35	0.85
D50	1.1
D75	1.6
D84	2.0
D95	3.2

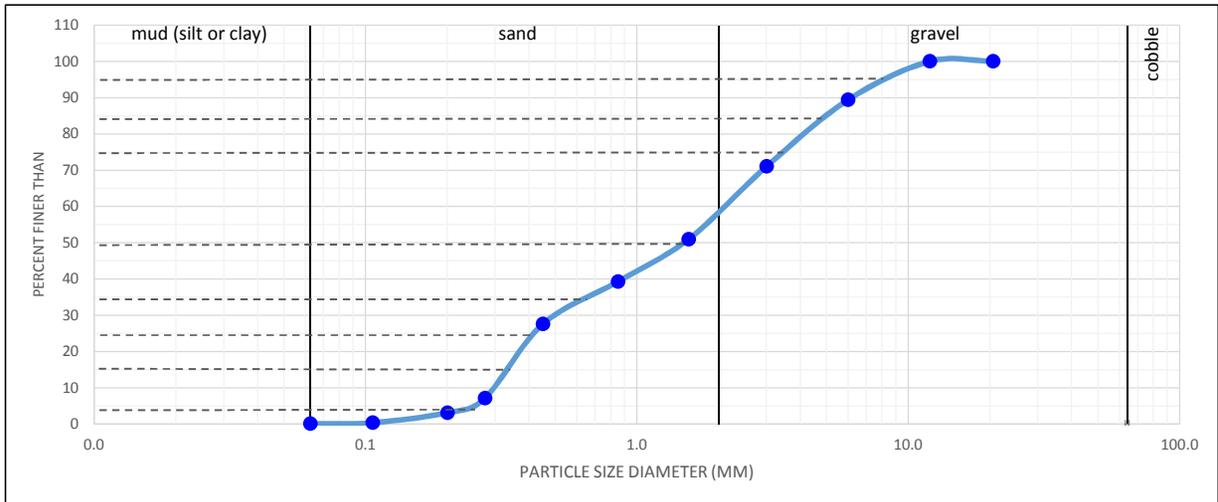
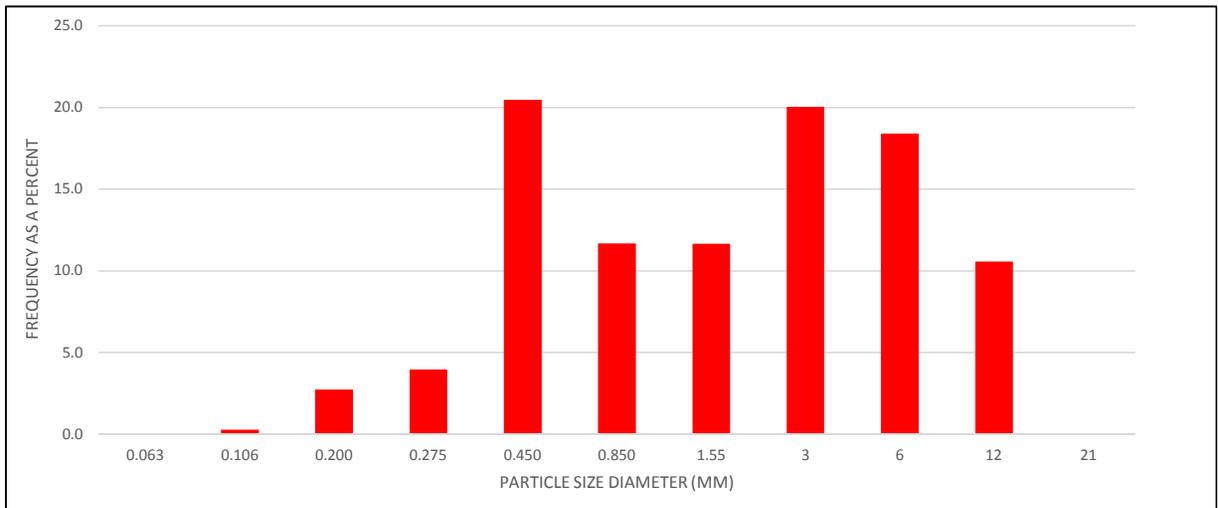
SUMMARY STATISTICS

Geometric Mean	1.1	characterizes the central portion of distribution
Standard Deviation	1.8	width of distribution, also represents sorting
Skewness	0.7	a measure of deviation from symmetry
Kurtosis	0.4	a measure of peakness or flatness of distribution
Arithmetic Mean	1.2	
Standard Deviation	0.8	
Skewness	0.4	
Kurtosis	0.6	

Transect ID: 16		Describer: KK, RKA
Date: May 9, 2016		Time: 4:15 pm
Facies Type: SAND GRAVEL		
Notes:		
Material	Size Range (mm)	Mass (g)
coarse gravel	16 - 25	0.00
medium gravel	8 - 16	27.84
fine gravel	4 - 8	48.44
very fine gravel	2 - 4	52.72
very coarse sand	1.10 - 2	30.72
coarse sand	0.600 - 1.10	30.77
coarse sand	0.300 - 0.600	53.88
medium sand	0.250 - 0.300	10.48
fine sand	0.150 - 0.250	7.24
very fine sand	0.0625 - 0.150	0.78
mud (silt or clay)	< 0.0625	0.18
Total Mass (g):		263.05

% MUD	% SAND	% GRAVEL
0.1	50.9	49.0

FOLK CLASSIFICATION
SANDY GRAVEL



REPRESENTATIVE GRAIN SIZES (MM)

D5	0.25
D16	0.33
D25	0.42
D35	0.65
D50	1.5
D75	3.3
D84	4.9
D95	8.0

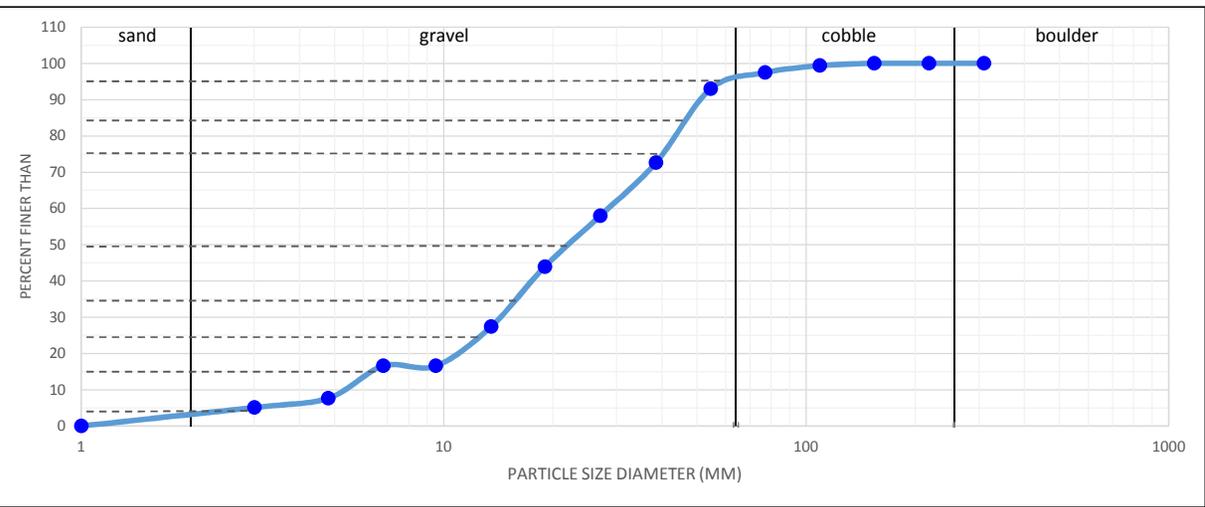
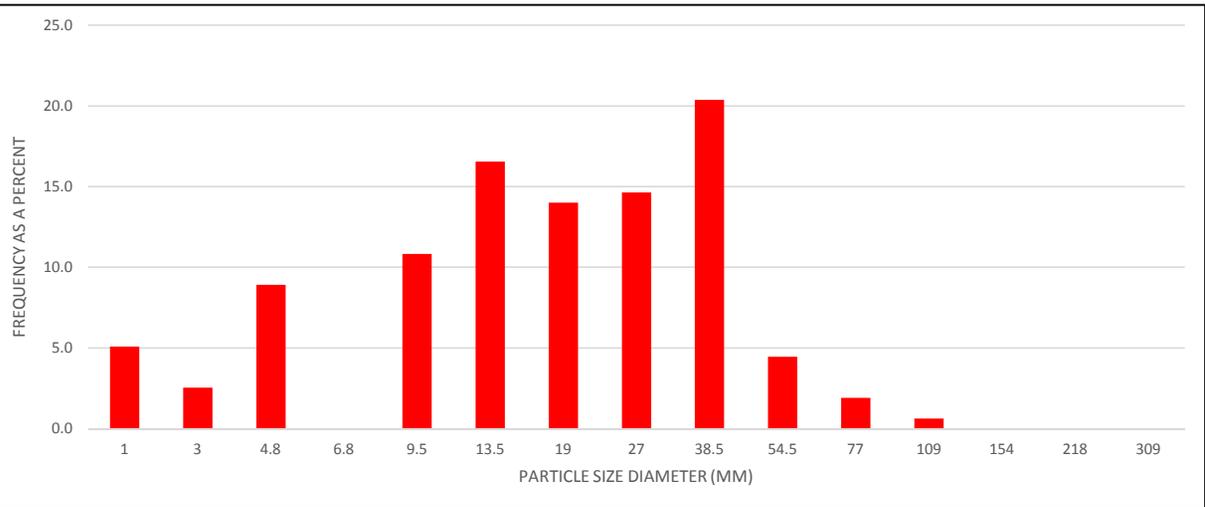
SUMMARY STATISTICS

Geometric Mean	1.3	characterizes the central portion of distribution
Standard Deviation	3.9	width of distribution, also represents sorting
Skewness	0.5	a measure of deviation from symmetry
Kurtosis	0.1	a measure of peakness or flatness of distribution
Arithmetic Mean	2.2	
Standard Deviation	2.3	
Skewness	0.6	
Kurtosis	0.6	

Transect ID: 17		Describer: KK, AG
Date: May 10, 2016		Time: 9:30 am
Facies Type: GRAVEL		
Notes:		
Material	Size Range (mm)	Count
sand/silt/clay	less than 2	8
very fine gravel	2 - 4	4
fine gravel	4 - 5.6	14
fine gravel	5.6 - 8	0
medium gravel	8 - 11	17
medium gravel	11 - 16	26
coarse gravel	16 - 22	22
coarse gravel	22 - 32	23
very coarse gravel	32 - 45	32
very coarse gravel	45 - 64	7
small cobble	64 - 90	3
medium cobble	90 - 128	1
large cobble	128 - 180	0
very large cobble	180 - 256	0
boulders	greater than 256	0
Total Count:		157

% SAND	% GRAVEL	% COBBLE
5	92	3

% BOULDER
0



REPRESENTATIVE GRAIN SIZES (MM)

D5	2.8
D16	6.3
D25	13
D35	16
D50	22
D75	41
D84	46
D95	58

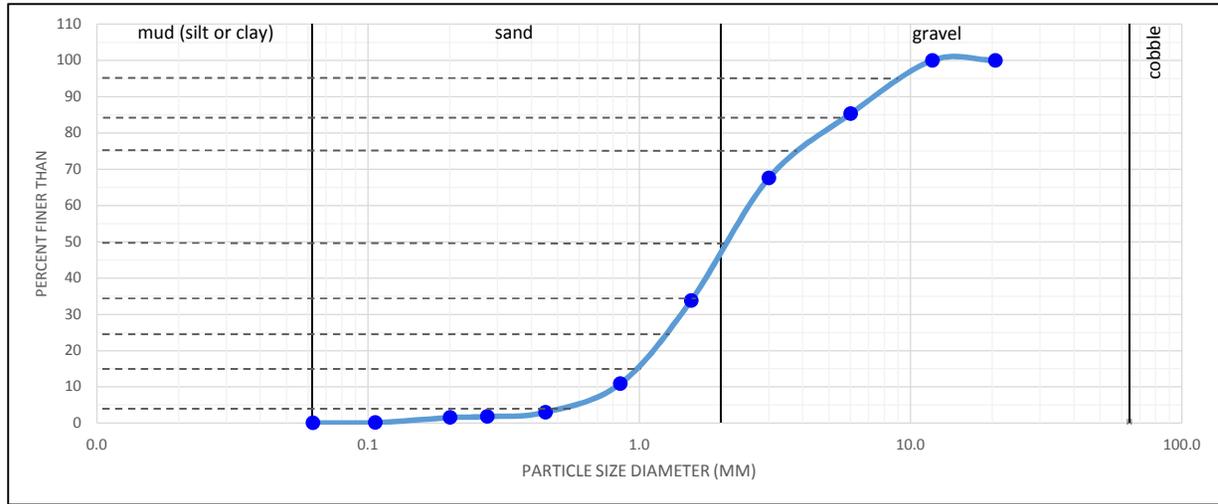
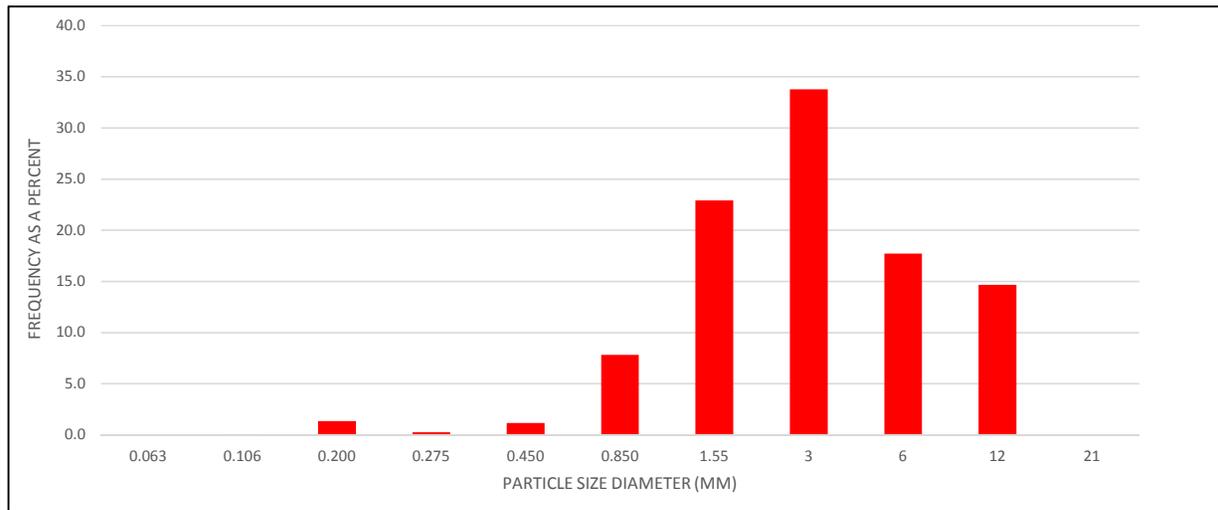
SUMMARY STATISTICS

Geometric Mean	17.0	<i>characterizes the central portion of distribution</i>
Standard Deviation	2.7	<i>width of distribution, also represents sorting</i>
Skewness	9.6	<i>a measure of deviation from symmetry</i>
Kurtosis	0.2	<i>a measure of peakness or flatness of distribution</i>
Arithmetic Mean	24.8	
Standard Deviation	18.3	
Skewness	0.3	
Kurtosis	0.1	

Transect ID: 17		Describer: KK, AG
Date: May 10, 2016		Time: 9:45 am
Facies Type: GRAVEL SAND		
Notes:		
Material	Size Range (mm)	Mass (g)
coarse gravel	16 - 25	0.00
medium gravel	8 - 16	43.52
fine gravel	4 - 8	52.51
very fine gravel	2 - 4	100.02
very coarse sand	1.10 - 2	67.86
coarse sand	0.600 - 1.10	23.24
med to coarse sand	0.300 - 0.600	3.52
medium sand	0.250 - 0.300	0.84
fine sand	0.150 - 0.250	4.06
very fine sand	0.0625 - 0.150	0.32
mud (silt or clay)	< 0.0625	0.11
Total Mass (g):		296.00

% MUD	% SAND	% GRAVEL
0.0	33.7	66.2

FOLK CLASSIFICATION
SANDY GRAVEL



REPRESENTATIVE GRAIN SIZES (MM)

D5	0.55
D16	1.0
D25	1.3
D35	1.6
D50	2.1
D75	3.9
D84	5.8
D95	9.0

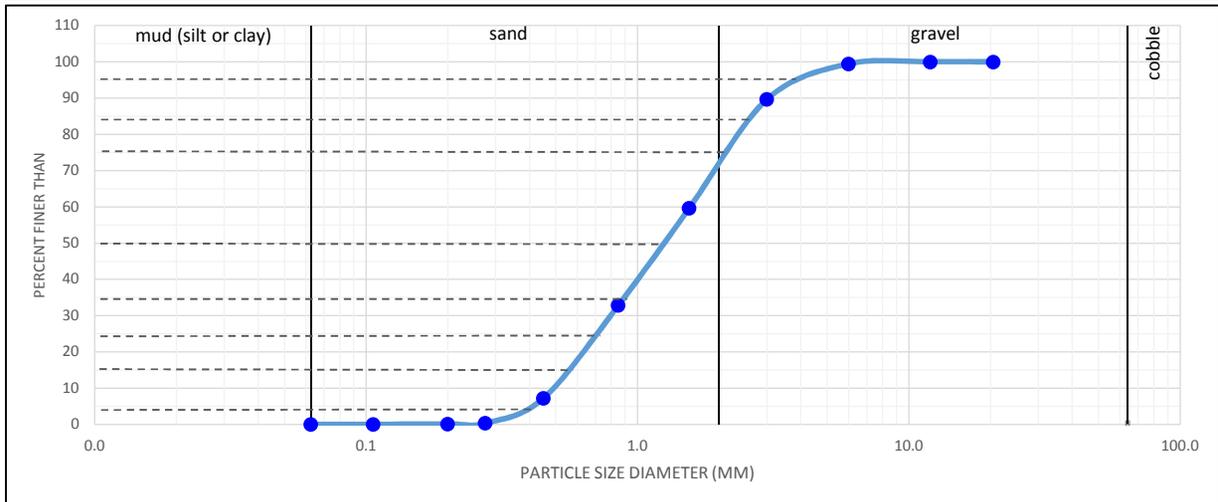
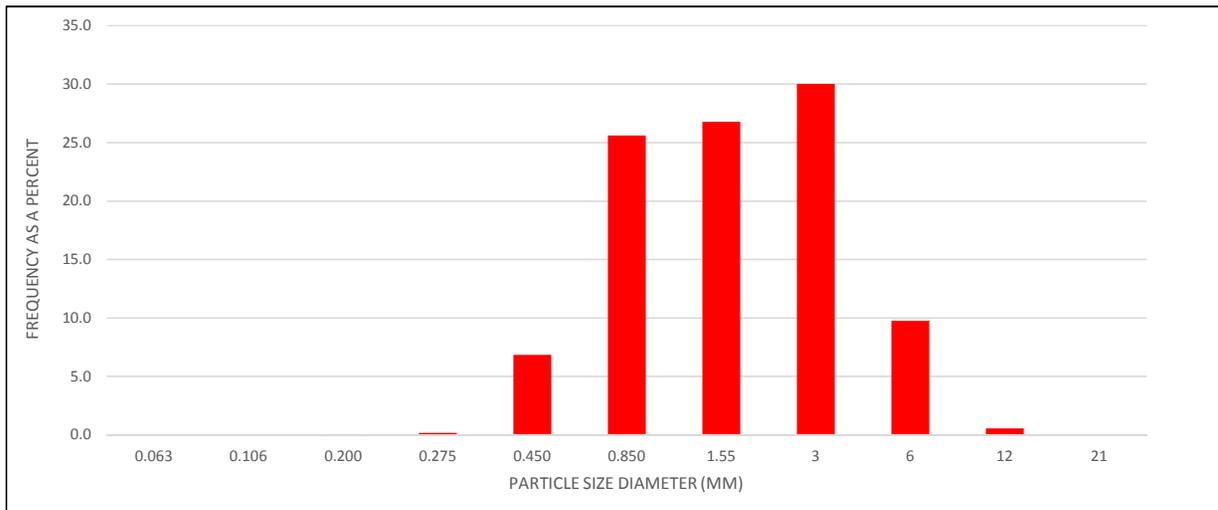
SUMMARY STATISTICS

Geometric Mean	2.4	characterizes the central portion of distribution
Standard Deviation	2.4	width of distribution, also represents sorting
Skewness	1.4	a measure of deviation from symmetry
Kurtosis	0.2	a measure of peakness or flatness of distribution
Arithmetic Mean	3.0	
Standard Deviation	2.5	
Skewness	0.6	
Kurtosis	0.4	

Transect ID: 17		Describer: KK, AG
Date: May 10, 2016		Time: 10 am
Facies Type: SAND GRAVEL		
Notes:		
Material	Size Range (mm)	Mass (g)
coarse gravel	16 - 25	0.00
medium gravel	8 - 16	1.39
fine gravel	4 - 8	23.71
very fine gravel	2 - 4	72.77
very coarse sand	1.10 - 2	64.91
coarse sand	0.600 - 1.10	62.11
med to coarse sand	0.300 - 0.600	16.66
medium sand	0.250 - 0.300	0.49
fine sand	0.150 - 0.250	0.23
very fine sand	0.0625 - 0.150	0.05
mud (silt or clay)	< 0.0625	0.03
Total Mass (g):		242.35

% MUD	% SAND	% GRAVEL
0.0	59.6	40.4

FOLK CLASSIFICATION
SANDY GRAVEL



REPRESENTATIVE GRAIN SIZES (MM)

D5	0.41
D16	0.57
D25	0.72
D35	0.9
D50	1.3
D75	2.2
D84	2.6
D95	3.8

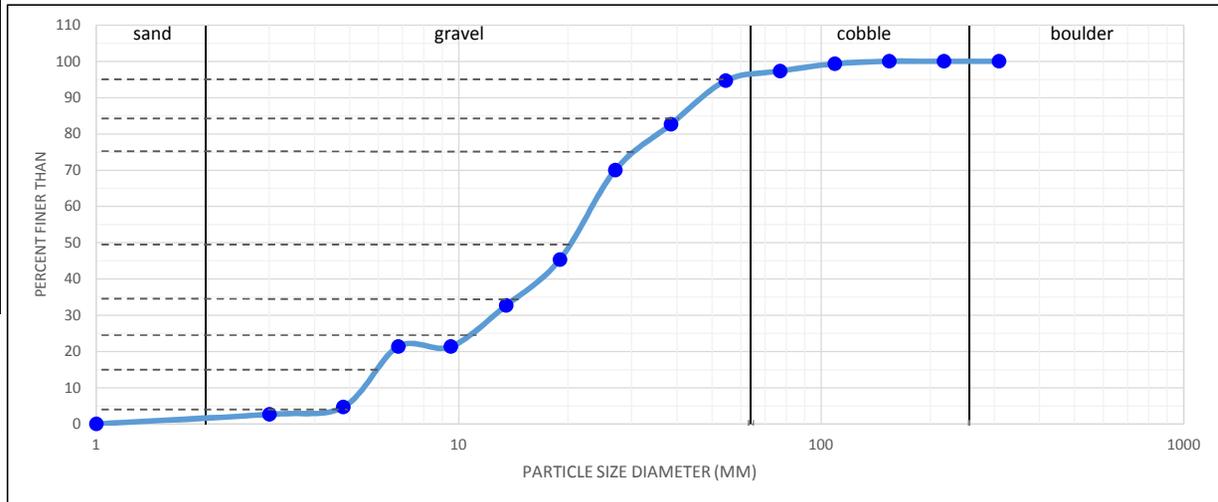
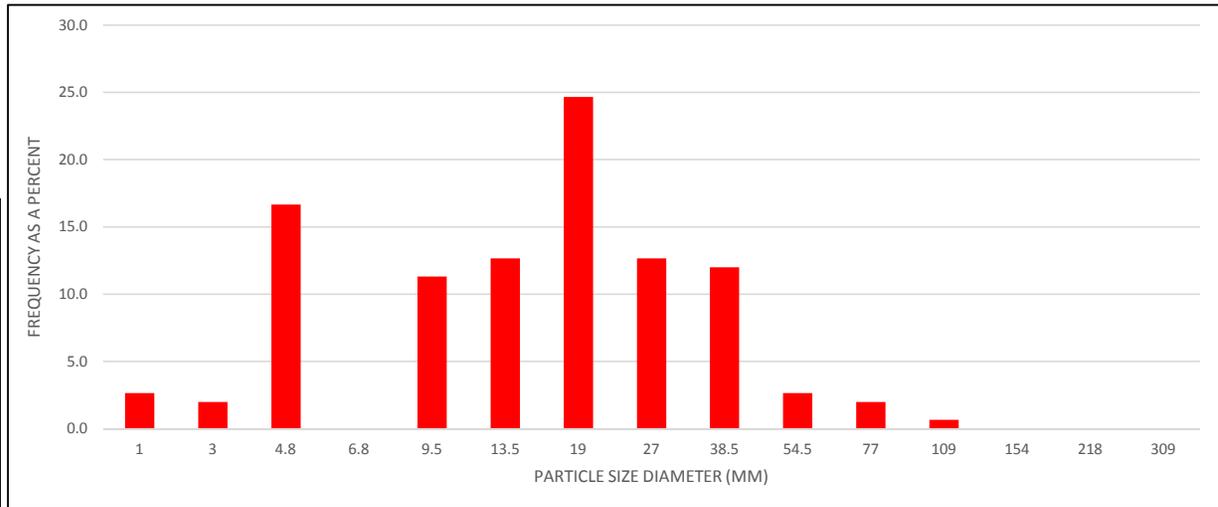
SUMMARY STATISTICS

Geometric Mean	1.2	characterizes the central portion of distribution
Standard Deviation	2.1	width of distribution, also represents sorting
Skewness	0.7	a measure of deviation from symmetry
Kurtosis	0.3	a measure of peakness or flatness of distribution
Arithmetic Mean	1.5	
Standard Deviation	1.0	
Skewness	0.4	
Kurtosis	0.4	

Transect ID: 18		Describer: KK, AG, AM
Date: May 10, 2016		Time: 12:45 pm
Facies Type: GRAVEL		
Notes:		
Material	Size Range (mm)	Count
sand/silt/clay	less than 2	4
very fine gravel	2 - 4	3
fine gravel	4 - 5.6	25
fine gravel	5.6 - 8	0
medium gravel	8 - 11	17
medium gravel	11 - 16	19
coarse gravel	16 - 22	37
coarse gravel	22 - 32	19
very coarse gravel	32 - 45	18
very coarse gravel	45 - 64	4
small cobble	64 - 90	3
medium cobble	90 - 128	1
large cobble	128 - 180	0
very large cobble	180 - 256	0
boulders	greater than 256	0
Total Count:		150

% SAND	% GRAVEL	% COBBLE
3	95	3

% BOULDER
0



REPRESENTATIVE GRAIN SIZES (MM)

D5	4.8
D16	6.0
D25	12
D35	15
D50	21
D75	31
D84	40
D95	55

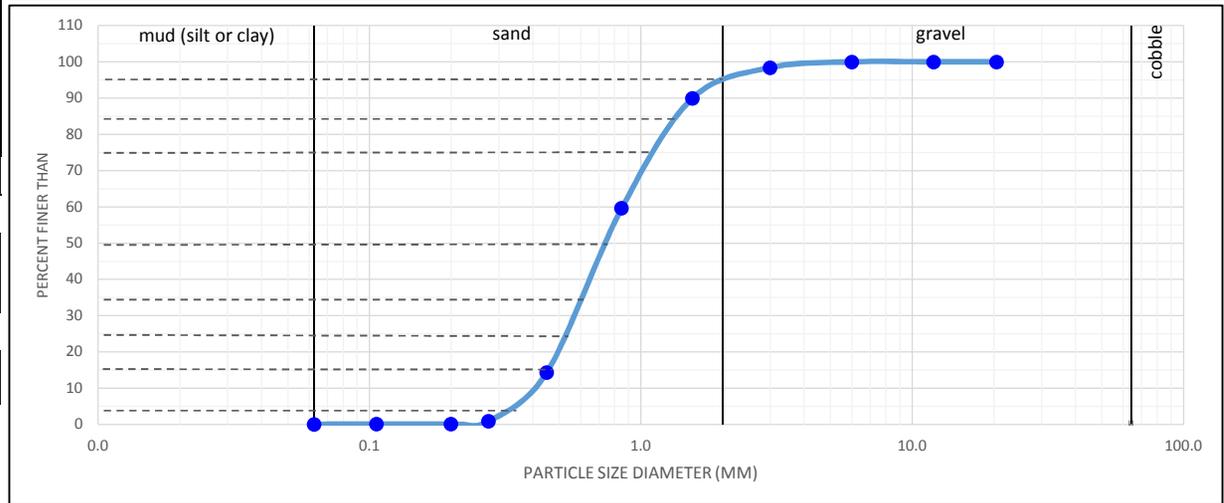
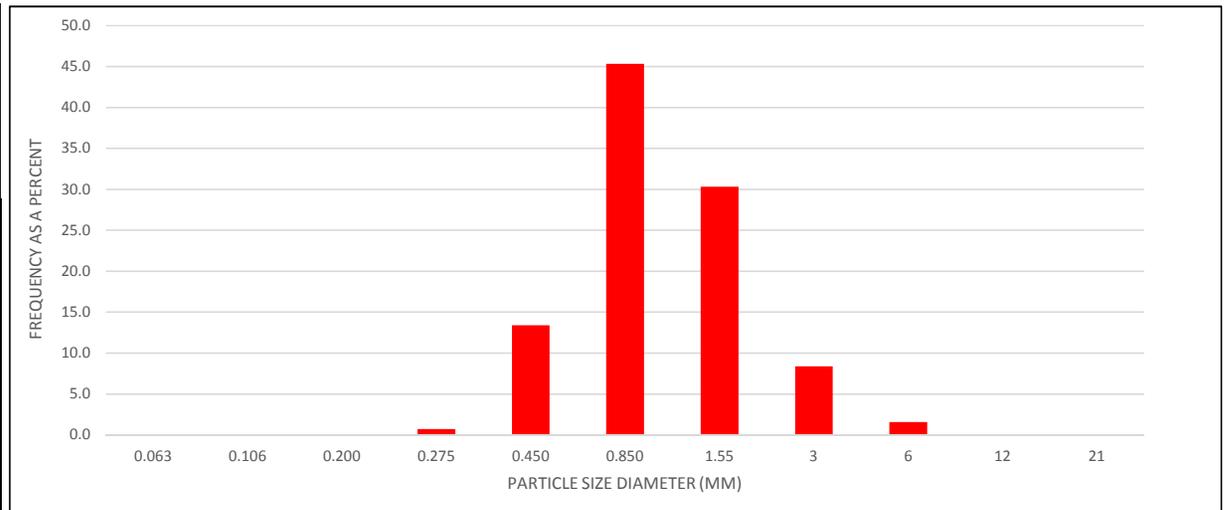
SUMMARY STATISTICS

Geometric Mean	15.5	<i>characterizes the central portion of distribution</i>
Standard Deviation	2.6	<i>width of distribution, also represents sorting</i>
Skewness	9.6	<i>a measure of deviation from symmetry</i>
Kurtosis	0.2	<i>a measure of peakness or flatness of distribution</i>
Arithmetic Mean	22.3	
Standard Deviation	16.1	
Skewness	0.2	
Kurtosis	0.3	

Transect ID: 18		Describer: KK, AG, AM
Date: May 10, 2016		Time: 1:15 pm
Facies Type: SAND GRAVEL		
Notes:		
Material	Size Range (mm)	Mass (g)
coarse gravel	16 - 25	0.00
medium gravel	8 - 16	0.00
fine gravel	4 - 8	3.81
very fine gravel	2 - 4	19.93
very coarse sand	1.10 - 2	71.94
coarse sand	0.600 - 1.10	107.41
med to coarse sand	0.300 - 0.600	31.81
medium sand	0.250 - 0.300	1.80
fine sand	0.150 - 0.250	0.10
very fine sand	0.0625 - 0.150	0.11
mud (silt or clay)	< 0.0625	0.11
Total Mass (g):		237.02

% MUD	% SAND	% GRAVEL
0.0	89.9	10.0

FOLK CLASSIFICATION
GRAVELLY SAND



REPRESENTATIVE GRAIN SIZES (MM)

D5	0.32
D16	0.46
D25	0.53
D35	0.61
D50	0.74
D75	1.2
D84	1.4
D95	2.0

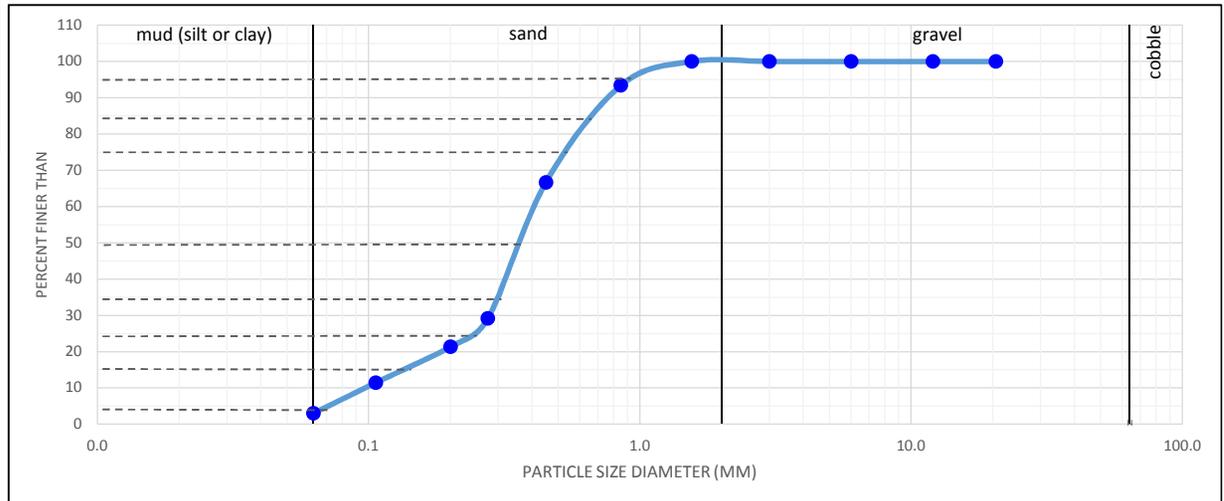
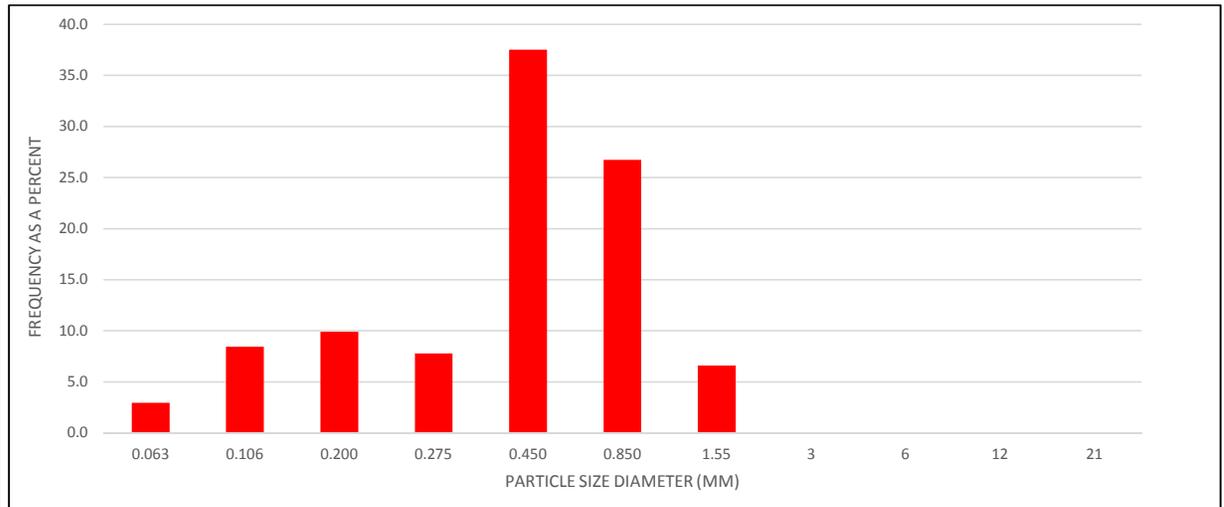
SUMMARY STATISTICS

Geometric Mean	0.8	characterizes the central portion of distribution
Standard Deviation	1.7	width of distribution, also represents sorting
Skewness	0.5	a measure of deviation from symmetry
Kurtosis	0.4	a measure of peakness or flatness of distribution
Arithmetic Mean	0.9	
Standard Deviation	0.5	
Skewness	0.5	
Kurtosis	0.4	

Transect ID: 18		Describer: KK, AG, AM
Date: May 10, 2016		Time: 1:30 pm
Facies Type: SAND		
Notes:		
Material	Size Range (mm)	Mass (g)
coarse gravel	16 - 25	0.00
medium gravel	8 - 16	0.00
fine gravel	4 - 8	0.00
very fine gravel	2 - 4	0.00
very coarse sand	1.10 - 2	10.82
coarse sand	0.600 - 1.10	43.76
med to coarse sand	0.300 - 0.600	61.36
medium sand	0.250 - 0.300	12.76
fine sand	0.150 - 0.250	16.21
very fine sand	0.0625 - 0.150	13.83
mud (silt or clay)	< 0.0625	4.84
Total Mass (g):		163.58

% MUD	% SAND	% GRAVEL
3.0	97.0	0.0

FOLK CLASSIFICATION
SAND



REPRESENTATIVE GRAIN SIZES (MM)

D5	0.069
D16	0.15
D25	0.25
D35	0.30
D50	0.36
D75	0.53
D84	0.64
D95	0.91

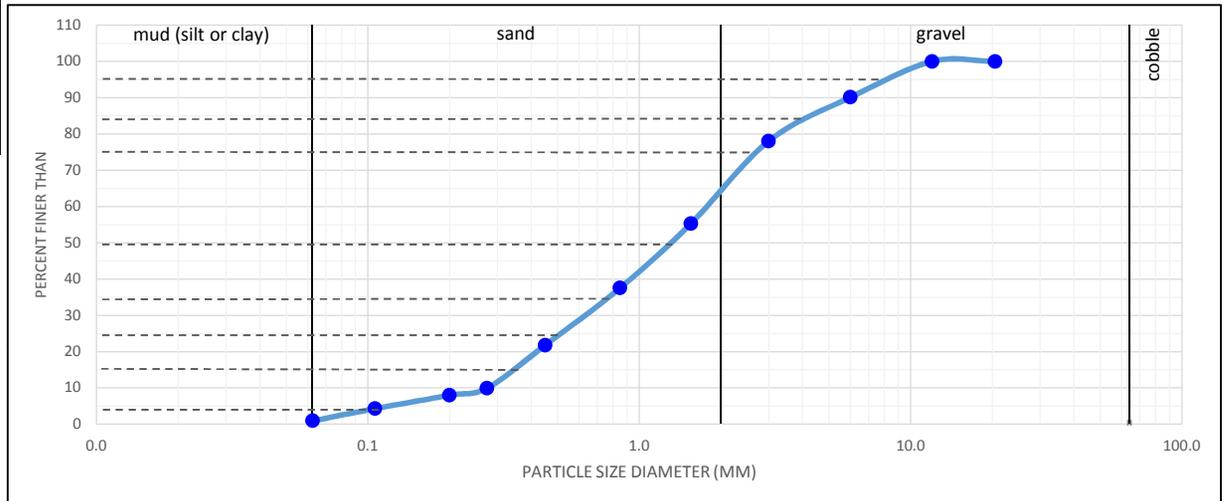
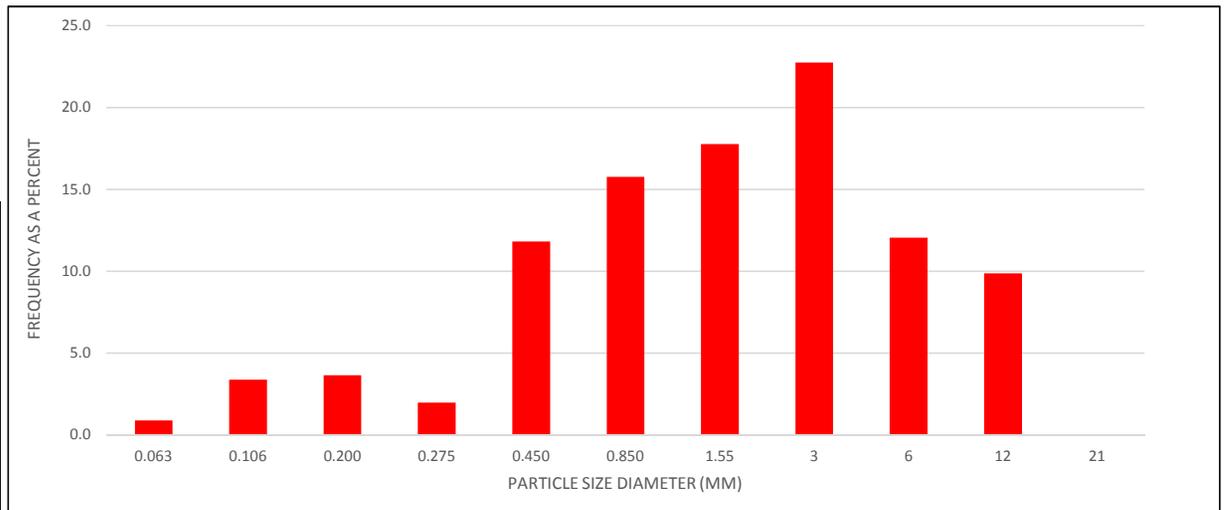
SUMMARY STATISTICS

Geometric Mean	0.3	characterizes the central portion of distribution
Standard Deviation	2.1	width of distribution, also represents sorting
Skewness	0.2	a measure of deviation from symmetry
Kurtosis	0.3	a measure of peakness or flatness of distribution
Arithmetic Mean	0.4	
Standard Deviation	0.2	
Skewness	0.2	
Kurtosis	0.2	

Transect ID: 18		Describer: KK, AG, AM
Date: May 10, 2016		Time: 1:45 pm
Facies Type: SAND GRAVEL		
Notes:		
Material	Size Range (mm)	Mass (g)
coarse gravel	16 - 25	0.00
medium gravel	8 - 16	18.58
fine gravel	4 - 8	22.65
very fine gravel	2 - 4	42.72
very coarse sand	1.10 - 2	33.39
coarse sand	0.600 - 1.10	29.65
med to coarse sand	0.300 - 0.600	22.20
medium sand	0.250 - 0.300	3.72
fine sand	0.150 - 0.250	6.88
very fine sand	0.0625 - 0.150	6.36
mud (silt or clay)	< 0.0625	1.69
Total Mass (g):		187.84

% MUD	% SAND	% GRAVEL
0.9	54.4	44.7

FOLK CLASSIFICATION
SANDY GRAVEL



REPRESENTATIVE GRAIN SIZES (MM)

D5	0.12
D16	0.35
D25	0.51
D35	0.78
D50	1.4
D75	2.7
D84	3.9
D95	8.0

SUMMARY STATISTICS

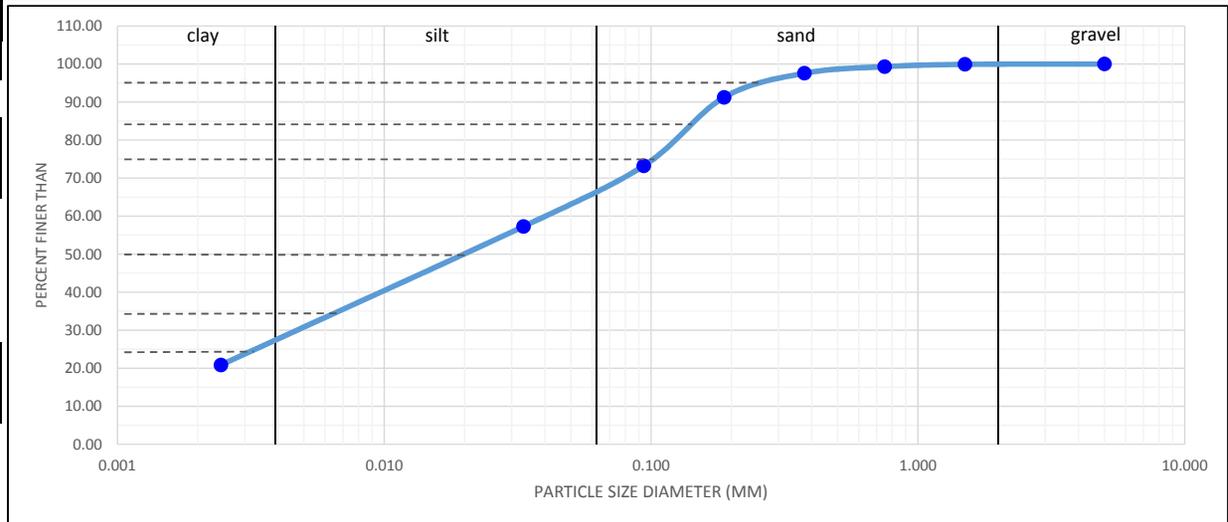
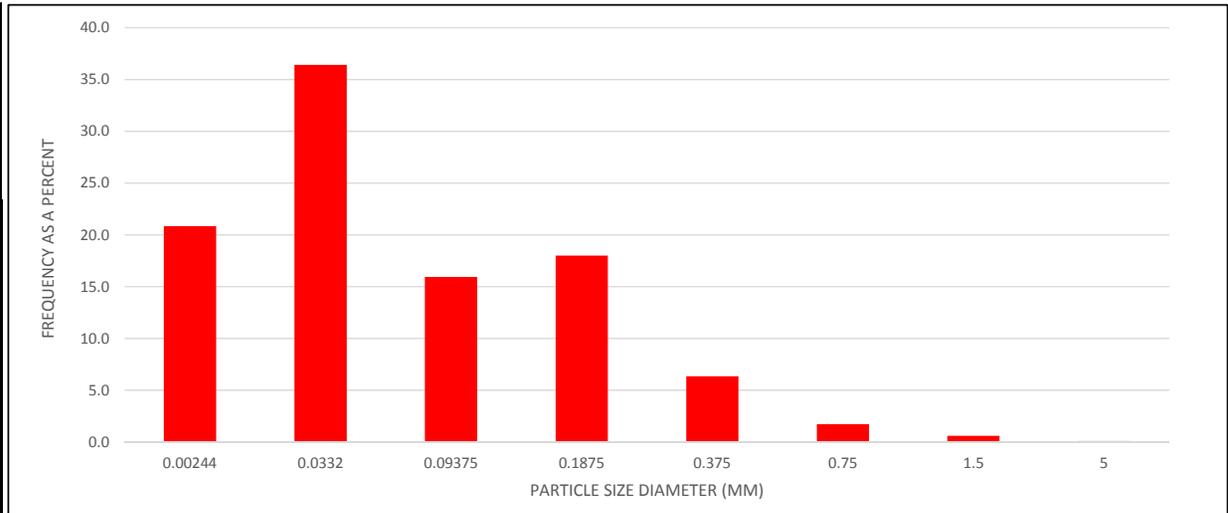
Geometric Mean	1.2	<i>characterizes the central portion of distribution</i>
Standard Deviation	3.3	<i>width of distribution, also represents sorting</i>
Skewness	0.5	<i>a measure of deviation from symmetry</i>
Kurtosis	0.1	<i>a measure of peakness or flatness of distribution</i>
Arithmetic Mean	1.9	
Standard Deviation	2.1	
Skewness	0.5	
Kurtosis	0.3	

Transect ID: 18		Describer: KK, AG, AM
Date: May 10, 2016		Time: 2 pm
Facies Type: SAND SILT CLAY		
Notes:		
Material	Size Range (mm)	Mass (g)
gravel	> 2	0.02
very coarse sand	1 - 2	0.13
coarse sand	0.5 - 1	0.37
medium sand	0.25 - 0.5	1.36
fine sand	0.125 - 0.25	3.85
very fine sand	0.0625 - 0.125	3.41
silt	0.0039 - 0.0625	7.79
clay	0.00098 - 0.0039	4.46
Total Mass (g):		21.39

% CLAY	% SILT	% SAND
20.9	36.4	42.6

% GRAVEL
0.1

FOLK CLASSIFICATION
SANDY MUD



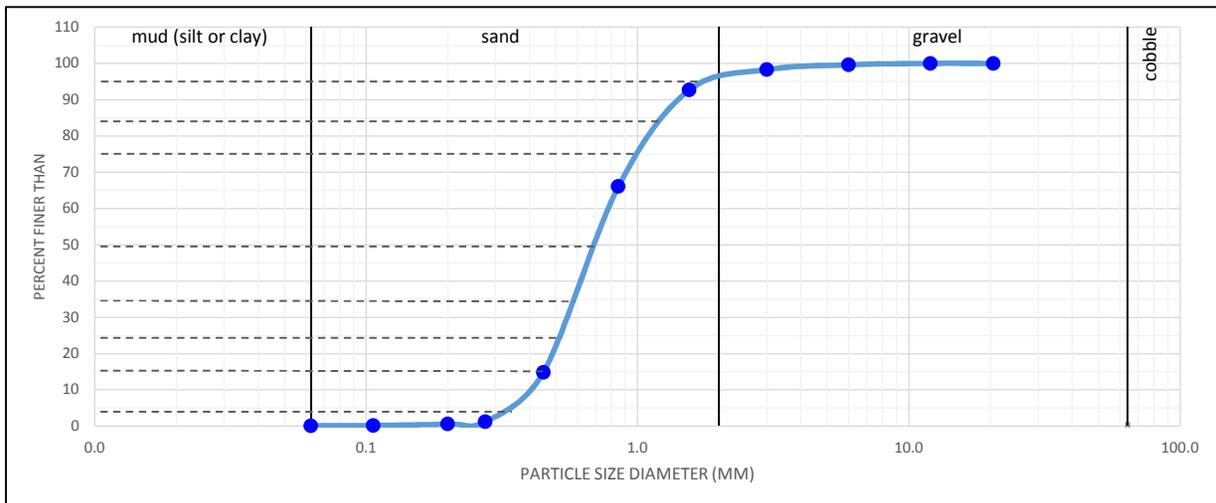
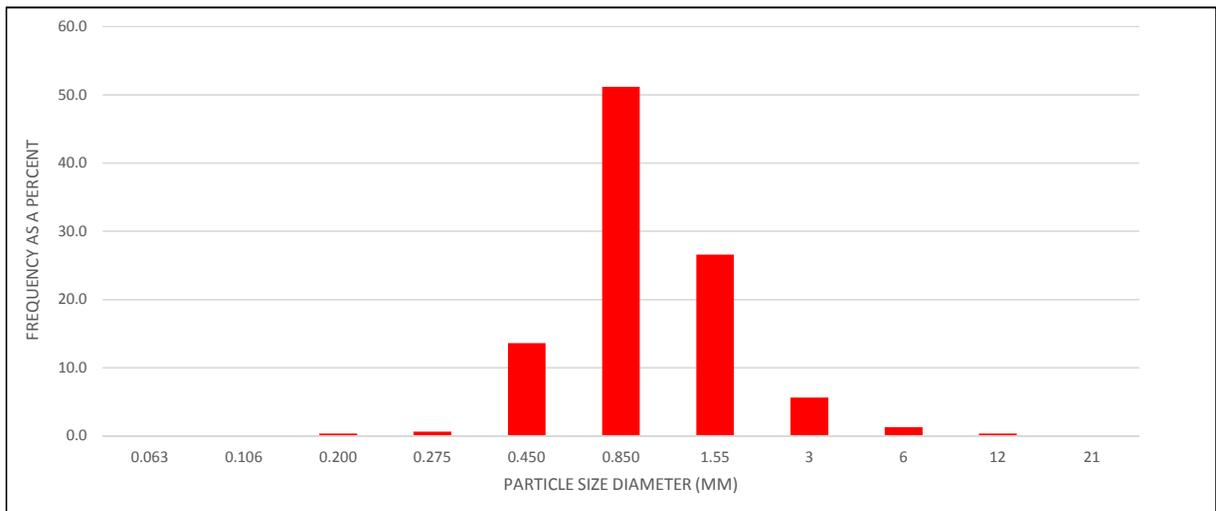
REPRESENTATIVE GRAIN SIZES (MM)

D5	--
D16	--
D25	0.0032
D35	0.0068
D50	0.020
D75	0.11
D84	0.15
D95	0.25

Transect ID: 19		Describer: KK, AG
Date: May 10, 2016		Time: 3:15 pm
Facies Type: SAND		
Notes:		
Material	Size Range (mm)	Mass (g)
coarse gravel	16 - 25	0.00
medium gravel	8 - 16	0.84
fine gravel	4 - 8	3.11
very fine gravel	2 - 4	13.22
very coarse sand	1.10 - 2	62.36
coarse sand	0.600 - 1.10	119.97
med to coarse sand	0.300 - 0.600	31.92
medium sand	0.250 - 0.300	1.53
fine sand	0.150 - 0.250	0.88
very fine sand	0.0625 - 0.150	0.22
mud (silt or clay)	< 0.0625	0.20
Total Mass (g):		234.25

% MUD	% SAND	% GRAVEL
0.1	92.6	7.3

FOLK CLASSIFICATION
GRAVELLY SAND



REPRESENTATIVE GRAIN SIZES (MM)

D5	0.33
D16	0.46
D25	0.51
D35	0.59
D50	0.70
D75	1.0
D84	1.2
D95	1.8

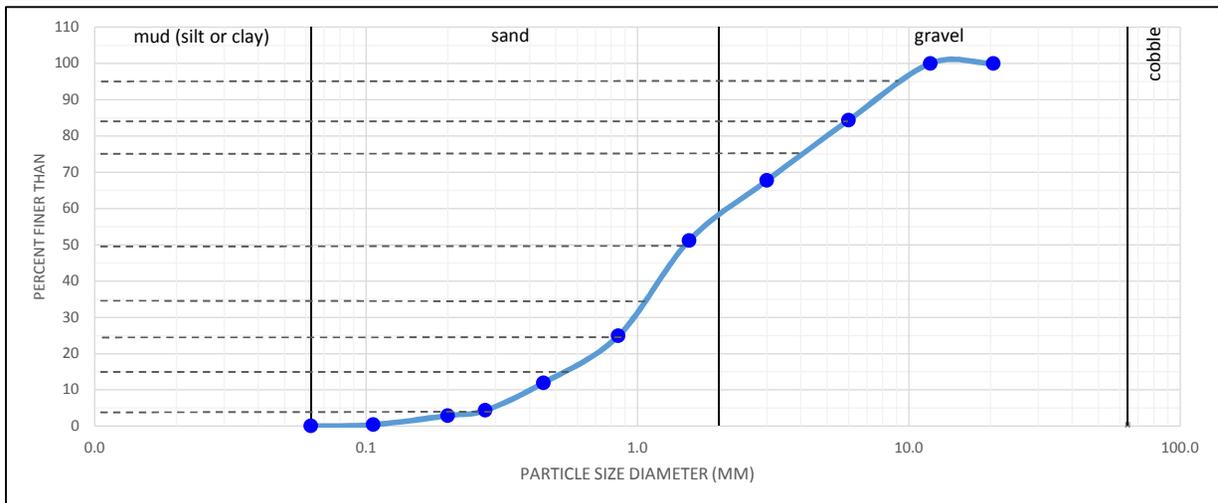
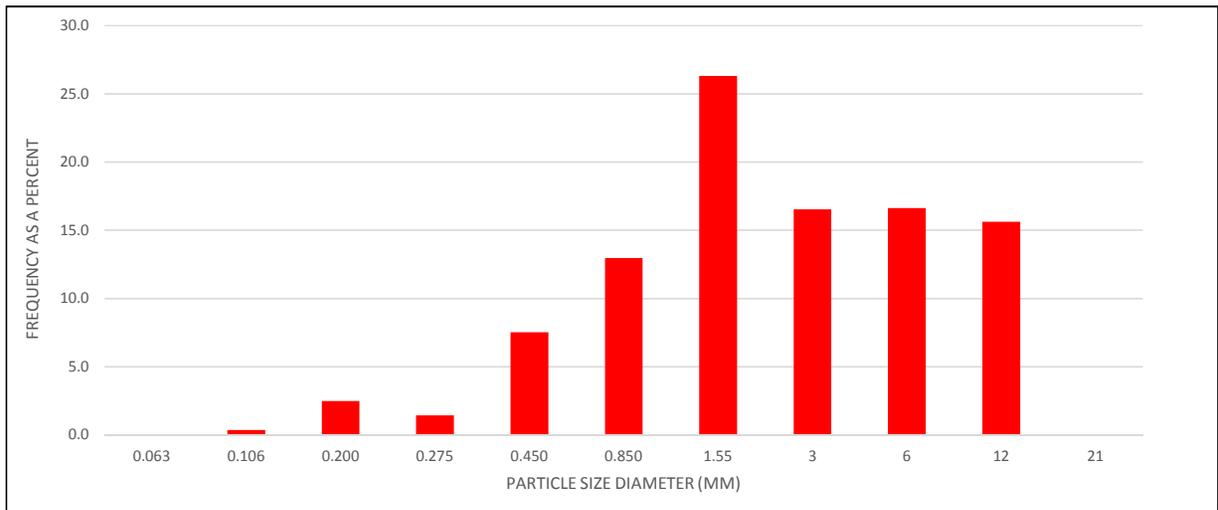
SUMMARY STATISTICS

Geometric Mean	0.7	characterizes the central portion of distribution
Standard Deviation	1.6	width of distribution, also represents sorting
Skewness	0.5	a measure of deviation from symmetry
Kurtosis	0.4	a measure of peakness or flatness of distribution
Arithmetic Mean	0.8	
Standard Deviation	0.4	
Skewness	0.4	
Kurtosis	0.5	

Transect ID: 19		Describer: KK, AG
Date: May 10, 2016		Time: 3:30 pm
Facies Type: SAND GRAVEL		
Notes:		
Material	Size Range (mm)	Mass (g)
coarse gravel	16 - 25	0.00
medium gravel	8 - 16	40.07
fine gravel	4 - 8	42.63
very fine gravel	2 - 4	42.37
very coarse sand	1.10 - 2	67.37
coarse sand	0.600 - 1.10	33.22
med to coarse sand	0.300 - 0.600	19.34
medium sand	0.250 - 0.300	3.73
fine sand	0.150 - 0.250	6.38
very fine sand	0.0625 - 0.150	0.94
mud (silt or clay)	< 0.0625	0.10
Total Mass (g):		256.15

% MUD	% SAND	% GRAVEL
0.0	51.1	48.8

FOLK CLASSIFICATION
SANDY GRAVEL



REPRESENTATIVE GRAIN SIZES (MM)

D5	0.29
D16	0.56
D25	0.87
D35	1.2
D50	1.5
D75	4.0
D84	6.0
D95	9.0

SUMMARY STATISTICS

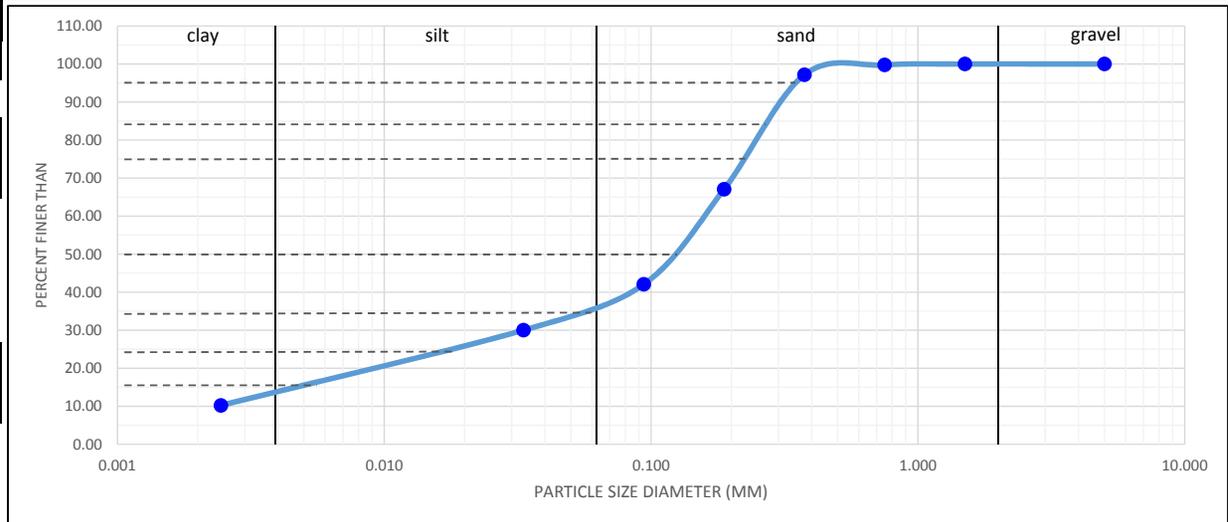
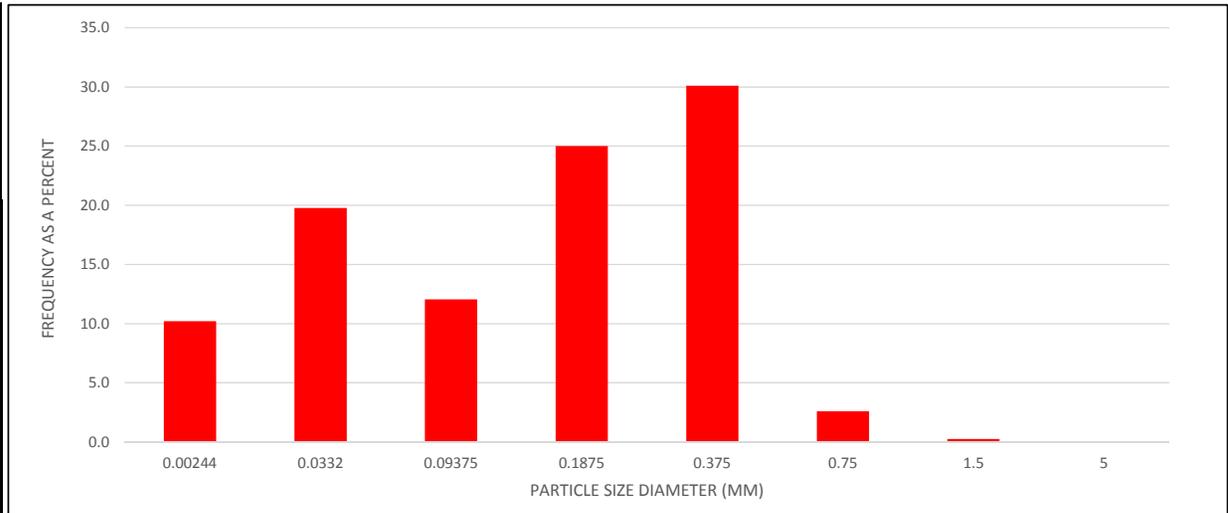
Geometric Mean	1.8	characterizes the central portion of distribution
Standard Deviation	3.3	width of distribution, also represents sorting
Skewness	0.9	a measure of deviation from symmetry
Kurtosis	0.1	a measure of peakness or flatness of distribution
Arithmetic Mean	2.7	
Standard Deviation	2.7	
Skewness	0.7	
Kurtosis	0.3	

Transect ID: 19		Describer: KK, AG
Date: May 10, 2016		Time: 3:45 pm
Facies Type: SAND SILT CLAY		
Notes:		
Material	Size Range (mm)	Mass (g)
gravel	> 2	0.00
very coarse sand	1 - 2	0.07
coarse sand	0.5 - 1	0.72
medium sand	0.25 - 0.5	8.34
fine sand	0.125 - 0.25	6.93
very fine sand	0.0625 - 0.125	3.34
silt	0.0039 - 0.0625	5.48
clay	0.00098 - 0.0039	2.83
Total Mass (g):		27.71

% CLAY	% SILT	% SAND
10.2	19.8	70.0

% GRAVEL
0.0

FOLK CLASSIFICATION
MUDDY SAND



REPRESENTATIVE GRAIN SIZES (MM)

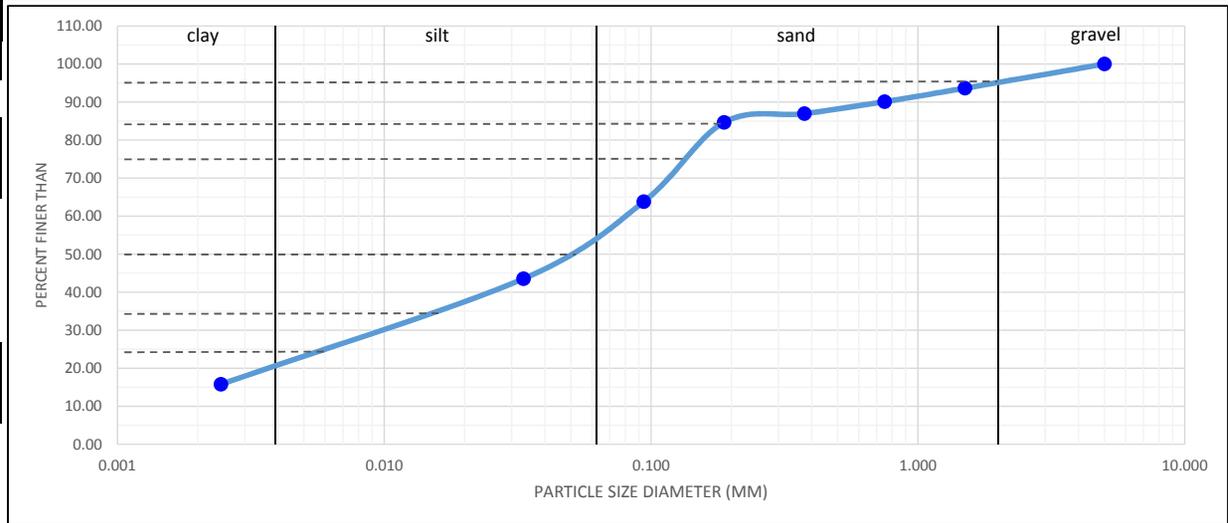
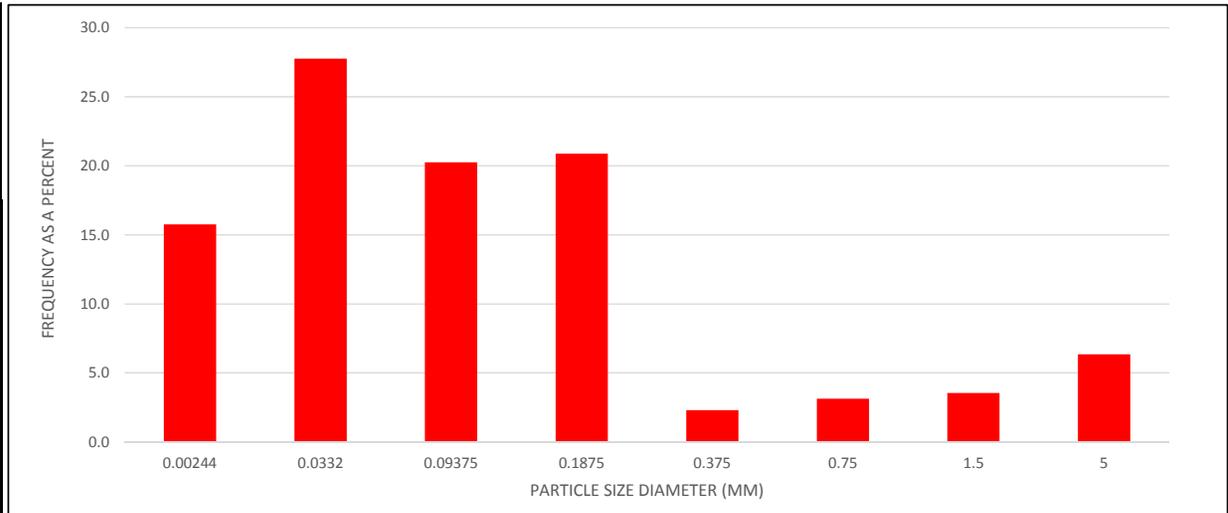
D5	--
D16	0.0053
D25	0.018
D35	0.058
D50	0.13
D75	0.22
D84	0.27
D95	0.34

Transect ID: 19		Describer: KK, AG
Date: May 10, 2016		Time: 4 pm
Facies Type: SAND SILT CLAY		
Notes:		
Material	Size Range (mm)	Mass (g)
gravel	> 2	1.54
very coarse sand	1 - 2	0.86
coarse sand	0.5 - 1	0.76
medium sand	0.25 - 0.5	0.56
fine sand	0.125 - 0.25	5.06
very fine sand	0.0625 - 0.125	4.91
silt	0.0039 - 0.0625	6.73
clay	0.00098 - 0.0039	3.82
Total Mass (g):		24.24

% CLAY	% SILT	% SAND
15.8	27.8	50.1

% GRAVEL
6.4

FOLK CLASSIFICATION
MUDDY SAND



REPRESENTATIVE GRAIN SIZES (MM)

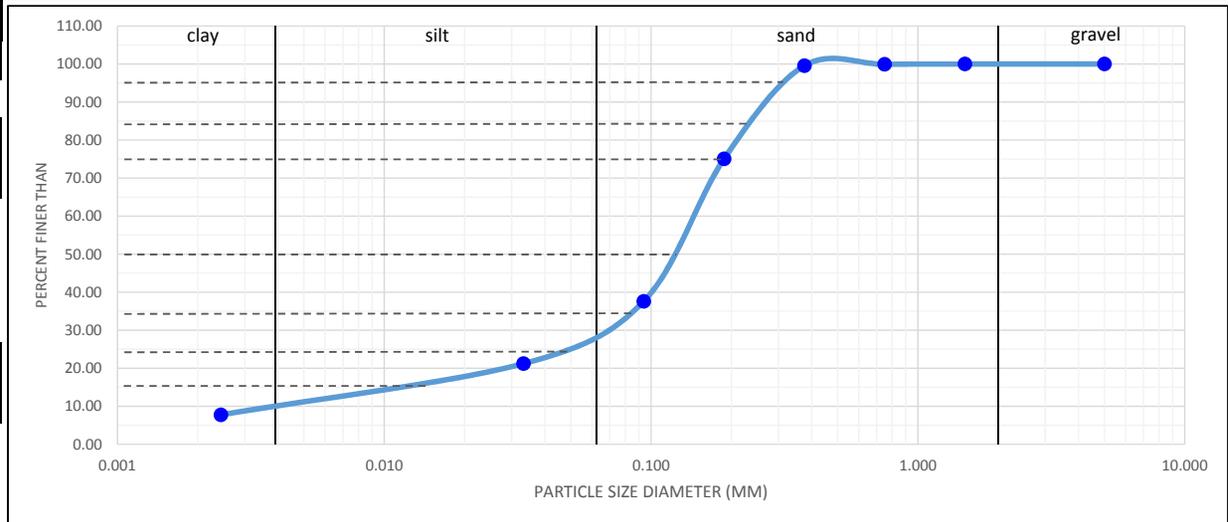
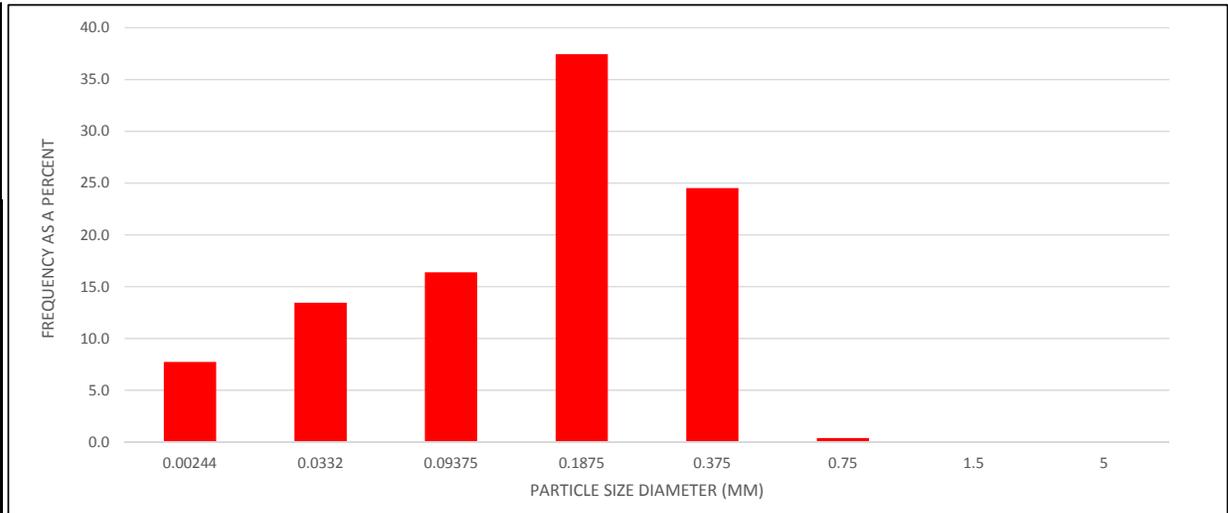
D5	--
D16	--
D25	0.0060
D35	0.016
D50	0.050
D75	0.15
D84	0.19
D95	2.00

Transect ID: 19		Describer: KK, AG
Date: May 10, 2016		Time: 4:15 pm
Facies Type: SAND SILT		
Notes:		
Material	Size Range (mm)	Mass (g)
gravel	> 2	0.00
very coarse sand	1 - 2	0.02
coarse sand	0.5 - 1	0.11
medium sand	0.25 - 0.5	7.03
fine sand	0.125 - 0.25	10.74
very fine sand	0.0625 - 0.125	4.70
silt	0.0039 - 0.0625	3.86
clay	0.00098 - 0.0039	2.22
Total Mass (g):		28.68

% CLAY	% SILT	% SAND
7.7	13.5	78.8

% GRAVEL
0.0

FOLK CLASSIFICATION
MUDDY SAND



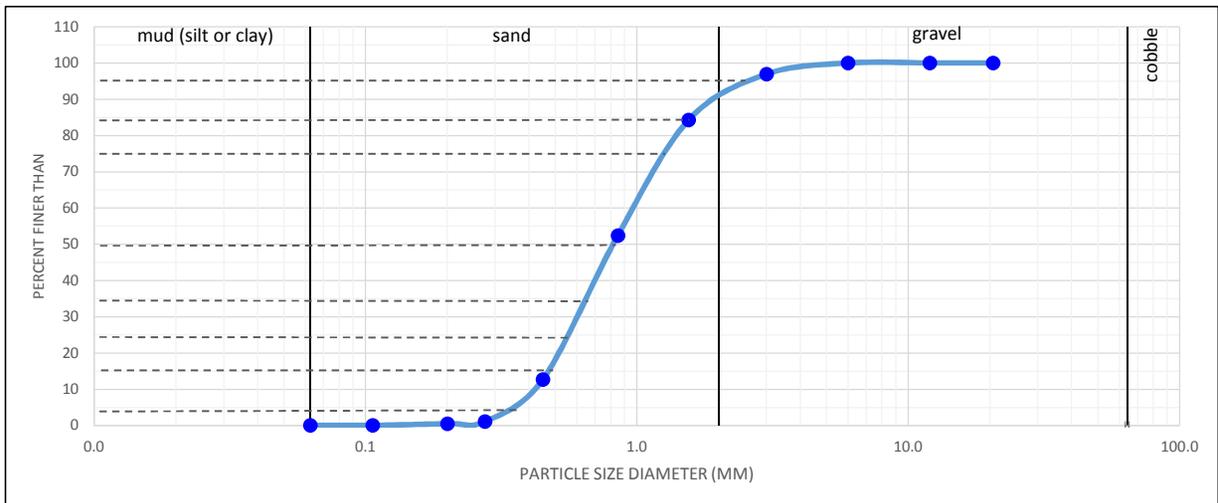
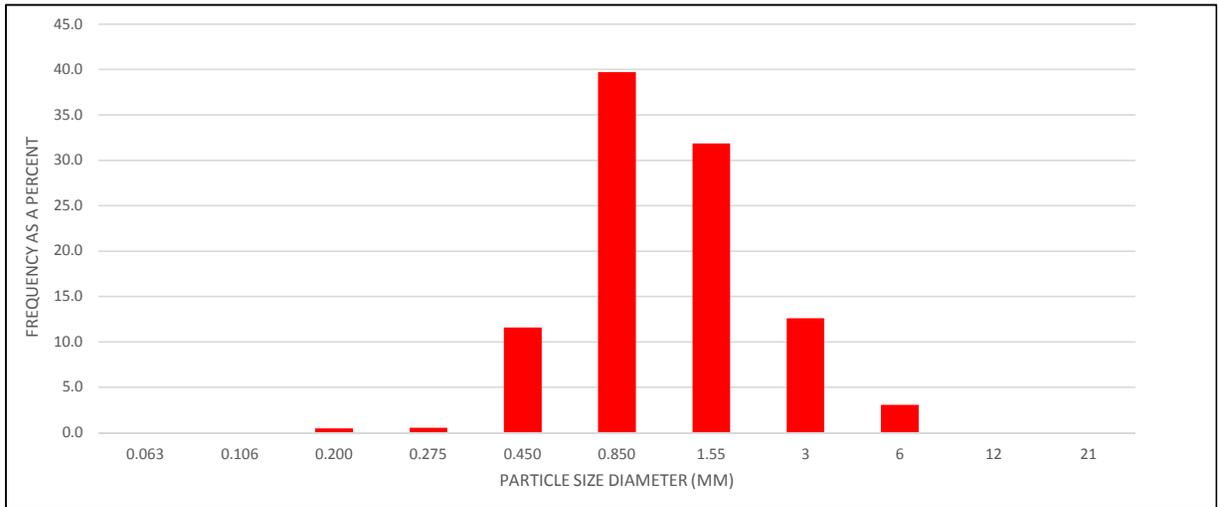
REPRESENTATIVE GRAIN SIZES (MM)

D5	--
D16	0.014
D25	0.050
D35	0.087
D50	0.13
D75	0.19
D84	0.23
D95	0.31

Transect ID: 20		Describer: KK, AG
Date: May 11, 2016		Time: 9:30 am
Facies Type: SAND GRAVEL		
Notes:		
Material	Size Range (mm)	Mass (g)
coarse gravel	16 - 25	0.00
medium gravel	8 - 16	0.00
fine gravel	4 - 8	7.54
very fine gravel	2 - 4	30.80
very coarse sand	1.10 - 2	77.90
coarse sand	0.600 - 1.10	96.99
med to coarse sand	0.300 - 0.600	28.36
medium sand	0.250 - 0.300	1.34
fine sand	0.150 - 0.250	1.16
very fine sand	0.0625 - 0.150	0.06
mud (silt or clay)	< 0.0625	0.11
Total Mass (g):		244.26

% MUD	% SAND	% GRAVEL
0.0	84.3	15.7

FOLK CLASSIFICATION
GRAVELLY SAND



REPRESENTATIVE GRAIN SIZES (MM)

D5	0.35
D16	0.49
D25	0.56
D35	0.65
D50	0.82
D75	1.3
D84	1.6
D95	2.5

SUMMARY STATISTICS

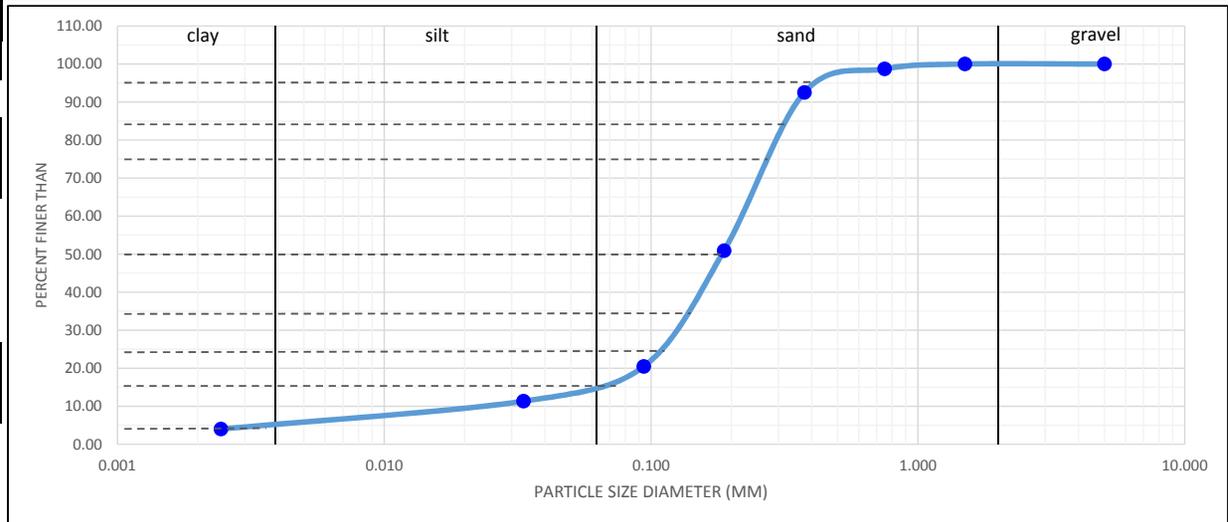
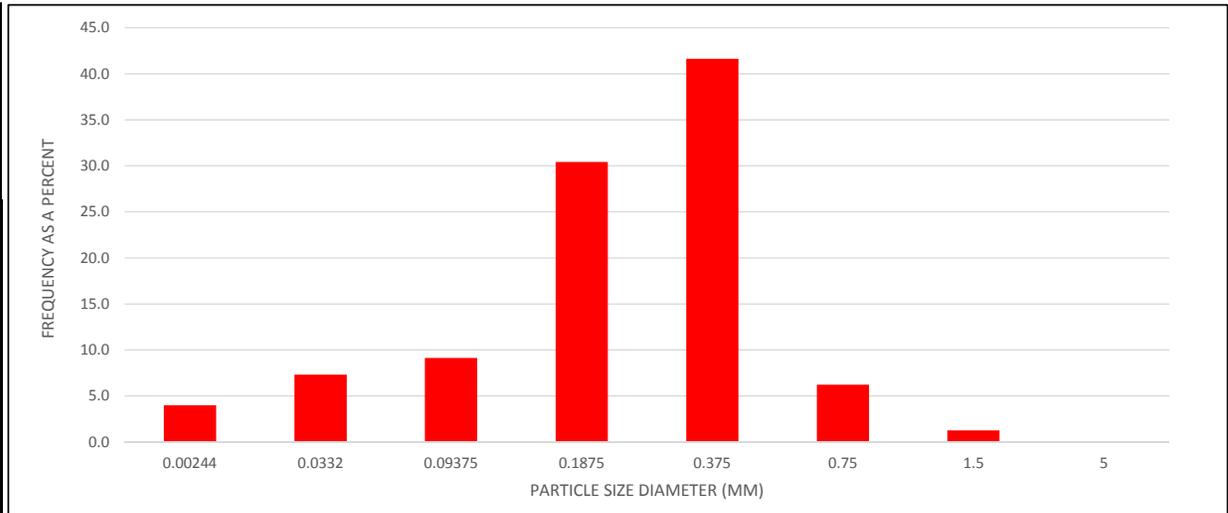
Geometric Mean	0.9	<i>characterizes the central portion of distribution</i>
Standard Deviation	1.8	<i>width of distribution, also represents sorting</i>
Skewness	0.6	<i>a measure of deviation from symmetry</i>
Kurtosis	0.4	<i>a measure of peakness or flatness of distribution</i>
Arithmetic Mean	1.0	
Standard Deviation	0.6	
Skewness	0.5	
Kurtosis	0.5	

Transect ID: 20		Describer: KK, AG
Date: May 11, 2016		Time: 9:45 am
Facies Type: SAND		
Notes:		
Material	Size Range (mm)	Mass (g)
gravel	> 2	0.00
very coarse sand	1 - 2	0.42
coarse sand	0.5 - 1	2.06
medium sand	0.25 - 0.5	13.75
fine sand	0.125 - 0.25	10.05
very fine sand	0.0625 - 0.125	3.02
silt	0.0039 - 0.0625	2.42
clay	0.00098 - 0.0039	1.32
Total Mass (g):		33.04

% CLAY	% SILT	% SAND
4.0	7.3	88.7

% GRAVEL
0.0

FOLK CLASSIFICATION
MUDDY SAND



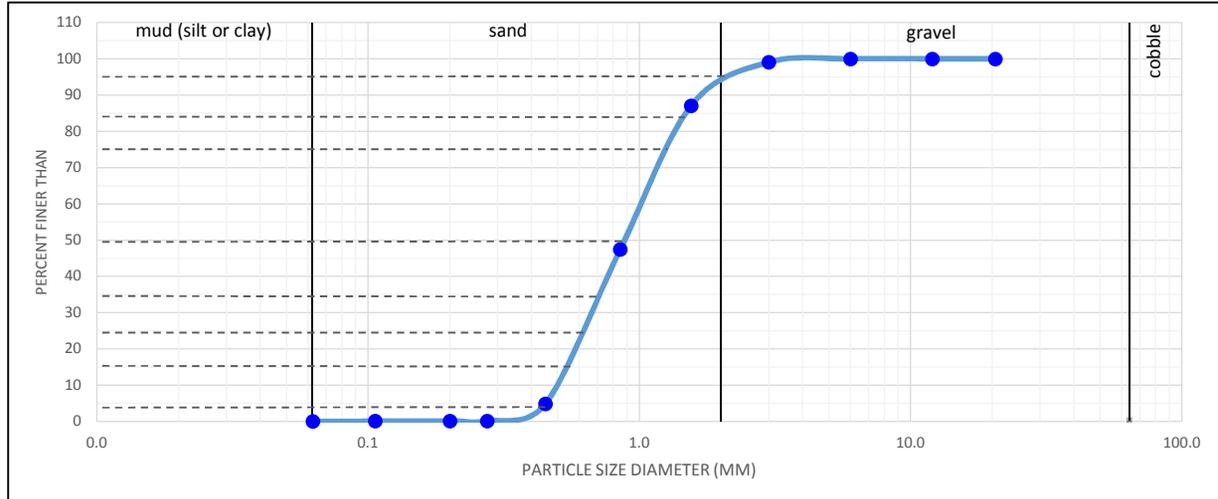
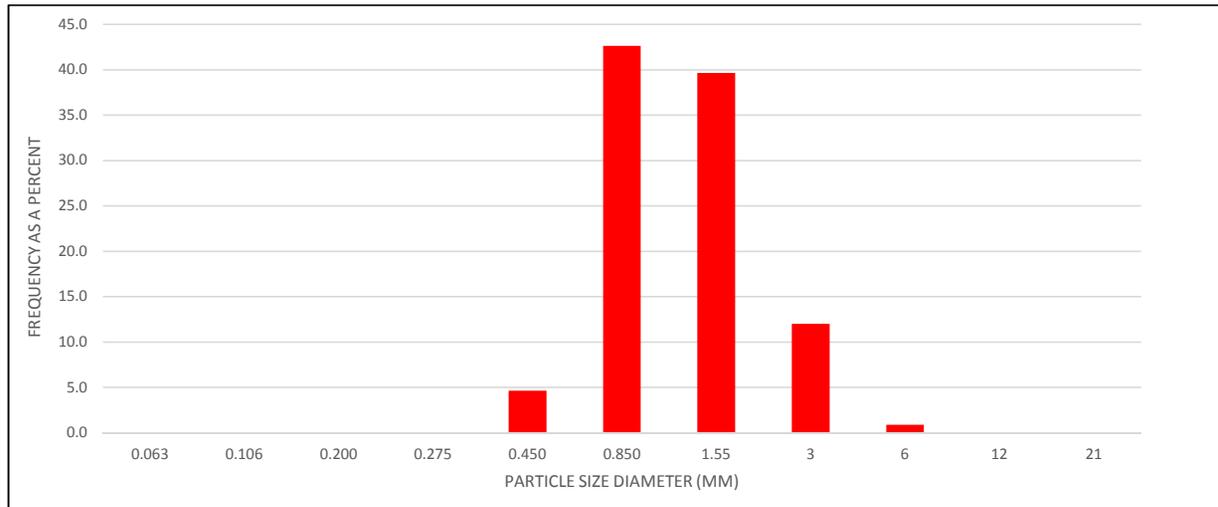
REPRESENTATIVE GRAIN SIZES (MM)

D5	0.0035
D16	0.072
D25	0.12
D35	0.15
D50	0.19
D75	0.28
D84	0.31
D95	0.41

Transect ID: 21		Describer: KK, AG
Date: May 11, 2016		Time: 12:30 pm
Facies Type: SAND GRAVEL		
Notes:		
Material	Size Range (mm)	Mass (g)
coarse gravel	16 - 25	0.00
medium gravel	8 - 16	0.00
fine gravel	4 - 8	2.25
very fine gravel	2 - 4	29.37
very coarse sand	1.10 - 2	96.74
coarse sand	0.600 - 1.10	104.05
med to coarse sand	0.300 - 0.600	11.40
medium sand	0.250 - 0.300	0.05
fine sand	0.150 - 0.250	0.13
very fine sand	0.0625 - 0.150	0.08
mud (silt or clay)	< 0.0625	0.08
Total Mass (g):		244.15

% MUD	% SAND	% GRAVEL
0.0	87.0	13.0

FOLK CLASSIFICATION
GRAVELLY SAND



REPRESENTATIVE GRAIN SIZES (MM)

D5	0.45
D16	0.55
D25	0.63
D35	0.71
D50	0.90
D75	1.3
D84	1.5
D95	2.1

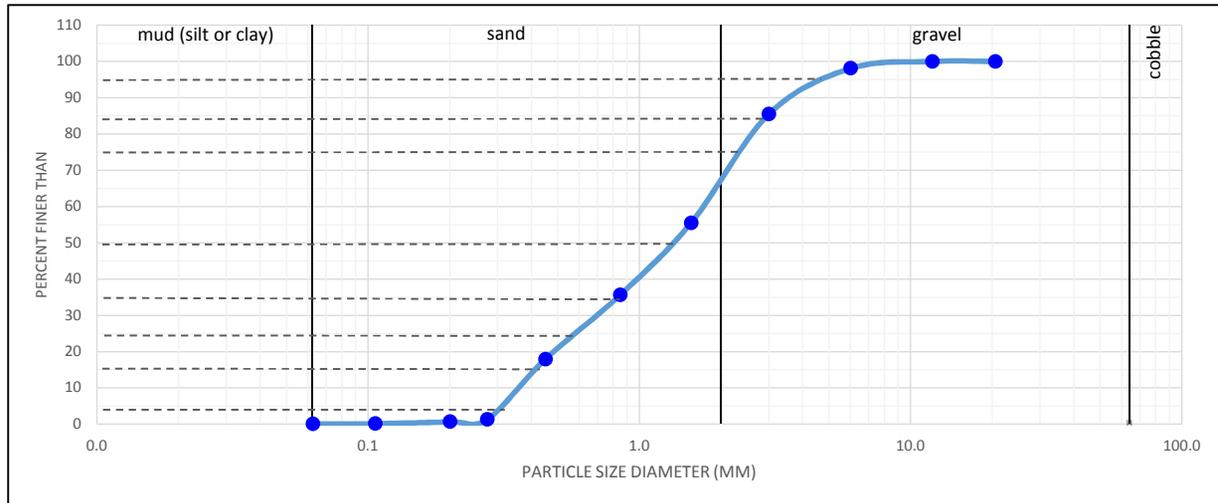
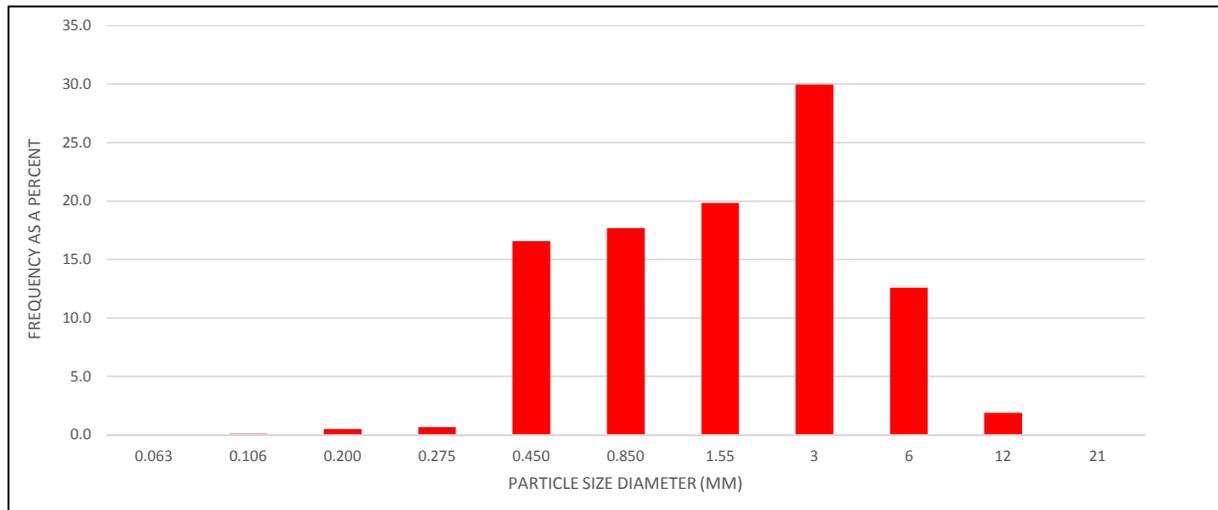
SUMMARY STATISTICS

Geometric Mean	0.9	<i>characterizes the central portion of distribution</i>
Standard Deviation	1.7	<i>width of distribution, also represents sorting</i>
Skewness	0.6	<i>a measure of deviation from symmetry</i>
Kurtosis	0.4	<i>a measure of peakness or flatness of distribution</i>
Arithmetic Mean	1.0	
Standard Deviation	0.5	
Skewness	0.4	
Kurtosis	0.5	

Transect ID: 21		Describer: KK, AG
Date: May 11, 2016		Time: 12:45 pm
Facies Type: SAND GRAVEL		
Notes:		
Material	Size Range (mm)	Mass (g)
coarse gravel	16 - 25	0.00
medium gravel	8 - 16	4.86
fine gravel	4 - 8	32.14
very fine gravel	2 - 4	76.40
very coarse sand	1.10 - 2	50.56
coarse sand	0.600 - 1.10	45.12
med to coarse sand	0.300 - 0.600	42.25
medium sand	0.250 - 0.300	1.73
fine sand	0.150 - 0.250	1.32
very fine sand	0.0625 - 0.150	0.25
mud (silt or clay)	< 0.0625	0.07
Total Mass (g):		254.70

% MUD	% SAND	% GRAVEL
0.0	55.4	44.5

FOLK CLASSIFICATION
SANDY GRAVEL



REPRESENTATIVE GRAIN SIZES (MM)

D5	0.31
D16	0.42
D25	0.58
D35	0.85
D50	1.4
D75	2.4
D84	2.9
D95	4.5

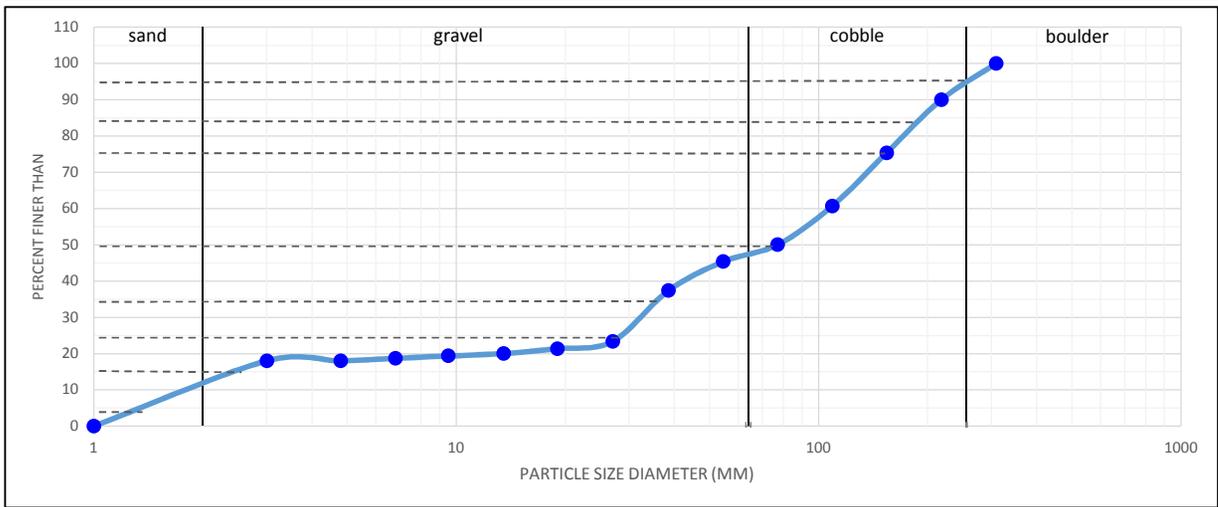
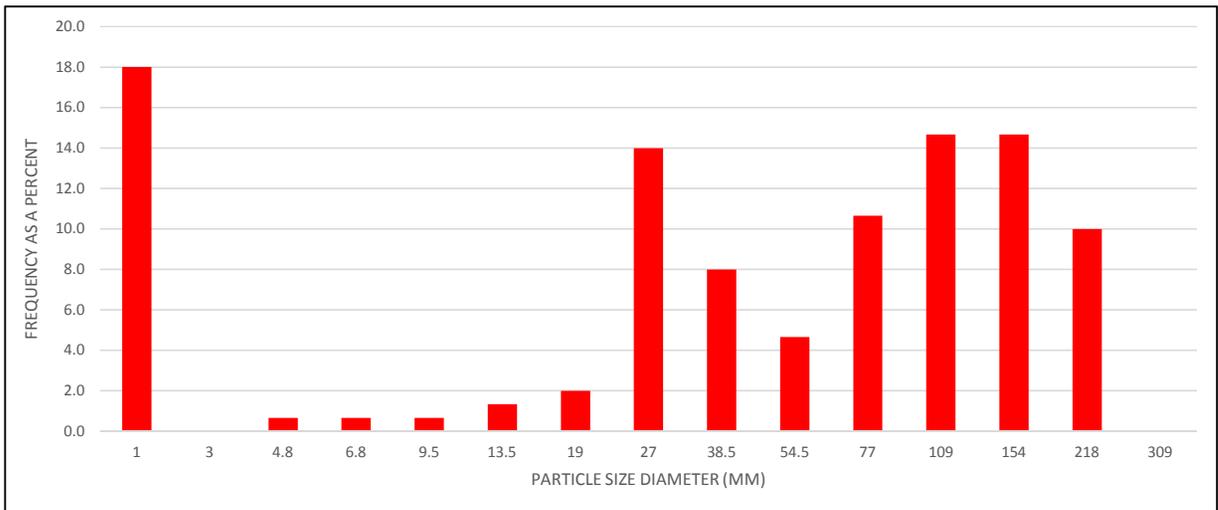
SUMMARY STATISTICS

Geometric Mean	1.1	characterizes the central portion of distribution
Standard Deviation	2.6	width of distribution, also represents sorting
Skewness	0.5	a measure of deviation from symmetry
Kurtosis	0.2	a measure of peakness or flatness of distribution
Arithmetic Mean	1.6	
Standard Deviation	1.3	
Skewness	0.3	
Kurtosis	0.4	

Transect ID: 23		Describer: KK, AG, AM
Date: May 19, 2016		Time: 9:10 am
Facies Type: COBBLE GRAVEL SAND		
Notes:		
Material	Size Range (mm)	Count
sand/silt/clay	less than 2	27
very fine gravel	2 - 4	0
fine gravel	4 - 5.6	1
fine gravel	5.6 - 8	1
medium gravel	8 - 11	1
medium gravel	11 - 16	2
coarse gravel	16 - 22	3
coarse gravel	22 - 32	21
very coarse gravel	32 - 45	12
very coarse gravel	45 - 64	7
small cobble	64 - 90	16
medium cobble	90 - 128	22
large cobble	128 - 180	22
very large cobble	180 - 256	15
boulders	greater than 256	0
Total Count:		150

% SAND	% GRAVEL	% COBBLE
18	32	50

% BOULDER
0



REPRESENTATIVE GRAIN SIZES (MM)

D5	1.3
D16	2.5
D25	28
D35	36
D50	77
D75	160
D84	185
D95	255

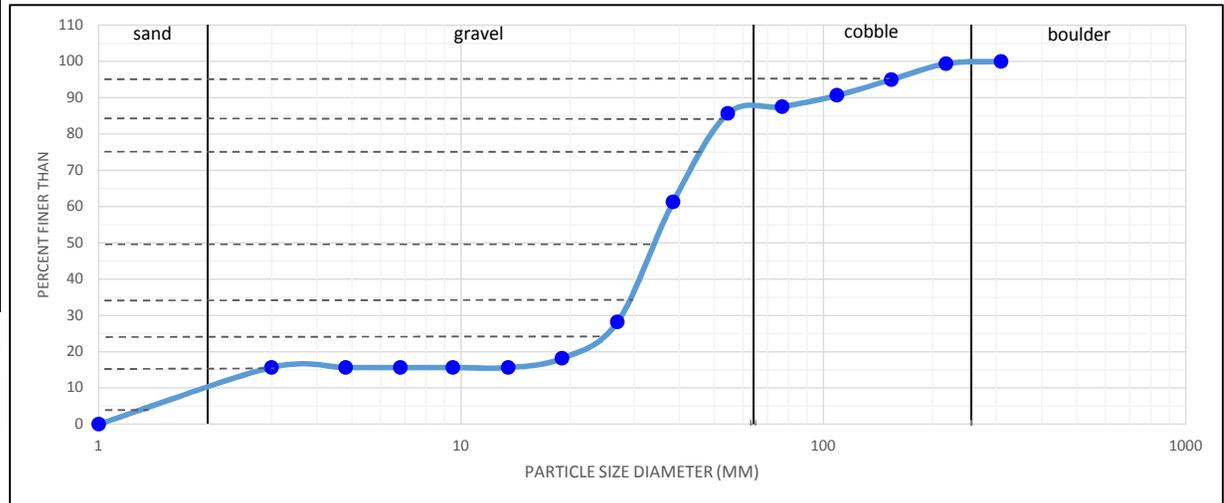
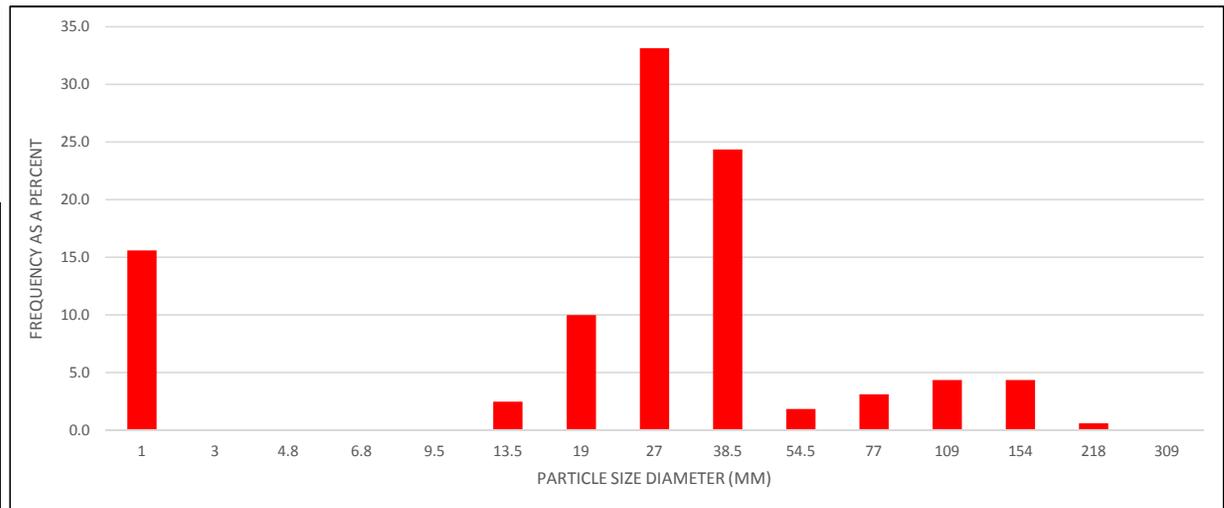
SUMMARY STATISTICS

Geometric Mean	21.5	<i>characterizes the central portion of distribution</i>
Standard Deviation	8.6	<i>width of distribution, also represents sorting</i>
Skewness	9.0	<i>a measure of deviation from symmetry</i>
Kurtosis	0.0	<i>a measure of peakness or flatness of distribution</i>
Arithmetic Mean	88.2	
Standard Deviation	84.1	
Skewness	0.3	
Kurtosis	0.0	

Transect ID: 23		Describer: KK, AG, AM
Date: May 19, 2016		Time: 9:35 am
Facies Type: GRAVEL SAND COBBLE		
Notes:		
Material	Size Range (mm)	Count
sand/silt/clay	less than 2	25
very fine gravel	2 - 4	0
fine gravel	4 - 5.6	0
fine gravel	5.6 - 8	0
medium gravel	8 - 11	0
medium gravel	11 - 16	4
coarse gravel	16 - 22	16
coarse gravel	22 - 32	53
very coarse gravel	32 - 45	39
very coarse gravel	45 - 64	3
small cobble	64 - 90	5
medium cobble	90 - 128	7
large cobble	128 - 180	7
very large cobble	180 - 256	1
boulders	greater than 256	0
Total Count:		160

% SAND	% GRAVEL	% COBBLE
16	72	13

% BOULDER
0



REPRESENTATIVE GRAIN SIZES (MM)

D5	1.4
D16	3.0
D25	25
D35	29
D50	34
D75	46
D84	52
D95	155

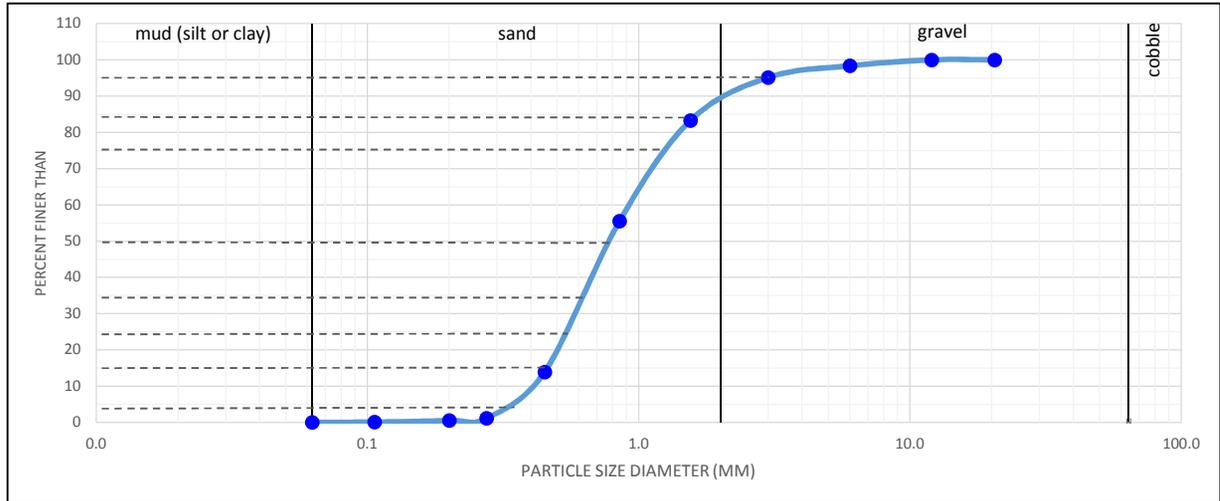
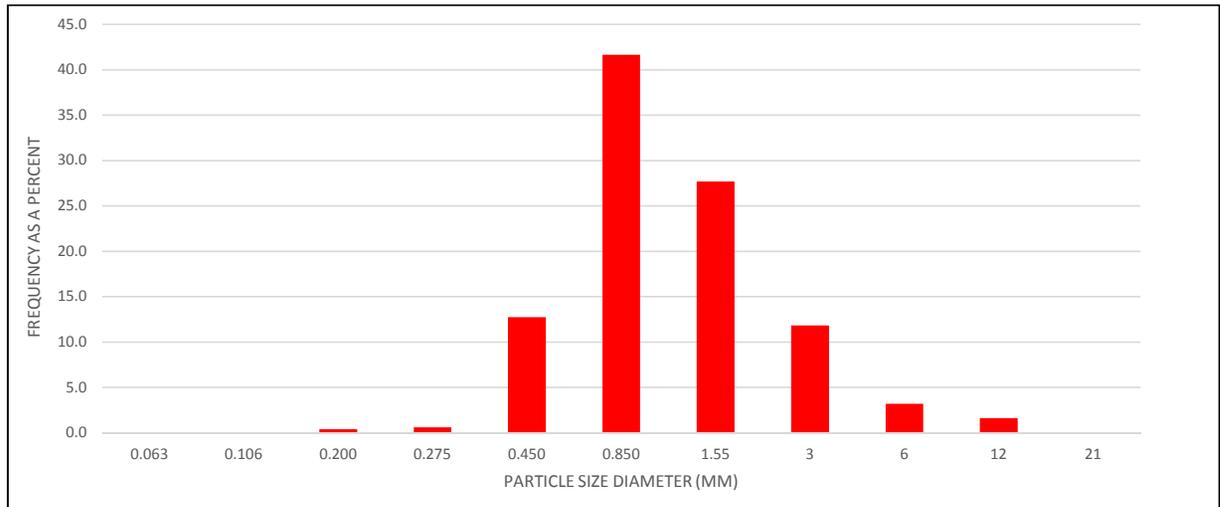
SUMMARY STATISTICS

Geometric Mean	12.5	<i>characterizes the central portion of distribution</i>
Standard Deviation	4.2	<i>width of distribution, also represents sorting</i>
Skewness	9.2	<i>a measure of deviation from symmetry</i>
Kurtosis	0.2	<i>a measure of peakness or flatness of distribution</i>
Arithmetic Mean	29.7	
Standard Deviation	35.5	
Skewness	0.2	
Kurtosis	0.1	

Transect ID: 23		Describer: KK, AG, AM
Date: May 19, 2016		Time: 9:45 am
Facies Type: SAND GRAVEL		
Notes:		
Material	Size Range (mm)	Mass (g)
coarse gravel	16 - 25	0.00
medium gravel	8 - 16	3.86
fine gravel	4 - 8	7.52
very fine gravel	2 - 4	27.71
very coarse sand	1.10 - 2	64.76
coarse sand	0.600 - 1.10	97.32
med to coarse sand	0.300 - 0.600	29.85
medium sand	0.250 - 0.300	1.48
fine sand	0.150 - 0.250	0.98
very fine sand	0.0625 - 0.150	0.18
mud (silt or clay)	< 0.0625	0.06
Total Mass (g):		233.72

% MUD	% SAND	% GRAVEL
0.0	83.2	16.7

FOLK CLASSIFICATION
GRAVELLY SAND



REPRESENTATIVE GRAIN SIZES (MM)

D5	0.33
D16	0.47
D25	0.55
D35	0.63
D50	0.78
D75	1.3
D84	1.6
D95	2.0

SUMMARY STATISTICS

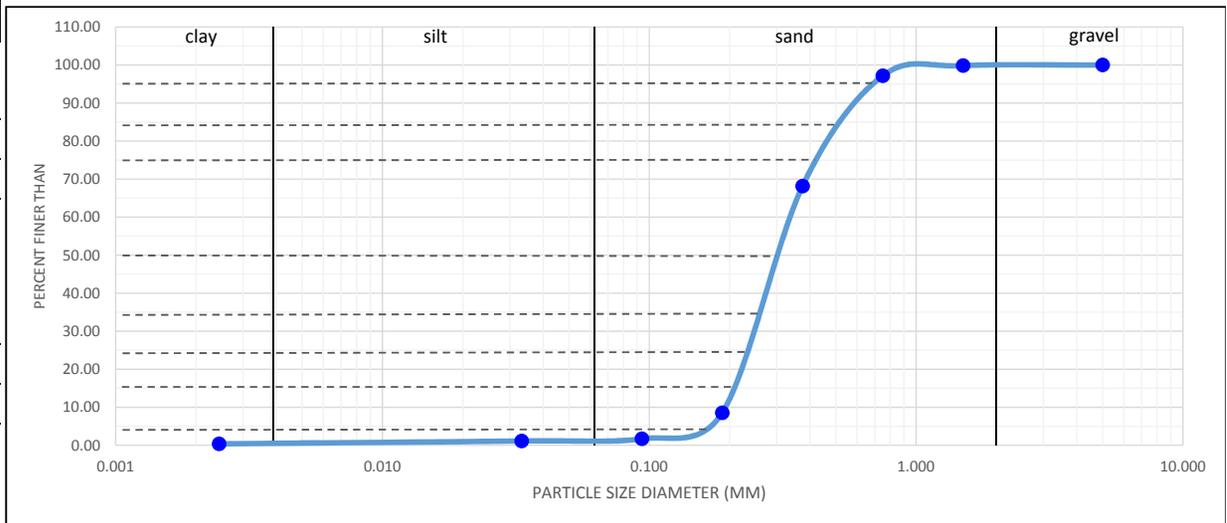
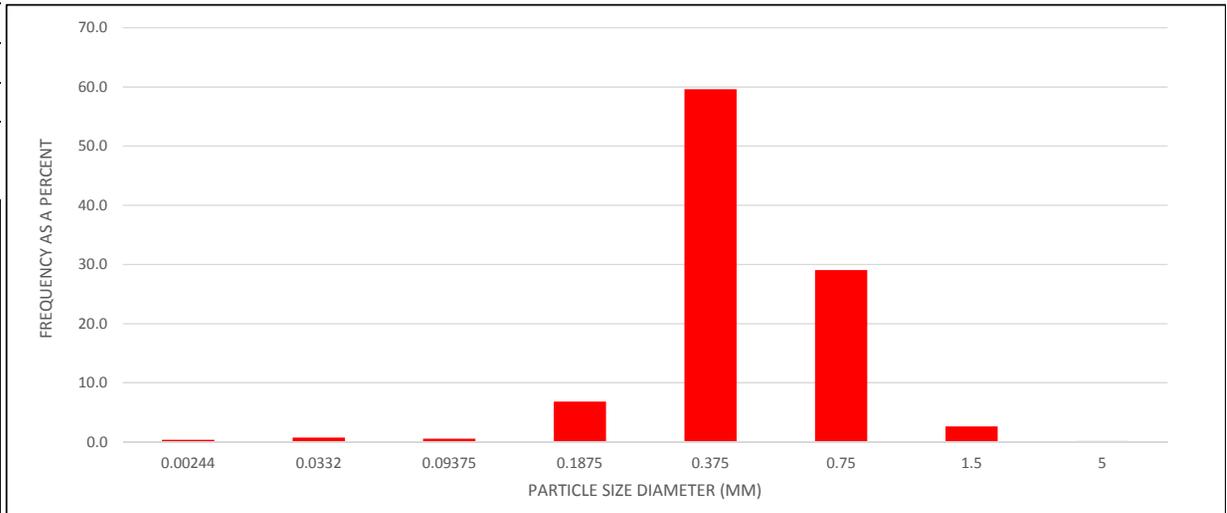
Geometric Mean	0.9	<i>characterizes the central portion of distribution</i>
Standard Deviation	1.8	<i>width of distribution, also represents sorting</i>
Skewness	0.6	<i>a measure of deviation from symmetry</i>
Kurtosis	0.4	<i>a measure of peakness or flatness of distribution</i>
Arithmetic Mean	1.0	
Standard Deviation	0.5	
Skewness	0.5	
Kurtosis	0.4	

Transect ID: 23		Describer: KK, AG, AM
Date: May 19, 2016		Time: 10 am
Facies Type: SAND		
Notes:		
Material	Size Range (mm)	Mass (g)
gravel	> 2	0.07
very coarse sand	1 - 2	1.06
coarse sand	0.5 - 1	11.62
medium sand	0.25 - 0.5	23.84
fine sand	0.125 - 0.25	2.73
very fine sand	0.0625 - 0.125	0.23
silt	0.0039 - 0.0625	0.30
clay	0.00098 - 0.0039	0.15
Total Mass (g):		40.00

% CLAY	% SILT	% SAND
0.4	0.8	98.7

% GRAVEL
0.2

FOLK CLASSIFICATION
SAND



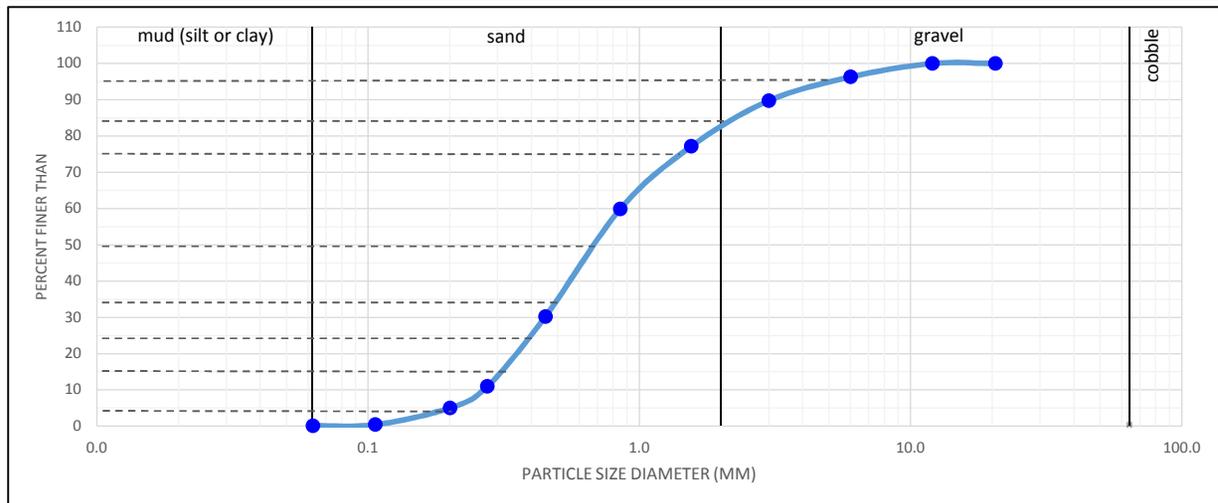
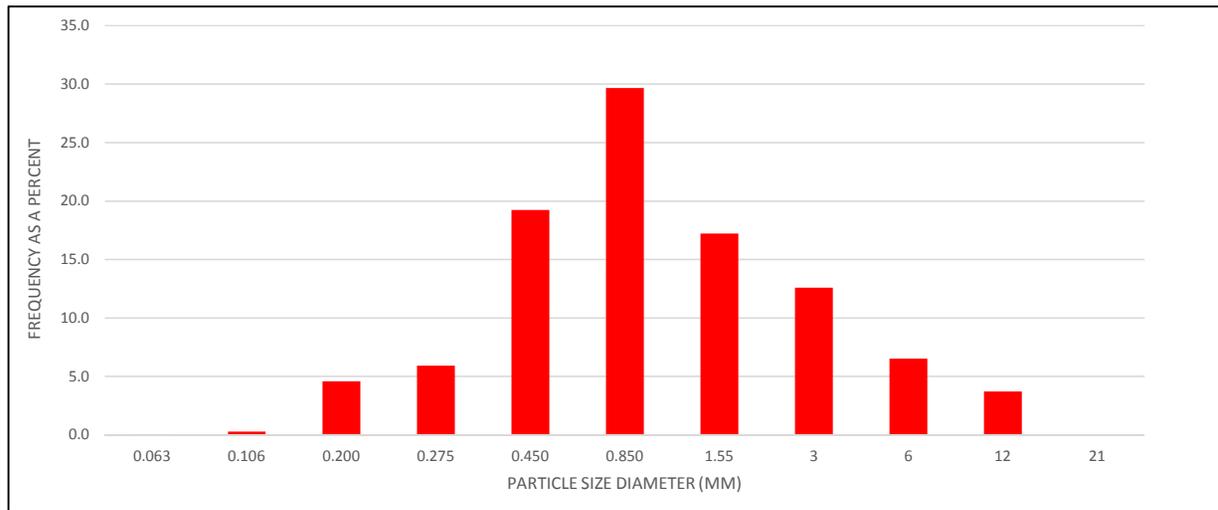
REPRESENTATIVE GRAIN SIZES (MM)

D5	0.17
D16	0.21
D25	0.23
D35	0.26
D50	0.30
D75	0.41
D84	0.50
D95	0.69

Transect ID: 25		Describer: KK, AG
Date: May 19, 2016		Time: 1:30 pm
Facies Type: SAND GRAVEL		
Notes:		
Material	Size Range (mm)	Mass (g)
coarse gravel	16 - 25	0.00
medium gravel	8 - 16	8.96
fine gravel	4 - 8	15.68
very fine gravel	2 - 4	30.22
very coarse sand	1.10 - 2	41.30
coarse sand	0.600 - 1.10	71.16
med to coarse sand	0.300 - 0.600	46.14
medium sand	0.250 - 0.300	14.22
fine sand	0.150 - 0.250	11.02
very fine sand	0.0625 - 0.150	0.72
mud (silt or clay)	< 0.0625	0.22
Total Mass (g):		239.64

% MUD	% SAND	% GRAVEL
0.1	77.0	22.9

FOLK CLASSIFICATION
GRAVELLY SAND



REPRESENTATIVE GRAIN SIZES (MM)

D5	0.20
D16	0.32
D25	0.40
D35	0.50
D50	0.69
D75	1.4
D84	2.2
D95	5.0

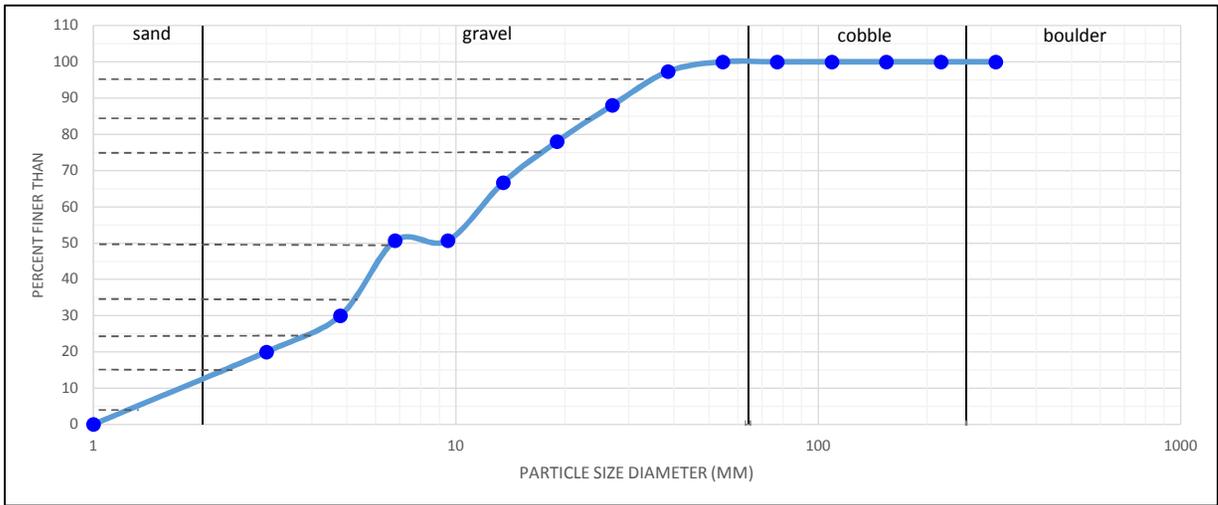
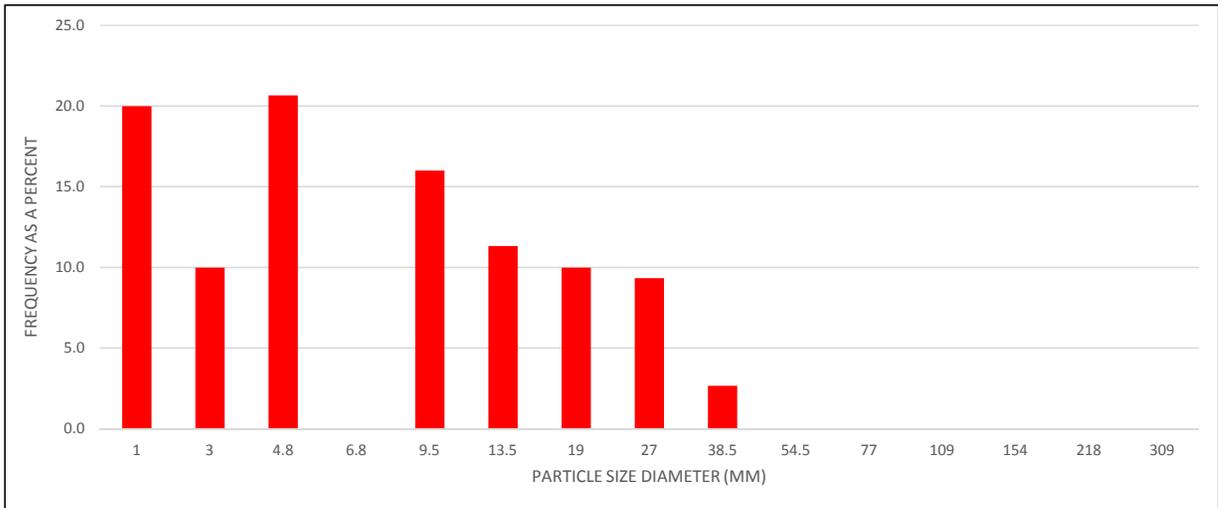
SUMMARY STATISTICS

Geometric Mean	0.8	characterizes the central portion of distribution
Standard Deviation	2.6	width of distribution, also represents sorting
Skewness	0.4	a measure of deviation from symmetry
Kurtosis	0.2	a measure of peakness or flatness of distribution
Arithmetic Mean	1.1	
Standard Deviation	1.2	
Skewness	0.7	
Kurtosis	0.7	

Transect ID: 26		Describer: KK, AG, AM
Date: May 19, 2016		Time: 4:15 pm
Facies Type: GRAVEL SAND		
Notes:		
Material	Size Range (mm)	Count
sand/silt/clay	less than 2	30
very fine gravel	2 - 4	15
fine gravel	4 - 5.6	31
fine gravel	5.6 - 8	0
medium gravel	8 - 11	24
medium gravel	11 - 16	17
coarse gravel	16 - 22	15
coarse gravel	22 - 32	14
very coarse gravel	32 - 45	4
very coarse gravel	45 - 64	0
small cobble	64 - 90	0
medium cobble	90 - 128	0
large cobble	128 - 180	0
very large cobble	180 - 256	0
boulders	greater than 256	0
Total Count:		150

% SAND	% GRAVEL	% COBBLE
20	80	0

% BOULDER
0



REPRESENTATIVE GRAIN SIZES (MM)

D5	1.3
D16	2.3
D25	3.9
D35	5.3
D50	6.6
D75	18
D84	23
D95	33

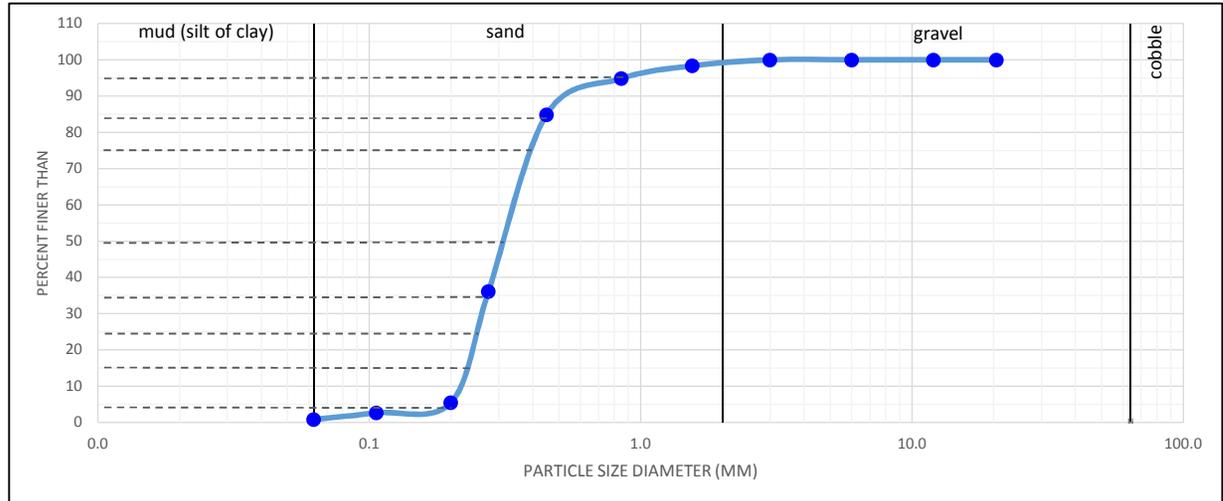
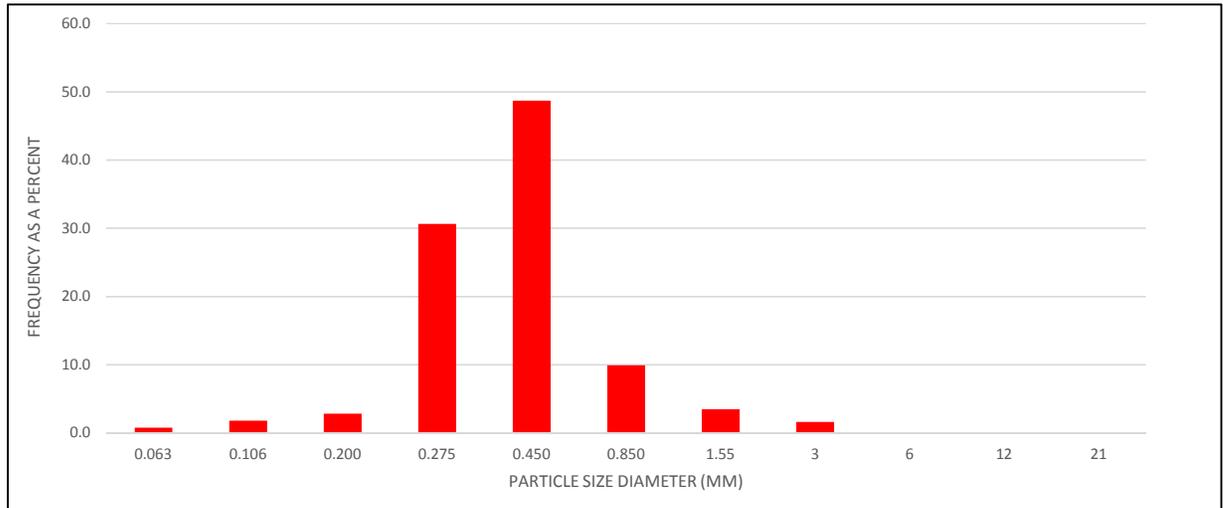
SUMMARY STATISTICS

Geometric Mean	7.3	<i>characterizes the central portion of distribution</i>
Standard Deviation	3.2	<i>width of distribution, also represents sorting</i>
Skewness	3.4	<i>a measure of deviation from symmetry</i>
Kurtosis	0.1	<i>a measure of peakness or flatness of distribution</i>
Arithmetic Mean	10.6	
Standard Deviation	10.0	
Skewness	0.6	
Kurtosis	0.3	

Transect ID: 26		Describer: KK, AG, AM
Date: May 19, 2016		Time: 4:30 pm
Facies Type: SAND		
Notes:		
Material	Size Range (mm)	Mass (g)
coarse gravel	16 - 25	0.00
medium gravel	8 - 16	0.00
fine gravel	4 - 8	0.00
very fine gravel	2 - 4	2.54
very coarse sand	1.10 - 2	5.41
coarse sand	0.600 - 1.10	15.38
med to coarse sand	0.300 - 0.600	75.33
medium sand	0.250 - 0.300	47.38
fine sand	0.150 - 0.250	4.38
very fine sand	0.0625 - 0.150	2.82
mud (silt or clay)	< 0.0625	1.25
Total Mass (g):		154.49

% MUD	% SAND	% GRAVEL
0.8	97.5	1.6

FOLK CLASSIFICATION
SAND



REPRESENTATIVE GRAIN SIZES (MM)

D5	0.20
D16	0.23
D25	0.25
D35	0.27
D50	0.31
D75	0.39
D84	0.44
D95	0.85

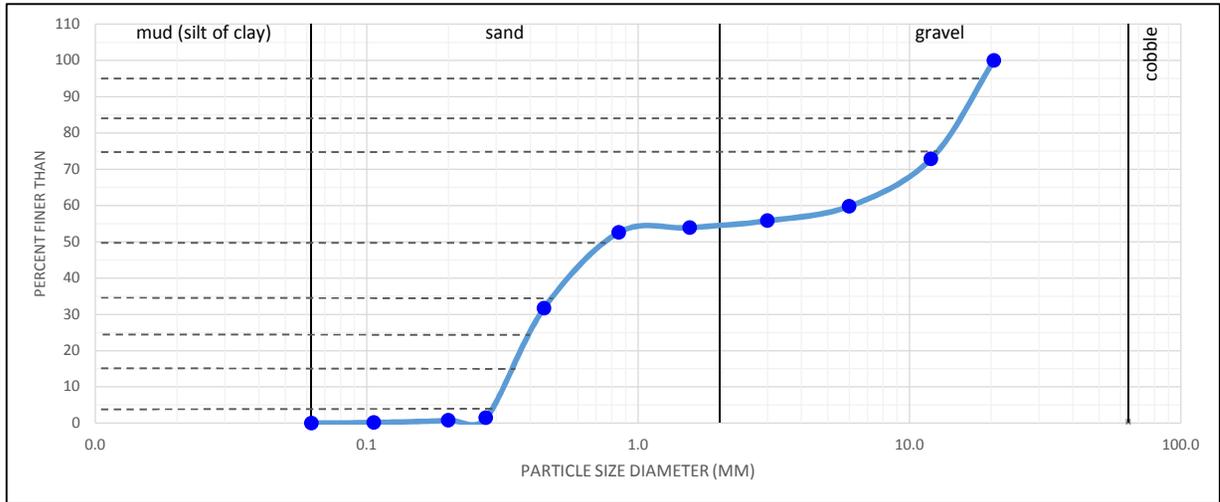
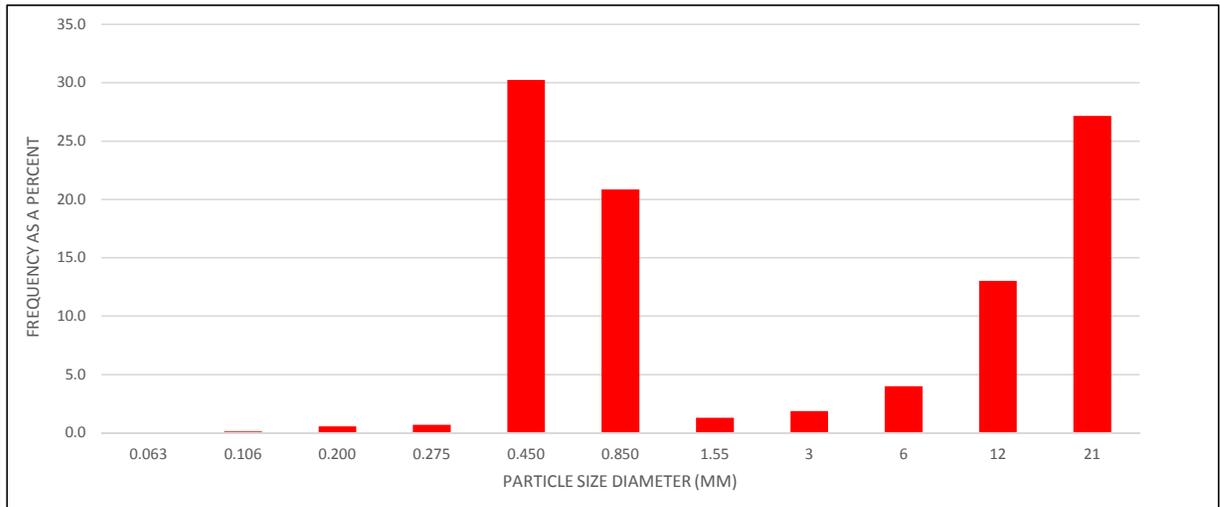
SUMMARY STATISTICS

Geometric Mean	0.3	characterizes the central portion of distribution
Standard Deviation	1.4	width of distribution, also represents sorting
Skewness	0.3	a measure of deviation from symmetry
Kurtosis	0.6	a measure of peakness or flatness of distribution
Arithmetic Mean	0.3	
Standard Deviation	0.2	
Skewness	0.4	
Kurtosis	0.7	

Transect ID: 26		Describer: KK, AG, AM
Date: May 19, 2016		Time: 4:45 pm
Facies Type: SAND GRAVEL		
Notes:		
Material	Size Range (mm)	Mass (g)
coarse gravel	16 - 25	69.14
medium gravel	8 - 16	33.16
fine gravel	4 - 8	10.23
very fine gravel	2 - 4	4.79
very coarse sand	1.10 - 2	3.35
coarse sand	0.600 - 1.10	53.14
med to coarse sand	0.300 - 0.600	77.00
medium sand	0.250 - 0.300	1.78
fine sand	0.150 - 0.250	1.46
very fine sand	0.0625 - 0.150	0.36
mud (silt or clay)	< 0.0625	0.04
Total Mass (g):		254.45

% MUD	% SAND	% GRAVEL
0.0	53.9	46.1

FOLK CLASSIFICATION
SANDY GRAVEL



REPRESENTATIVE GRAIN SIZES (MM)

D5	0.29
D16	0.35
D25	0.40
D35	0.49
D50	0.75
D75	13
D84	16
D95	18

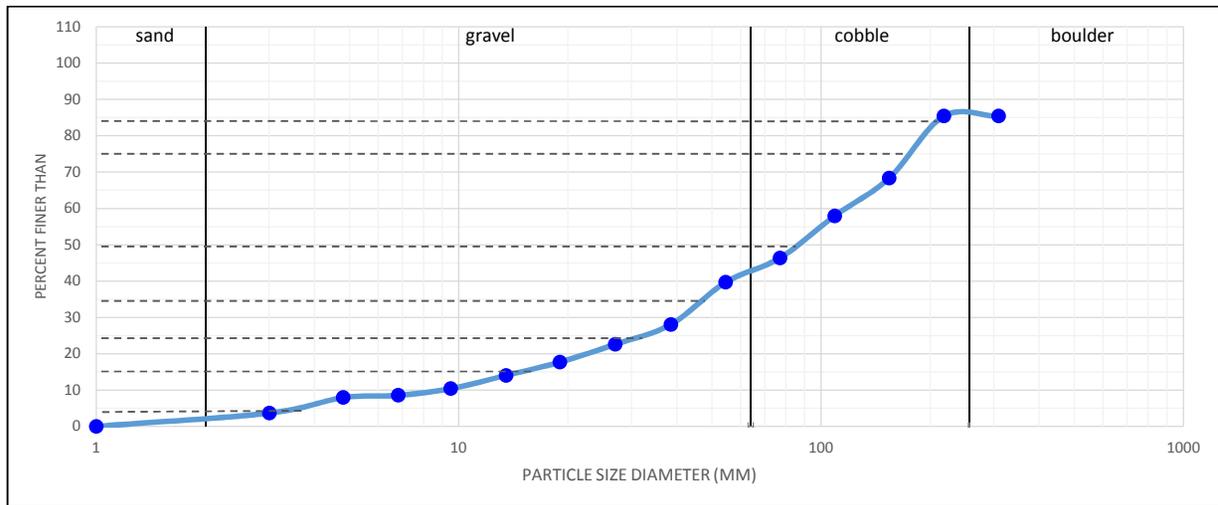
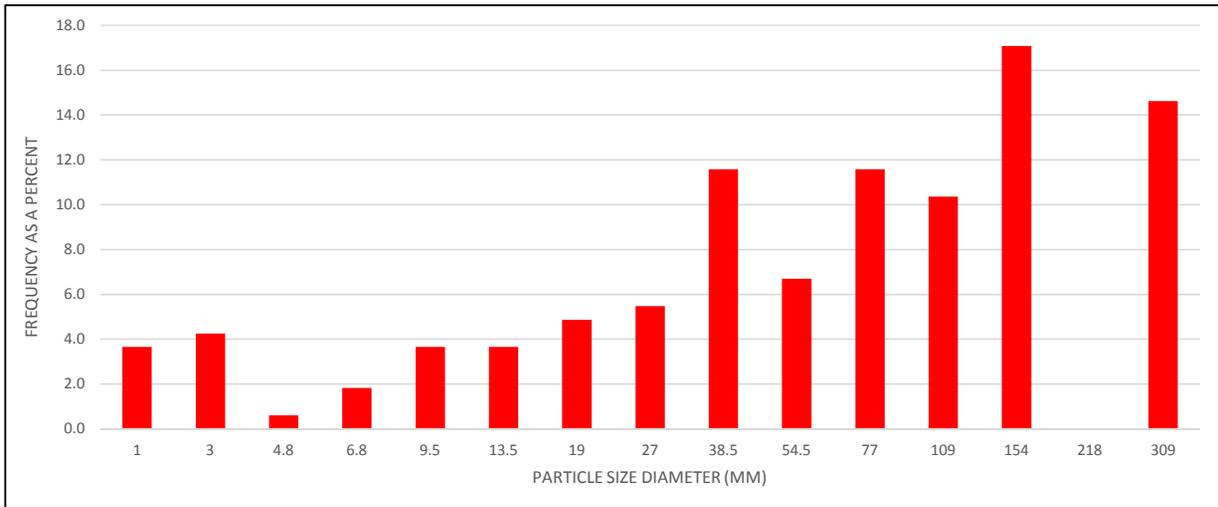
SUMMARY STATISTICS

Geometric Mean	2.4	characterizes the central portion of distribution
Standard Deviation	6.8	width of distribution, also represents sorting
Skewness	0.4	a measure of deviation from symmetry
Kurtosis	0.0	a measure of peakness or flatness of distribution
Arithmetic Mean	5.7	
Standard Deviation	6.6	
Skewness	0.9	
Kurtosis	0.4	

Transect ID: REF A		Describer: KK, AM
Date: May 18, 2016		Time: 4:30 pm
Facies Type: GRAVEL COBBLE BOULDER		
Notes:		
Material	Size Range (mm)	Count
sand/silt/clay	less than 2	6
very fine gravel	2 - 4	7
fine gravel	4 - 5.6	1
fine gravel	5.6 - 8	3
medium gravel	8 - 11	6
medium gravel	11 - 16	6
coarse gravel	16 - 22	8
coarse gravel	22 - 32	9
very coarse gravel	32 - 45	19
very coarse gravel	45 - 64	11
small cobble	64 - 90	19
medium cobble	90 - 128	17
large cobble	128 - 180	28
very large cobble	180 - 256	0
boulders	greater than 256	24
Total Count:		164

% SAND	% GRAVEL	% COBBLE
4	43	39

% BOULDER
15



REPRESENTATIVE GRAIN SIZES (MM)

D5	3.7
D16	16
D25	32
D35	48
D50	85
D75	180
D84	205
D95	--

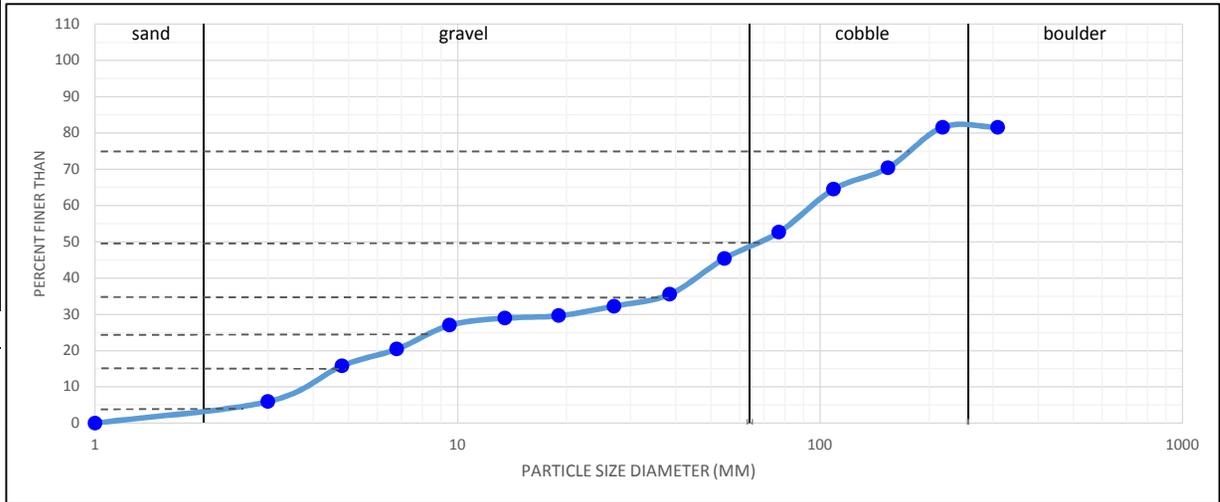
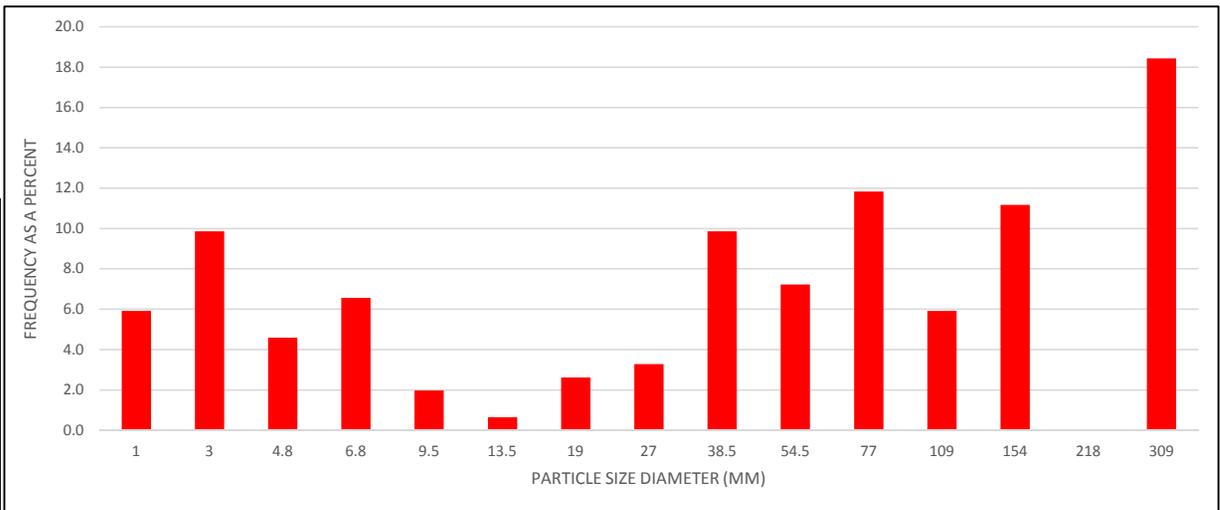
SUMMARY STATISTICS

Geometric Mean	57.3	characterizes the central portion of distribution
Standard Deviation	3.6	width of distribution, also represents sorting
Skewness	24.1	a measure of deviation from symmetry
Kurtosis	0.1	a measure of peakness or flatness of distribution
Arithmetic Mean	102.0	
Standard Deviation	--	
Skewness	--	
Kurtosis	--	

Transect ID: REF B		Describer: KK, AM, AG
Date: May 18, 2016		Time: 2 pm
Facies Type: GRAVEL COBBLE BOULDER		
Notes:		
Material	Size Range (mm)	Count
sand/silt/clay	less than 2	9
very fine gravel	2 - 4	15
fine gravel	4 - 5.6	7
fine gravel	5.6 - 8	10
medium gravel	8 - 11	3
medium gravel	11 - 16	1
coarse gravel	16 - 22	4
coarse gravel	22 - 32	5
very coarse gravel	32 - 45	15
very coarse gravel	45 - 64	11
small cobble	64 - 90	18
medium cobble	90 - 128	9
large cobble	128 - 180	17
very large cobble	180 - 256	0
boulders	greater than 256	28
Total Count:		152

% SAND	% GRAVEL	% COBBLE
6	47	29

% BOULDER
18



REPRESENTATIVE GRAIN SIZES (MM)

D5	2.5
D16	4.8
D25	8.3
D35	38
D50	69
D75	180
D84	--
D95	--

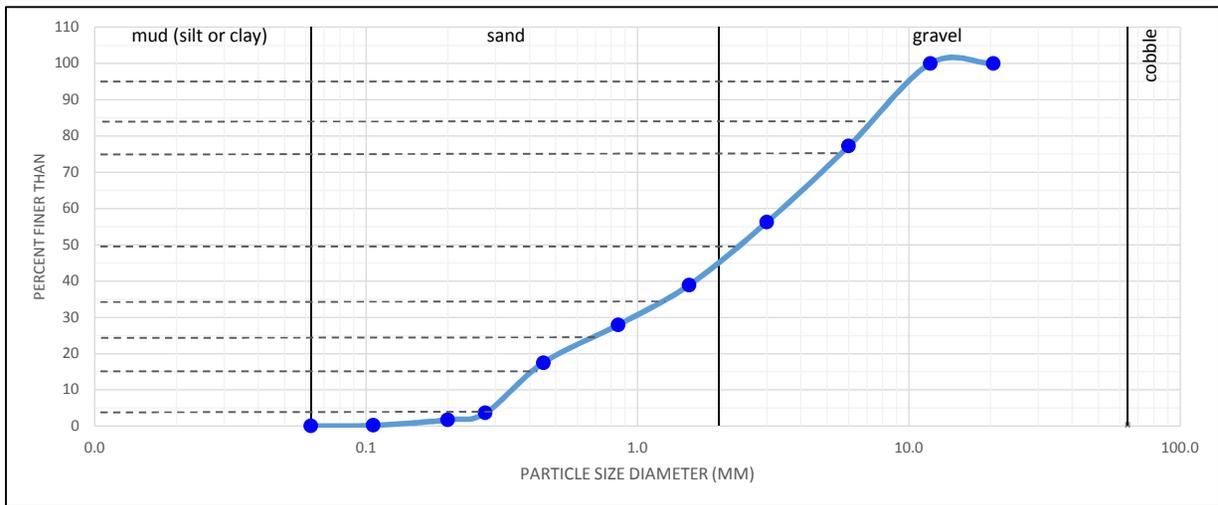
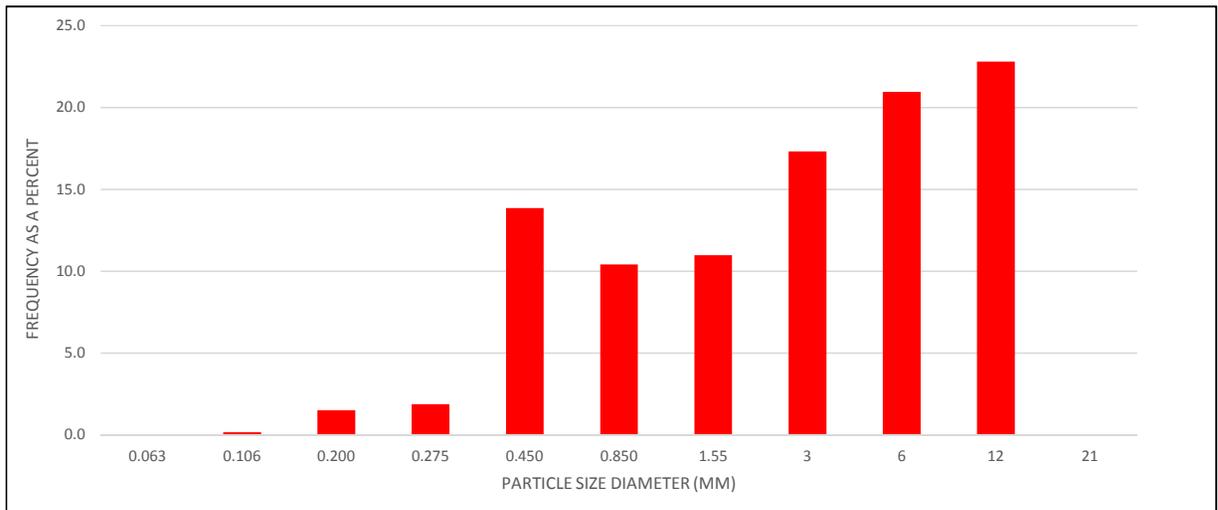
SUMMARY STATISTICS

Geometric Mean	--	<i>characterizes the central portion of distribution</i>
Standard Deviation	--	<i>width of distribution, also represents sorting</i>
Skewness	--	<i>a measure of deviation from symmetry</i>
Kurtosis	--	<i>a measure of peakness or flatness of distribution</i>
Arithmetic Mean	--	
Standard Deviation	--	
Skewness	--	
Kurtosis	--	

Transect ID: C		Describer: KK, AG
Date: May 12, 2016		Time: 9 am
Facies Type: GRAVEL SAND		
Notes:		
Material	Size Range (mm)	Mass (g)
coarse gravel	16 - 25	0.00
medium gravel	8 - 16	40.06
fine gravel	4 - 8	36.82
very fine gravel	2 - 4	30.46
very coarse sand	1.10 - 2	19.30
coarse sand	0.600 - 1.10	18.31
med to coarse sand	0.300 - 0.600	24.36
medium sand	0.250 - 0.300	3.33
fine sand	0.150 - 0.250	2.67
very fine sand	0.0625 - 0.150	0.32
mud (silt or clay)	< 0.0625	0.04
Total Mass (g):		175.67

% MUD	% SAND	% GRAVEL
0.0	38.9	61.1

FOLK CLASSIFICATION
SANDY GRAVEL



REPRESENTATIVE GRAIN SIZES (MM)

D5	0.29
D16	0.42
D25	0.70
D35	1.3
D50	2.4
D75	5.6
D84	7.2
D95	9.9

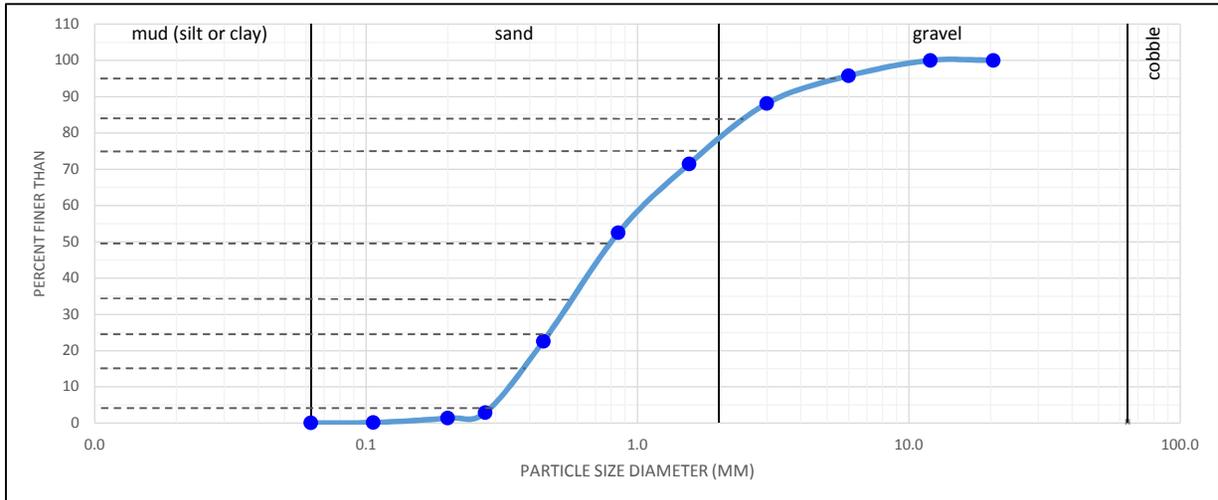
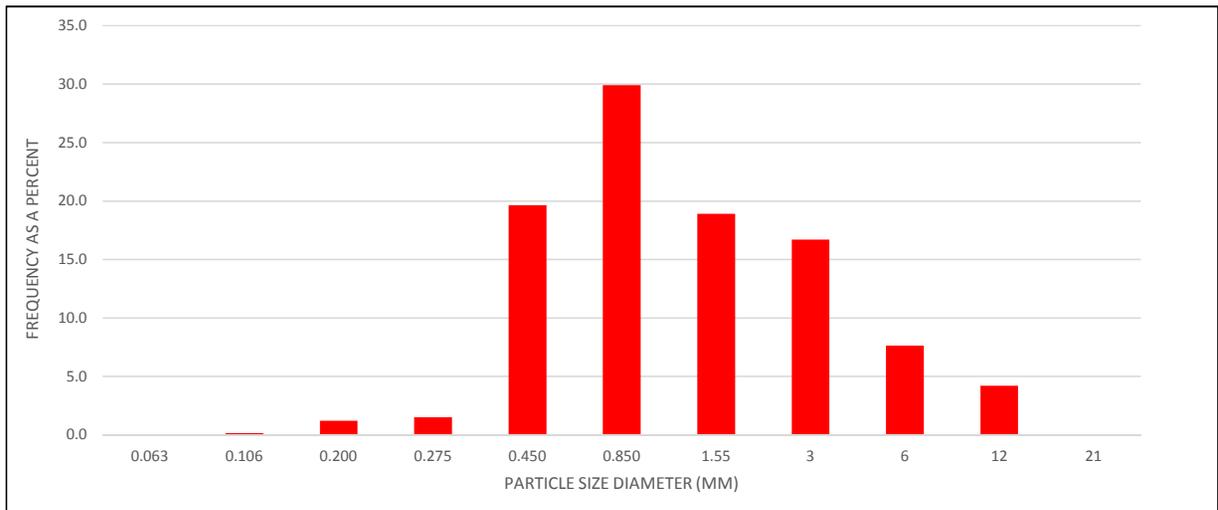
SUMMARY STATISTICS

Geometric Mean	1.7	characterizes the central portion of distribution
Standard Deviation	4.1	width of distribution, also represents sorting
Skewness	0.6	a measure of deviation from symmetry
Kurtosis	0.1	a measure of peakness or flatness of distribution
Arithmetic Mean	3.3	
Standard Deviation	3.2	
Skewness	0.5	
Kurtosis	0.3	

Transect ID: C		Describer: KK, AG
Date: May 12, 2016		Time: 9:15 am
Facies Type: SAND GRAVEL		
Notes:		
Material	Size Range (mm)	Mass (g)
coarse gravel	16 - 25	0.00
medium gravel	8 - 16	10.47
fine gravel	4 - 8	19.00
very fine gravel	2 - 4	41.53
very coarse sand	1.10 - 2	47.03
coarse sand	0.600 - 1.10	74.40
med to coarse sand	0.300 - 0.600	48.84
medium sand	0.250 - 0.300	3.78
fine sand	0.150 - 0.250	3.03
very fine sand	0.0625 - 0.150	0.38
mud (silt or clay)	< 0.0625	0.04
Total Mass (g):		248.50

% MUD	% SAND	% GRAVEL
0.0	71.4	28.6

FOLK CLASSIFICATION
GRAVELLY SAND



REPRESENTATIVE GRAIN SIZES (MM)

D5	0.29
D16	0.39
D25	0.48
D35	0.58
D50	0.80
D75	1.8
D84	2.4
D95	5.5

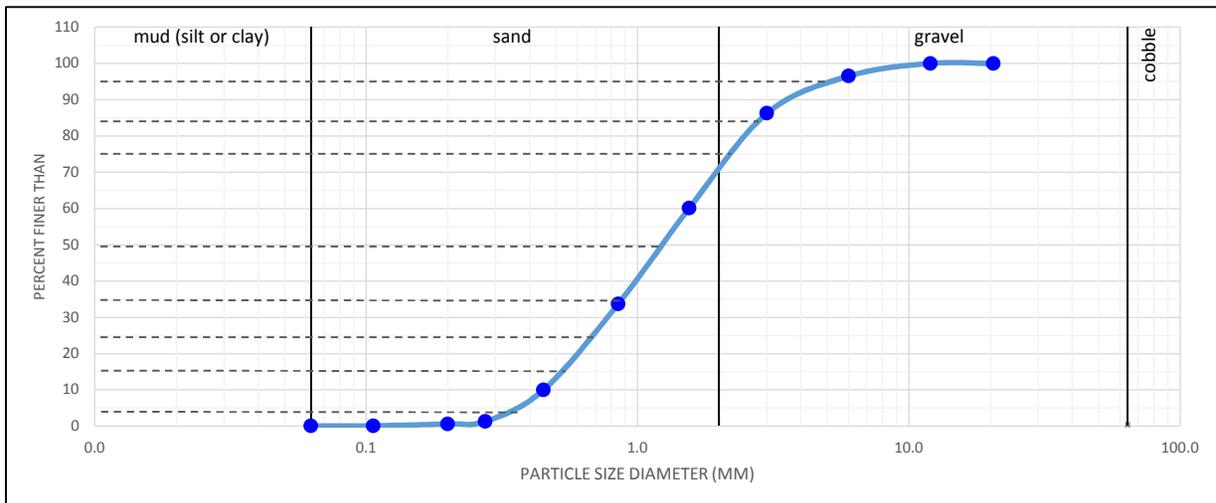
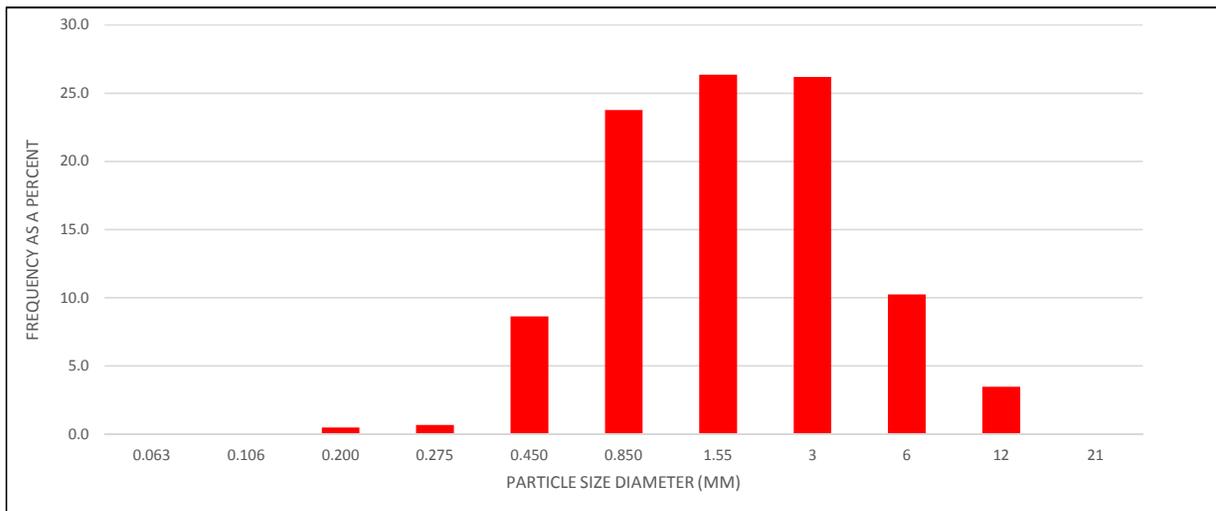
SUMMARY STATISTICS

Geometric Mean	1.0	characterizes the central portion of distribution
Standard Deviation	2.5	width of distribution, also represents sorting
Skewness	0.5	a measure of deviation from symmetry
Kurtosis	0.2	a measure of peakness or flatness of distribution
Arithmetic Mean	1.2	
Standard Deviation	1.3	
Skewness	0.7	
Kurtosis	0.8	

Transect ID: C		Describer: KK, AG
Date: May 12, 2016		Time: 9:30 am
Facies Type: SAND GRAVEL		
Notes:		
Material	Size Range (mm)	Mass (g)
coarse gravel	16 - 25	0.00
medium gravel	8 - 16	6.10
fine gravel	4 - 8	17.96
very fine gravel	2 - 4	45.84
very coarse sand	1.10 - 2	46.14
coarse sand	0.600 - 1.10	41.62
med to coarse sand	0.300 - 0.600	15.14
medium sand	0.250 - 0.300	1.20
fine sand	0.150 - 0.250	0.89
very fine sand	0.0625 - 0.150	0.14
mud (silt or clay)	< 0.0625	0.04
Total Mass (g):		175.07

% MUD	% SAND	% GRAVEL
0.0	60.1	39.9

FOLK CLASSIFICATION
SANDY GRAVEL



REPRESENTATIVE GRAIN SIZES (MM)

D5	0.35
D16	0.53
D25	0.69
D35	0.89
D50	1.2
D75	2.2
D84	2.8
D95	5.0

SUMMARY STATISTICS

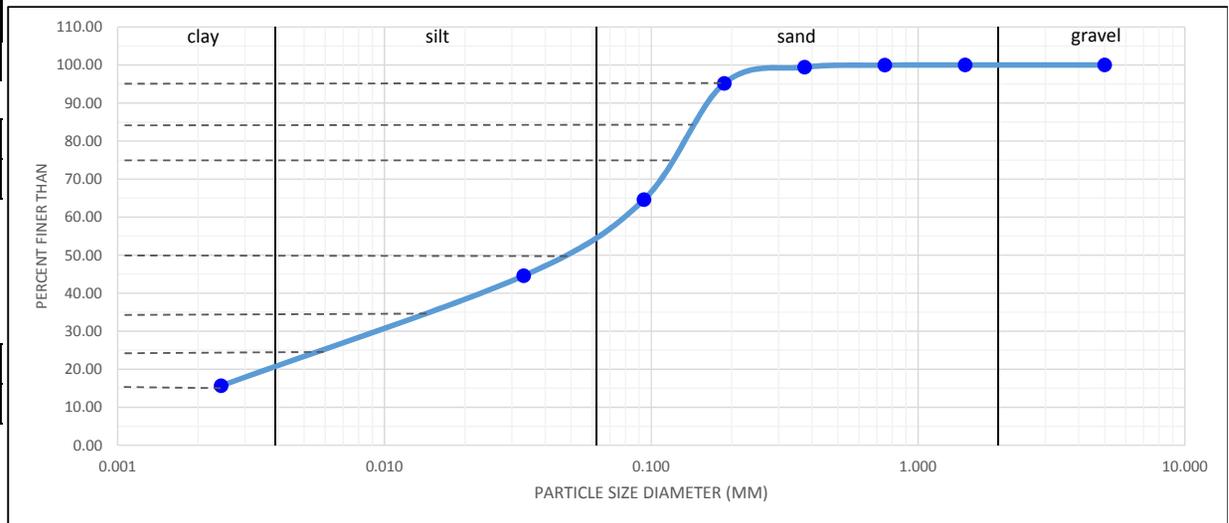
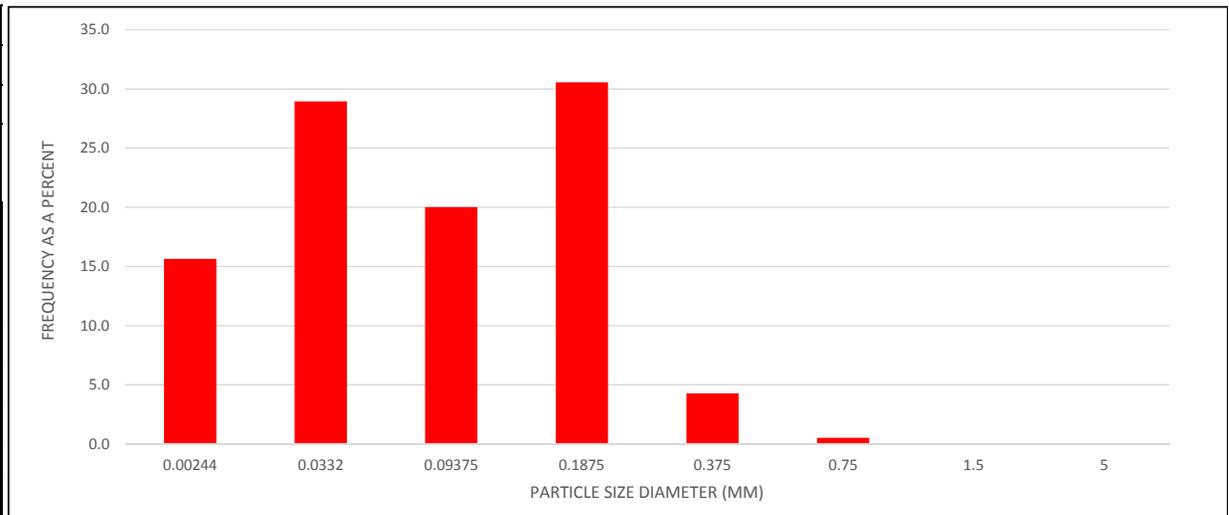
Geometric Mean	1.2	characterizes the central portion of distribution
Standard Deviation	2.3	width of distribution, also represents sorting
Skewness	0.7	a measure of deviation from symmetry
Kurtosis	0.2	a measure of peakness or flatness of distribution
Arithmetic Mean	1.5	
Standard Deviation	1.3	
Skewness	0.5	
Kurtosis	0.5	

Transect ID: C		Describer: KK, AG
Date: May 12, 2016		Time: 9:45 am
Facies Type: SAND SILT CLAY		
Notes:		
Material	Size Range (mm)	Mass (g)
gravel	> 2	0.00
very coarse sand	1 - 2	0.01
coarse sand	0.5 - 1	0.11
medium sand	0.25 - 0.5	0.90
fine sand	0.125 - 0.25	6.43
very fine sand	0.0625 - 0.125	4.21
silt	0.0039 - 0.0625	6.09
clay	0.00098 - 0.0039	3.29
Total Mass (g):		21.04

% CLAY	% SILT	% SAND
15.6	28.9	55.4

% GRAVEL
0.0

FOLK CLASSIFICATION
MUDDY SAND



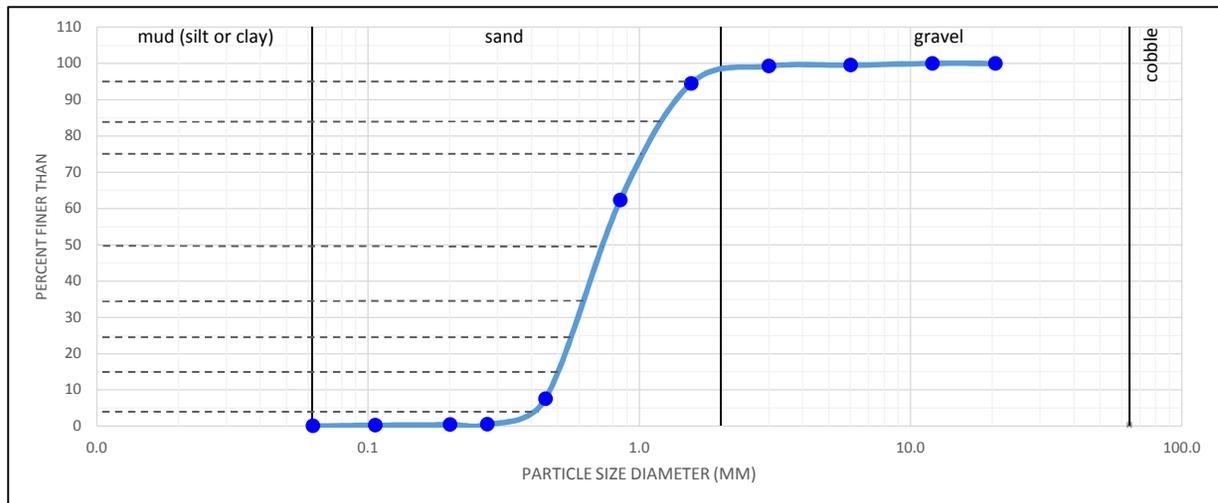
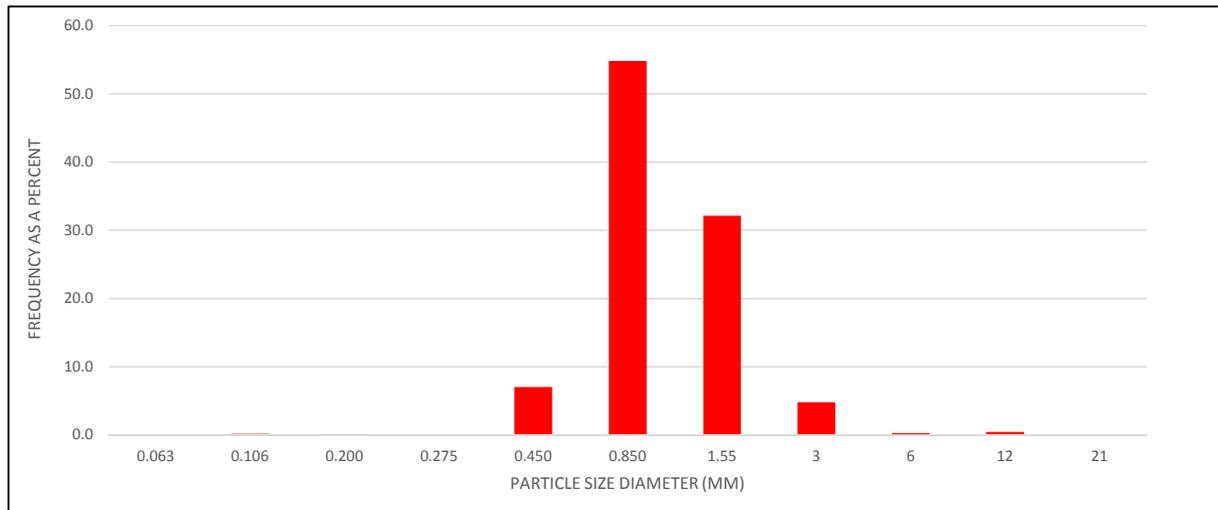
REPRESENTATIVE GRAIN SIZES (MM)

D5	--
D16	0.0024
D25	0.0056
D35	0.015
D50	0.048
D75	0.13
D84	0.15
D95	0.19

Transect ID: D		Describer: KK, AG
Date: May 12, 2016		Time: 3:30 pm
Facies Type: SAND		
Notes:		
Material	Size Range (mm)	Mass (g)
coarse gravel	16 - 25	0.00
medium gravel	8 - 16	1.16
fine gravel	4 - 8	0.65
very fine gravel	2 - 4	11.69
very coarse sand	1.10 - 2	78.49
coarse sand	0.600 - 1.10	133.64
med to coarse sand	0.300 - 0.600	17.16
medium sand	0.250 - 0.300	0.19
fine sand	0.150 - 0.250	0.39
very fine sand	0.0625 - 0.150	0.45
mud (silt or clay)	< 0.0625	0.10
Total Mass (g):		243.92

% MUD	% SAND	% GRAVEL
0.0	94.4	5.5

FOLK CLASSIFICATION
GRAVELLY SAND



REPRESENTATIVE GRAIN SIZES (MM)

D5	0.42
D16	0.50
D25	0.56
D35	0.62
D50	0.74
D75	1.1
D84	1.3
D95	1.6

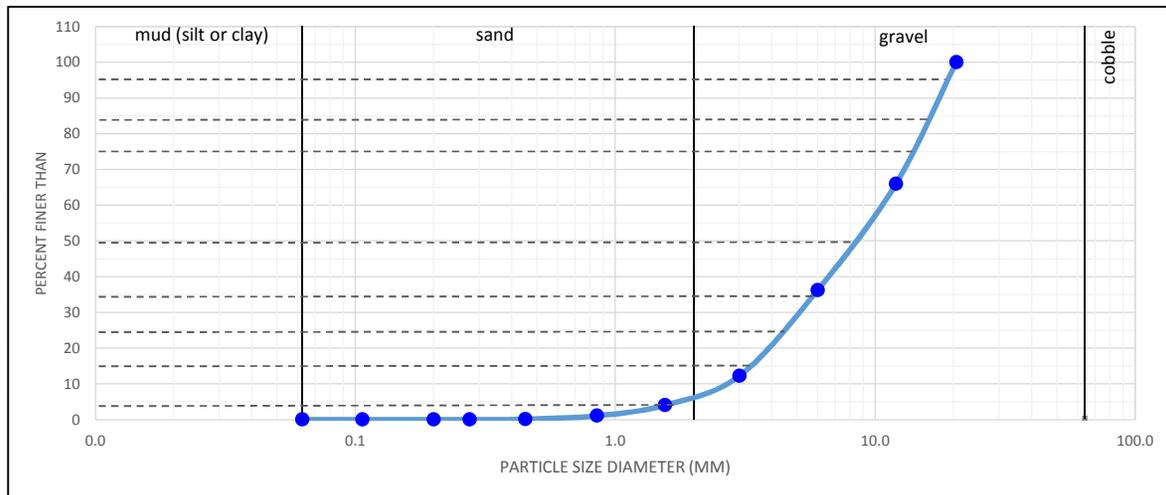
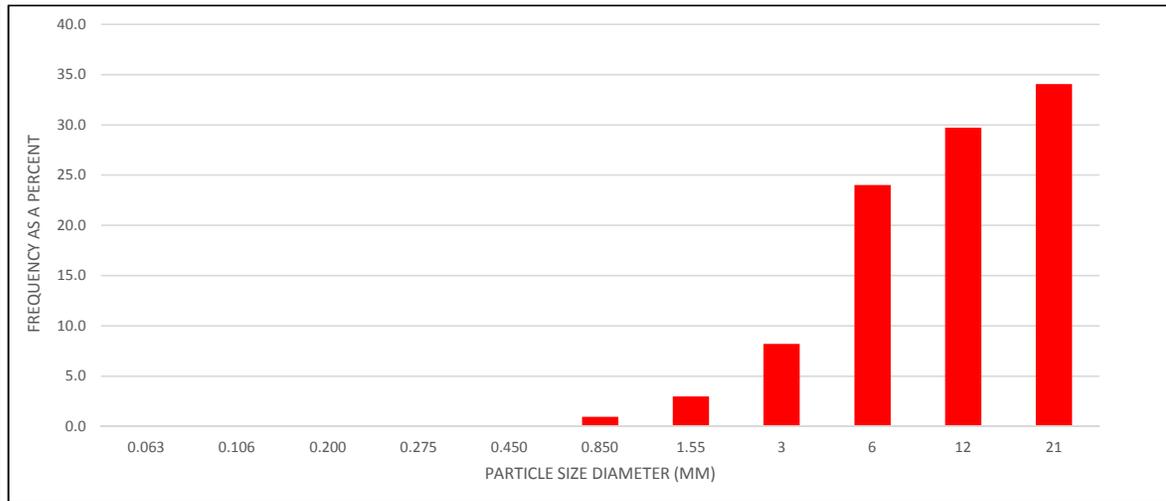
SUMMARY STATISTICS

Geometric Mean	0.8	<i>characterizes the central portion of distribution</i>
Standard Deviation	1.6	<i>width of distribution, also represents sorting</i>
Skewness	0.6	<i>a measure of deviation from symmetry</i>
Kurtosis	0.4	<i>a measure of peakness or flatness of distribution</i>
Arithmetic Mean	0.8	
Standard Deviation	0.4	
Skewness	0.4	
Kurtosis	0.4	

Transect ID: DEM 24-26		Describer: AG, AM
Date: June 2, 2016		Time: Unknown
Facies Type: GRAVEL		
Notes:		
Material	Size Range (mm)	Mass (g)
coarse gravel	16 - 25	99.06
medium gravel	8 - 16	86.43
fine gravel	4 - 8	69.80
very fine gravel	2 - 4	23.83
very coarse sand	1.10 - 2	8.62
coarse sand	0.600 - 1.10	2.74
med to coarse sand	0.300 - 0.600	0.25
medium sand	0.250 - 0.300	0.04
fine sand	0.150 - 0.250	0.06
very fine sand	0.0625 - 0.150	0.08
mud (silt or clay)	< 0.0625	0.02
Total Mass (g):		290.93

% MUD	% SAND	% GRAVEL
0.0	4.1	95.9

FOLK CLASSIFICATION
GRAVEL



REPRESENTATIVE GRAIN SIZES (MM)

D5	1.7
D16	3.3
D25	4.5
D35	5.9
D50	8.5
D75	15
D84	17
D95	19

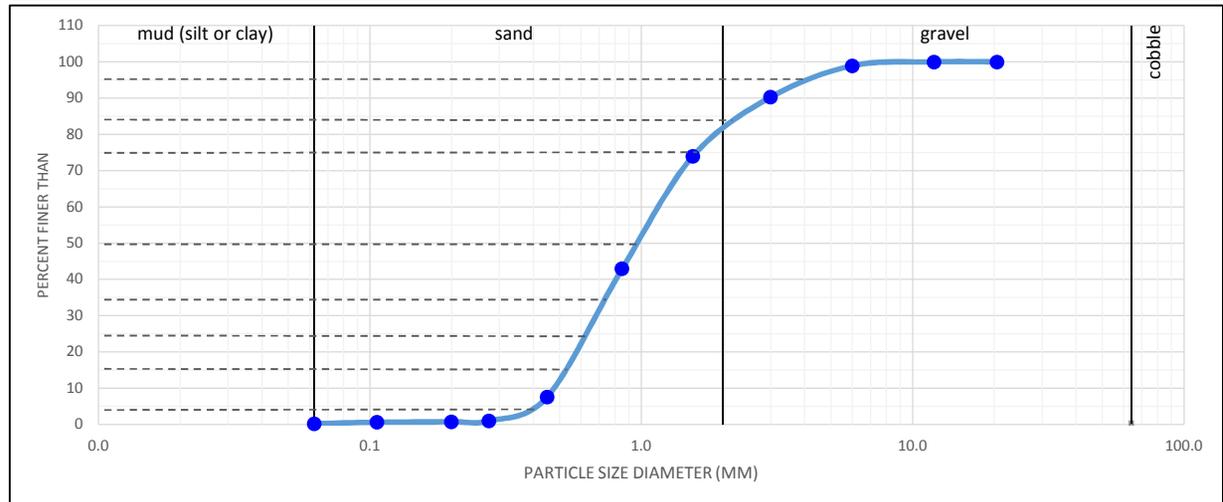
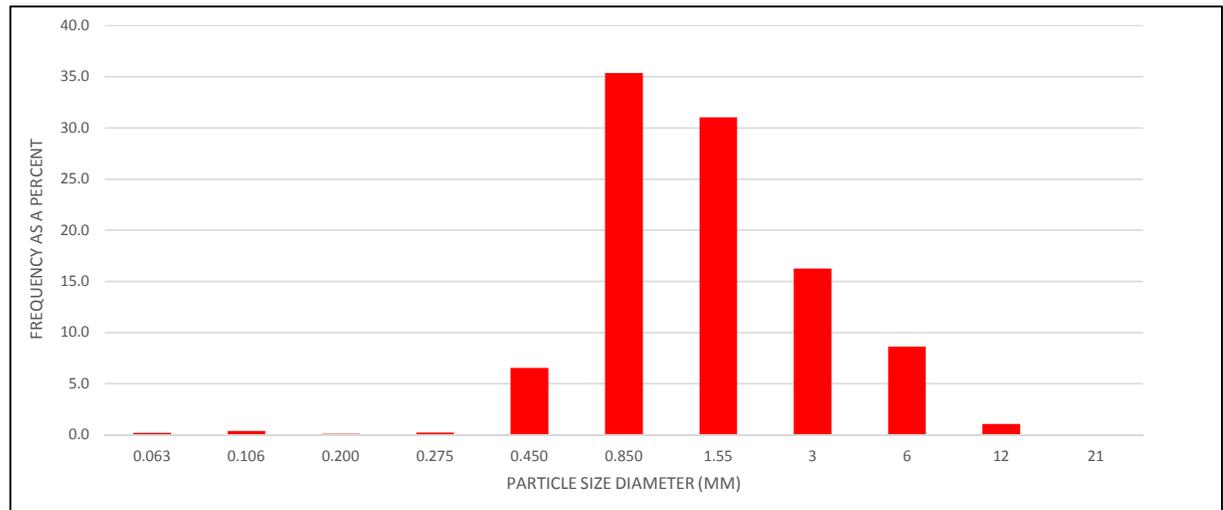
SUMMARY STATISTICS

Geometric Mean	7.5	<i>characterizes the central portion of distribution</i>
Standard Deviation	2.3	<i>width of distribution, also represents sorting</i>
Skewness	4.1	<i>a measure of deviation from symmetry</i>
Kurtosis	0.2	<i>a measure of peakness or flatness of distribution</i>
Arithmetic Mean	9.6	
Standard Deviation	6.0	
Skewness	0.2	
Kurtosis	0.2	

Transect ID: DEM 24-26		Describer: AG, AM
Date: June 2, 2016		Time: Unknown
Facies Type: SAND GRAVEL		
Notes:		
Material	Size Range (mm)	Mass (g)
coarse gravel	16 - 25	0.00
medium gravel	8 - 16	1.93
fine gravel	4 - 8	15.38
very fine gravel	2 - 4	28.96
very coarse sand	1.10 - 2	55.23
coarse sand	0.600 - 1.10	62.90
med to coarse sand	0.300 - 0.600	11.70
medium sand	0.250 - 0.300	0.45
fine sand	0.150 - 0.250	0.20
very fine sand	0.0625 - 0.150	0.71
mud (silt or clay)	< 0.0625	0.37
Total Mass (g):		177.83

% MUD	% SAND	% GRAVEL
0.2	73.8	26.0

FOLK CLASSIFICATION
GRAVELLY SAND



REPRESENTATIVE GRAIN SIZES (MM)

D5	0.41
D16	0.53
D25	0.63
D35	0.75
D50	0.97
D75	1.6
D84	2.2
D95	4.0

SUMMARY STATISTICS

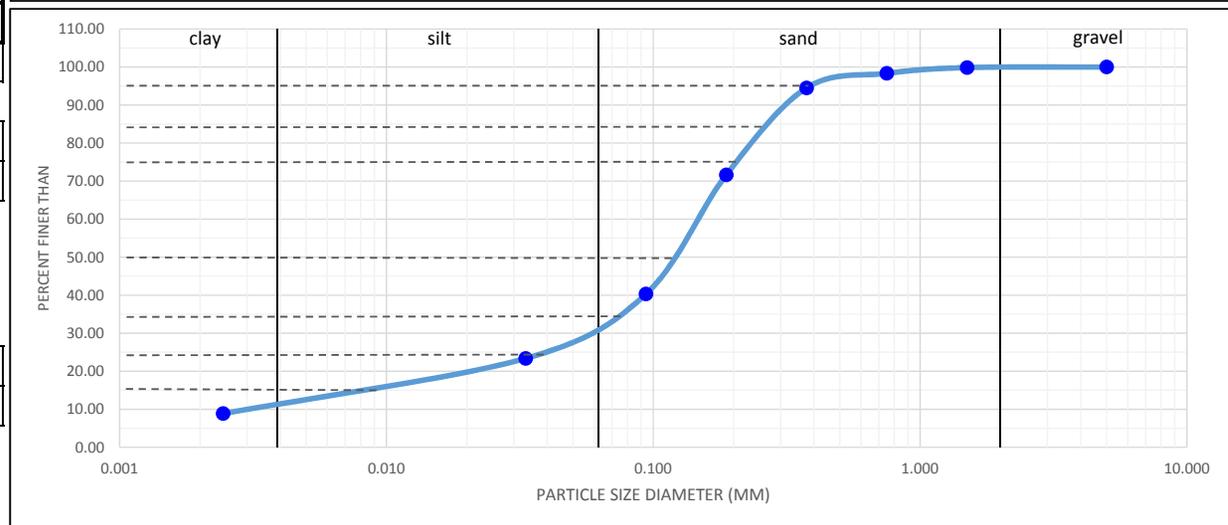
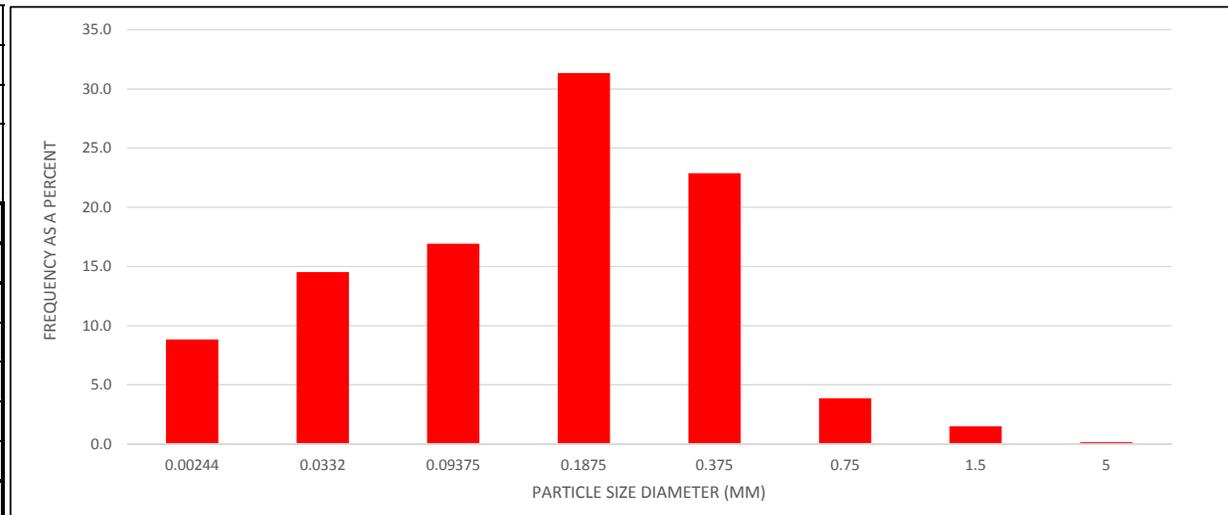
Geometric Mean	1.1	characterizes the central portion of distribution
Standard Deviation	2.0	width of distribution, also represents sorting
Skewness	0.7	a measure of deviation from symmetry
Kurtosis	0.3	a measure of peakness or flatness of distribution
Arithmetic Mean	1.2	
Standard Deviation	1.0	
Skewness	0.6	
Kurtosis	0.7	

Transect ID: DEM 26-31		Describer: AG
Date: June 6, 2016		Time: Unknown
Facies Type: SAND SILT		
Notes:		
Material	Size Range (mm)	Mass (g)
gravel	> 2	0.04
very coarse sand	1 - 2	0.40
coarse sand	0.5 - 1	1.03
medium sand	0.25 - 0.5	6.11
fine sand	0.125 - 0.25	8.37
very fine sand	0.0625 - 0.125	4.52
silt	0.0039 - 0.0625	3.88
clay	0.00098 - 0.0039	2.36
Total Mass (g):		26.71

% CLAY	% SILT	% SAND
8.8	14.5	76.5

% GRAVEL
0.1

FOLK CLASSIFICATION
MUDDY SAND



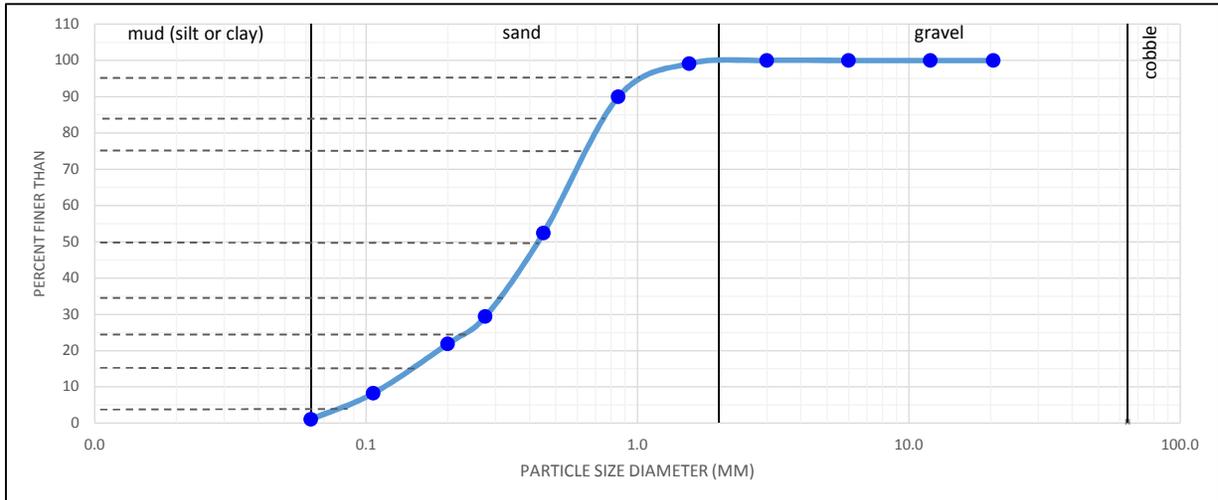
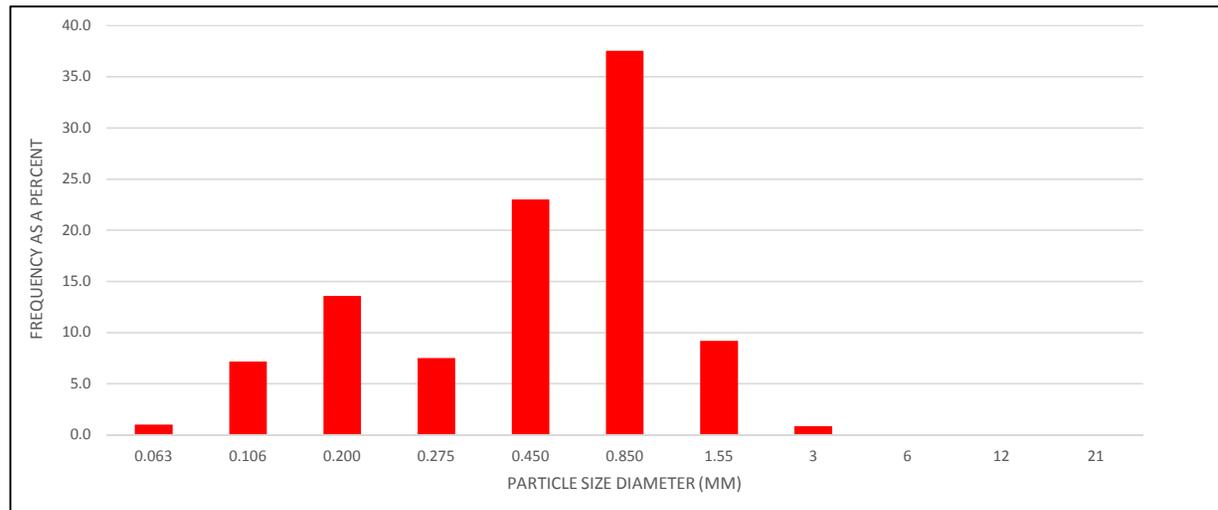
REPRESENTATIVE GRAIN SIZES (MM)

D5	--
D16	0.0090
D25	0.040
D35	0.077
D50	0.13
D75	0.20
D84	0.26
D95	0.38

Transect ID: DEM 27-32		Describer: AG, AM
Date: June 6, 2016		Time: Unknown
Facies Type: SAND		
Notes:		
Material	Size Range (mm)	Mass (g)
coarse gravel	16 - 25	0.00
medium gravel	8 - 16	0.00
fine gravel	4 - 8	0.00
very fine gravel	2 - 4	1.38
very coarse sand	1.10 - 2	14.75
coarse sand	0.600 - 1.10	60.12
med to coarse sand	0.300 - 0.600	36.90
medium sand	0.250 - 0.300	12.06
fine sand	0.150 - 0.250	21.79
very fine sand	0.0625 - 0.150	11.50
mud (silt or clay)	< 0.0625	1.67
Total Mass (g):		160.17

% MUD	% SAND	% GRAVEL
1.0	98.1	0.9

FOLK CLASSIFICATION
SAND



REPRESENTATIVE GRAIN SIZES (MM)

D5	0.082
D16	0.16
D25	0.23
D35	0.31
D50	0.43
D75	0.64
D84	0.75
D95	1.0

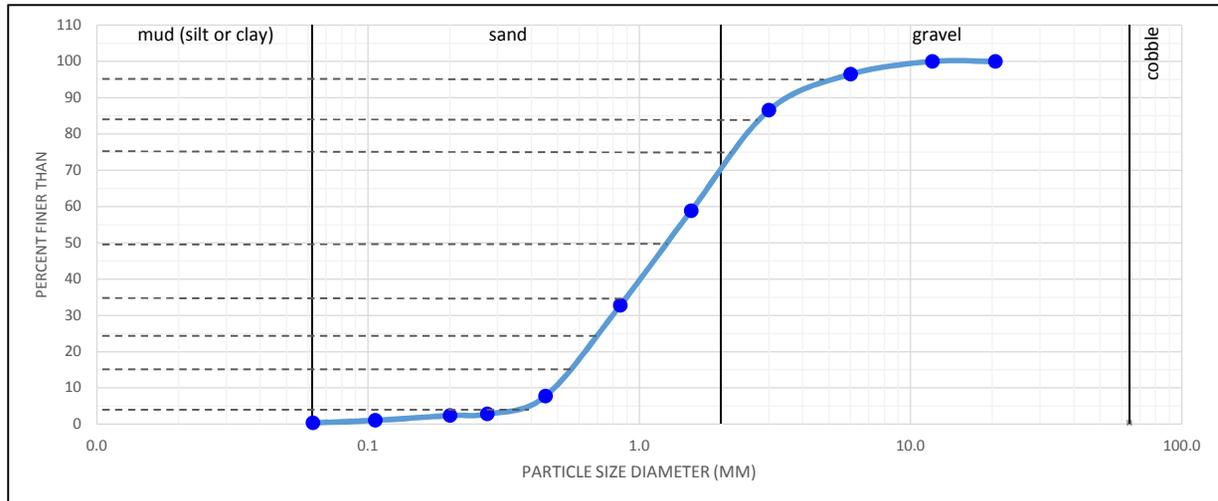
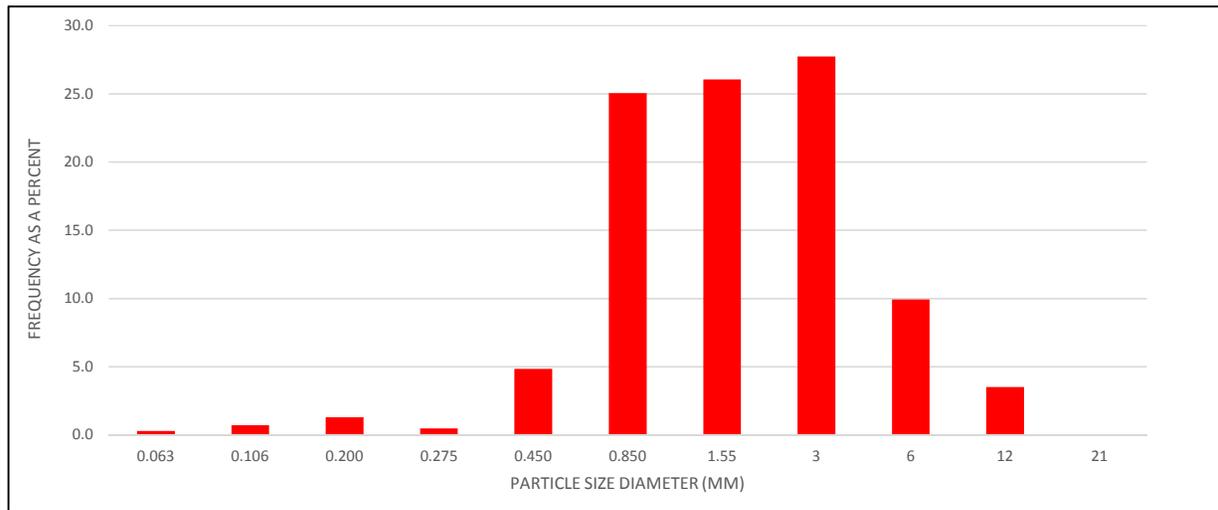
SUMMARY STATISTICS

Geometric Mean	0.3	<i>characterizes the central portion of distribution</i>
Standard Deviation	2.2	<i>width of distribution, also represents sorting</i>
Skewness	0.2	<i>a measure of deviation from symmetry</i>
Kurtosis	0.3	<i>a measure of peakness or flatness of distribution</i>
Arithmetic Mean	0.4	
Standard Deviation	0.3	
Skewness	0.2	
Kurtosis	0.2	

Transect ID: DEM 27-32		Describer: AG, AM
Date: June 6, 2016		Time: Unknown
Facies Type: SAND GRAVEL		
Notes:		
Material	Size Range (mm)	Mass (g)
coarse gravel	16 - 25	0.00
medium gravel	8 - 16	6.09
fine gravel	4 - 8	17.15
very fine gravel	2 - 4	47.82
very coarse sand	1.10 - 2	44.96
coarse sand	0.600 - 1.10	43.26
med to coarse sand	0.300 - 0.600	8.36
medium sand	0.250 - 0.300	0.83
fine sand	0.150 - 0.250	2.26
very fine sand	0.0625 - 0.150	1.26
mud (silt or clay)	< 0.0625	0.51
Total Mass (g):		172.50

% MUD	% SAND	% GRAVEL
0.3	58.5	41.2

FOLK CLASSIFICATION
SANDY GRAVEL



REPRESENTATIVE GRAIN SIZES (MM)

D5	0.38
D16	0.57
D25	0.72
D35	0.90
D50	1.3
D75	2.3
D84	2.8
D95	5.0

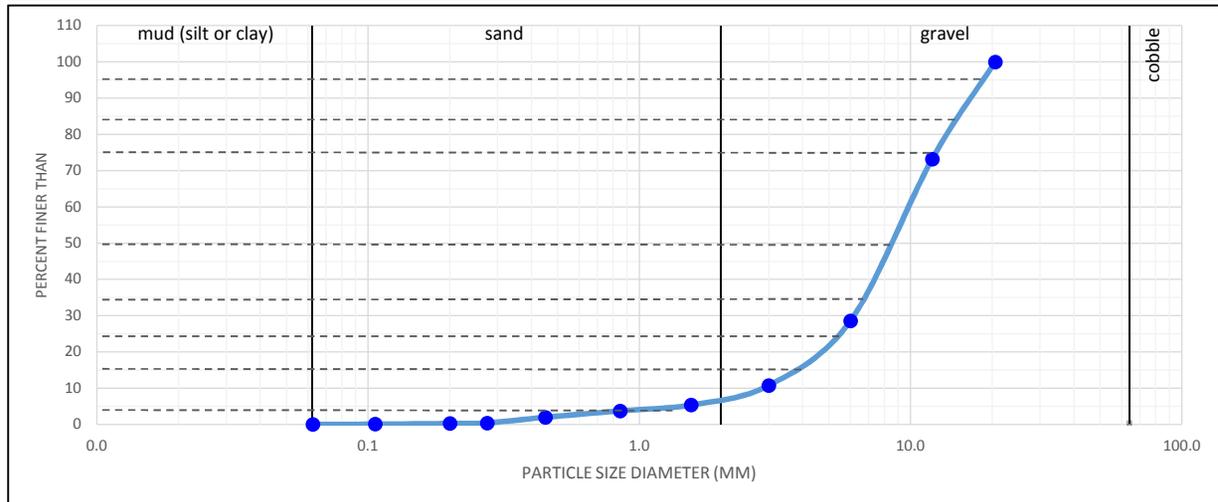
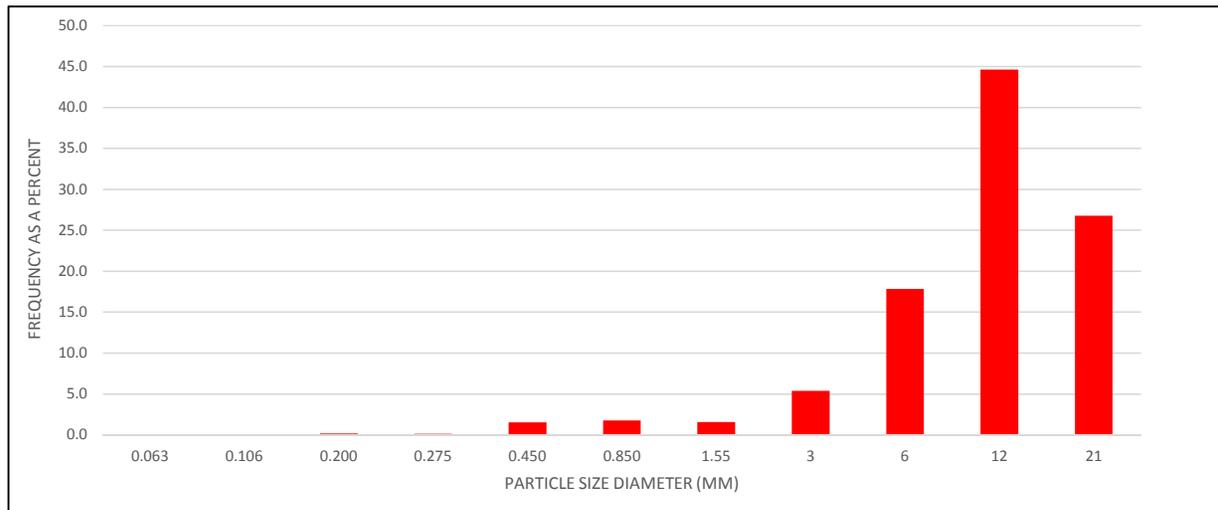
SUMMARY STATISTICS

Geometric Mean	1.3	characterizes the central portion of distribution
Standard Deviation	2.2	width of distribution, also represents sorting
Skewness	0.7	a measure of deviation from symmetry
Kurtosis	0.3	a measure of peakness or flatness of distribution
Arithmetic Mean	1.6	
Standard Deviation	1.3	
Skewness	0.5	
Kurtosis	0.5	

Transect ID: DEM 27-32		Describer: AG, AM
Date: June 6, 2016		Time: Unknown
Facies Type: GRAVEL		
Notes:		
Material	Size Range (mm)	Mass (g)
coarse gravel	16 - 25	52.40
medium gravel	8 - 16	87.27
fine gravel	4 - 8	34.91
very fine gravel	2 - 4	10.56
very coarse sand	1.10 - 2	3.15
coarse sand	0.600 - 1.10	3.47
med to coarse sand	0.300 - 0.600	3.03
medium sand	0.250 - 0.300	0.29
fine sand	0.150 - 0.250	0.36
very fine sand	0.0625 - 0.150	0.10
mud (silt or clay)	< 0.0625	0.05
Total Mass (g):		195.59

% MUD	% SAND	% GRAVEL
0.0	5.3	94.7

FOLK CLASSIFICATION
GRAVEL



REPRESENTATIVE GRAIN SIZES (MM)

D5	1.4
D16	4.0
D25	5.5
D35	6.8
D50	8.6
D75	13
D84	15
D95	18

SUMMARY STATISTICS

Geometric Mean	7.7	characterizes the central portion of distribution
Standard Deviation	1.9	width of distribution, also represents sorting
Skewness	5.0	a measure of deviation from symmetry
Kurtosis	0.3	a measure of peakness or flatness of distribution
Arithmetic Mean	9.2	
Standard Deviation	5.3	
Skewness	0.1	
Kurtosis	0.1	

Appendix B

Facies Maps and Cross Section Graphs

