

APPENDIX A

TERMS AND DEFINITIONS

Absorbed Water:	Water that fills the voids of a soil.
Adsorbed Water:	Water that is held in a film on the surface of soil particles.
Aeolian Soil:	Soil transported by wind.
Aggregate:	<p>A granular material of mineral composition such as sand, gravel, slag or crushed stone used for mixing in graduated amounts.</p> <ul style="list-style-type: none">• Coarse Aggregate - Aggregate retained on the 4.75 mm (No. 4) sieve.• Coarse-Graded Aggregate - One having a continuous grading in sizes of particles from coarse through fine with a predominance of coarse sizes.• Dense-Graded Aggregate - An aggregate that has a particle size distribution such that when it is compacted, the resulting voids between the aggregate particles, expressed as a percentage of the total space occupied by the material, are relatively small.• Fine Aggregate - That passing the 4.75 mm (No. 4) sieve.• Fine-Graded Aggregate - One having continuous grading in sizes of particles from coarse through fine with a predominance of fine sizes.• Mineral Filler - A finely divided mineral product of which at least 70 percent will pass a 0.075 mm (No. 200) sieve. Pulverized limestone is the most commonly manufactured filler, although other stone dust, hydrated lime, Portland cement, and certain natural deposits of finely divided mineral matter are also used.• Open-Graded Aggregate - One containing little or no mineral filler in which the void spaces in the compacted aggregate are relatively large.• Well-Graded Aggregate - Aggregate graded from the maximum size down to filler with the object of obtaining an asphalt mix with a controlled void content and high stability.
Air Dry:	When the material appears to be dry, but still has some absorbed moisture in its pore structure.
Alluvial Soil:	Soil transported by water.
Angular Aggregate:	Aggregate, the particles of which possess well-defined edges formed at the intersection of roughly planar faces.
Arid:	Dry.

Atterberg Limits:	Test designed by A. Atterberg. Used to identify the limits at which a soil passes from solid, semisolid, plastic, and liquid states of consistency. Atterberg Limits are the Plastic Limit, Liquid Limit and Shrinkage Limit. The Plastic Limit and Liquid Limit are used to determine the Plastic Index, and is one of the criteria for AASHTO and Unified Soil Classification Systems.
Background Count:	The naturally occurring radiation from lights, the sun and many other sources.
Basalt:	Igneous rock that has been ejected by volcanic activity to the surface of the earth's crust.
Base Course:	A layer of specified or selected material of planned thickness constructed on the subgrade or subbase for the purpose of serving one or more functions such as distributing load, providing drainage, minimizing frost action, etc.
Batholith:	Large (greater than 40 square miles), intrusive, igneous mass of crystallized granitic rock, which usually forms mountain cores.
Bell Jar:	Glass container used for vacuum testing, which is strong enough to resist collapsing.
Borrow:	Material that has been excavated from one area to be used as fill in another.
Boulder:	A rock fragment, usually rounded by weathering or abrasion, with an average dimension of 305 mm (12 in.) or more.
Brittle:	A material, such as shell, which will break easily during preparation, resulting in reduced particle size.
Calcium Carbonate:	A compound found in nature as calcite and aragonite and in combination in soil or rocks, such as limestone and caliche.
Capillary Action:	The attraction of water to a surface that causes it to rise against the force of gravity through surface tension.
Carbonation:	The dissolving of carbon dioxide in water to form carbonic acid, which reacts with calcium or other elements to form carbonates (e.g., limestone).
Chemical Weathering:	Deterioration of parent rock into soil through chemical changes (e.g., carbonation, leaching, and oxidation).
Clastic:	Material consisting of fragments of pre-existing rock.
Clay:	Fine-graded soil or the fine-grained portion of soil that can be made to exhibit plasticity (putty-like properties) within a range of water contents, and that exhibits considerable strength when air-dried. An earth material with a particle size smaller than 0.002 mm.

Cobble (Cobblestone):	A rock fragment usually rounded or semi-rounded, with an average dimension between 75 and 305 mm (3 and 12 in.).
Cohesionless Soil:	A soil that when unconfined has little or no strength when air-dried and that has little or no cohesion when submerged.
Cohesive:	Tending to stick together through water surface tension and electro-chemical.
Cohesive Soil:	A soil that when unconfined has considerable strength when air-dried and that has significant cohesion when submerged.
Colloids:	Earth material with very small particles, being anything smaller than 0.001 mm.
Colluvial Soil:	Rock detritus and soil accumulated at the foot of a slope.
Compaction:	The reduction of voids in a soil mass. It is the densification of a soil mass through an applied dynamic force such as that delivered by a falling rammer or compaction equipment (e.g. rollers)
Compaction Curve:	The curve showing the relationship between the dry unit weight (density) and the water content of a soil for a given compactive effort.
Compaction Test:	The process of determining the degree of densification.
Compactive Effort:	The force applied to achieve compaction of a soil mass.
Constant Mass:	The point at which a specimen no longer loses mass between two successive weighings.
Continental Drift:	The movement of continents around the earth through geologic time due to plate tectonics.
Crust:	The outer layer of the earth's structure directly in contact with the atmosphere.
Dehydration:	Removal of moisture.
Degradation:	Breakdown of soil or rock material through mechanical or chemical means.
Density:	The mass of the soil or aggregate divided by the volume.
Deposition:	The process carried out by wind, ice, and water moving material from one location to another.
Detritus:	Loose material (e.g. rock fragments) that results directly from degradation.
Dry Density:	The density of a soil or aggregate corrected for moisture content.

Effective Diameter:	D10, particle diameter corresponding to 10% fine on the grain size curve.
Entrapped Air:	Air that occupies some of the voids within the soil.
Erosion:	Wearing away.
Extrusion:	Molten material (magma) from deep within the earth, which has been ejected onto the surface through volcanic activity.
Fast Neutron Source:	Each atom has a nucleus comprised of varying numbers of Protons and Neutrons. When a high-energy electron strikes a nuclei, one or more Protons or Neutrons are released. These Neutrons are used to measure moisture content by a nuclear gauge.
Fines:	That material which passes a 0.075 mm (No. 200) sieve.
Fraction:	A term applied to a portion of a sample usually resulting from a sieving process.
Friable:	A non-cohesive material that crumbles readily.
Gamma Detector:	An electronic device that converts electronic pulses into a numerical count. The electronic pulse is caused by high-energy photons passing through a special gas enclosed in a tube.
Gamma Source:	A radioactive material that emits high-energy photon radiation. The radiation is invisible and capable of passing through many millimeters of wood, soil, or other material.
Geology:	The science that deals with the history of the earth, especially the study of rock forms.
Geotechnical:	Having to do with the properties of soil and rock materials.
Glacial:	Referring to the parts of geologic time from Precambrian onward, when a much larger portion of the earth was covered with sheets of ice.
Glacial soils:	Soils transported and redeposited by glacial ice.
Gradation:	The particle size distribution of soil and aggregates determined by using sieves with square openings.
Granite:	A light colored predominately siliceous rock normally found in igneous intrusions.
Granular:	Grainy, coarse, rough texture.
Gypsum:	A widely distributed mineral consisting of calcium sulfate that forms on the stony soil of arid regions as a result of evaporation
Heterogeneous:	Consisting of dissimilar components; non-uniform blend.
Homogeneous:	Of uniform structure and composition throughout.

Horizon Soil:	A layer of soil produced by soil forming processes, lying approximately parallel to the surface, having distinct characteristics.
Humus:	A brown or black complex variable material resulting from partial decomposition of plant or animal matter and forming the more stable organic portion of a soil.
Hydration:	A reaction of other chemicals with water.
Hydrometer:	A testing device used to measure the specific gravity of a liquid in which particles are either suspended or dissolved.
Hygroscopic Moisture:	Moisture still remaining in soil after it has been air-dried.
Igneous:	Resulting from the intrusion or extrusion of magma or the activity of volcanoes: rocks formed from molten magma.
In situ:	In its natural or original position.
Intrusion:	Molten crystal material that is injected into other rock through fissures and bedding planes.
Leach:	To dissolve and remove soluble compounds from a substance by the action of water percolating through soils.
Liquid Limit:	An Atterberg Limit. It is the moisture content corresponding to an arbitrary limit at which a soil moves from a liquid state to a plastic state of consistency.
Loam:	A mixture of sand, silt, or clay, or a combination of any of these, with organic matter.
Lot:	A given quantity of material that needs to be sampled.
Magma:	Molten rock.
Mantle:	The layer of the earth's structure lying immediately below the earth's crust.
Mass Wasting:	The movement of rock debris downslope under the direct influence of gravity.
Maximum Dry Density:	The dry unit mass of a soil when it is compacted with standard compactive effort and at optimum moisture content.
Mesh:	The square opening of a sieve.
Meniscus:	The curved concave upper surface of a column of liquid in a tube. This concave surface is caused by surface tension.
Metamorphic:	The types of rocks produced by a pronounced change of pressure, heat, and water, resulting in a more compact and more highly crystalline condition.

Mica:	A mineral comprised of very thin friable plates.
Moisture Content:	The ratio, expressed as a percentage, of the mass of the water in a given soil mass to the mass of the solid particles. The mass of the soil remaining after oven-drying is used as the mass of the solid particles.
Moisture-Density Curve:	A smooth line connecting the points obtained from this test procedure when plotted on a graph with moisture on the x- axis and density on the y-axis.
Moisture-Density Relationship:	The interrelationship between density and changing moisture contents in a soil.
Nomenclature:	A system of terms used in a particular discipline.
Nominal Maximum Size:	The largest sieve size listed in the applicable specification upon which any material may be retained.
Non-plastic:	Not capable of being molded into a sustainable shape.
Non-Representative:	A sample which does not exhibit the same characteristics as the in-situ material from which it was taken.
Optimum Moisture Content:	The percent of moisture at which a soil or aggregate can reach its maximum density with standard compactive effort.
Organic:	Plant and animal residue in the soil in various stages of decomposition.
Organic Clay:	Clay with sufficient organic content to influence the soil property.
Organic Silt:	Silt with sufficient organic content to influence the soil property.
Oxidation:	The process of chemically changing a compound through exposure to oxygen.
Parent Rock:	The original rock formation: either the original rock mass or the Clastic material in which soil or aggregate forms.
Particle Size:	A soil or aggregate is composed of many fragments of varying dimensions. When sorted by a sieving process, the soil or aggregate can be defined by sizes of the fragments related to the sieve size.
Passing:	Material fragments that fall through a sieve during sieving operations.
Peat:	A soil comprised primarily of vegetable tissue in various stages of decomposition, usually with an organic odor, a dark brown to black color, a spongy consistency, and a texture ranging from fibrous to amorphous (completely decomposed).

Percent Compaction:	The ratio, expressed as a percentage, of the dry density of a soil or aggregate to its maximum dry density.
Permeability:	The property of a soil or aggregate that enables water to move through the material.
Phreatic Surface:	Ground water elevation.
Physical Weathering:	Degradation caused by agents such as wind, water, and ice.
Plastic:	Capable of being molded into a sustainable shape.
Plasticity Index:	A measure of the cohesive properties of a soil. The numerical difference between the Liquid Limit and the Plastic Limit.
Plastic Limit:	An Atterberg Limit. It is the moisture content corresponding to an arbitrary limit at which a soil moves from a plastic state to a semisolid state of consistency.
Plate Tectonics:	The movement of the earth's crust, divided into large pieces, which float on a viscous material in the mantle.
Protocol:	Standardized methods and sequences of testing developed to ensure reliable results.
Pulverize:	The process to reduce soil or aggregate mass into individual particles.
Pycnometer:	A small hand blown glass bottle of known volume, usually 100 ml or less, with a vent in its stopper to allow excess water to leave the bottle when the stopper is inserted.
Quality Assurance:	The independent monitoring, testing and documenting process verifying that materials meet appropriate specifications.
Quality Control:	The process of monitoring the handling, testing and documentation used to maintain conformance to appropriate material specifications.
Radioisotope:	Radioactive isotope of an element (e.g. Cesium 137, Americium 241).
Random:	An equal probability that any one of a group will be selected.
Random Sampling:	Procedure for obtaining non-biased representative samples.
Residual Soil:	Soil formed in-place by weathering of parent rock.
Percent Compaction:	The ratio, expressed as a percentage, of the dry density of a soil or aggregate to its maximum dry density.
Relief:	The relative elevations of the land surface; topography.
Representative:	A sample that exhibits the same characteristics as the in situ material from which it was taken.

Retained:	Material fragments that do not fall through a sieve during sieving operations.
Riffle Splitter:	A device containing chutes on each side that effectively divide a sample into two equal portions.
Sand:	Material that will pass a 4.75 mm (No. 4) sieve and be retained on a 0.075 mm (No. 200) sieve with the following subdivisions: <ul style="list-style-type: none"> • Coarse - Passes a 4.75 mm (No.4) and is retained on a 2.00 mm (No.10) sieve. • Medium - Passes a 2.00 mm (No.10) sieve and is retained on a 0.425 mm (No.40) sieve. • Fine- Passes a 0.425 mm (No. 40) sieve and is retained on a 0.075 mm (No. 200) sieve.
Saturated Surface Dry (SSD):	An aggregate is considered to be in a saturated surface dry condition when there is no free moisture present, but the aggregate is in a nonabsorbent state. In other words, the aggregate has all the moisture it can absorb and the surface of the aggregate is dry.
Scaler:	Part of a nuclear gauge that converts electronic pulses into numerical counts and displays the results.
Segregation:	The tendency of any graded material to separate into individual particle size groupings.
Sedimentary Rock:	Formed from materials transported by moving water, air, ice, or chemically precipitated.
Shear Strength:	Resistance of a material to forces acting along a defined plane.
Shrinkage Limit:	An Atterberg Limit. It is the point at which a soil changes from a solid to a semisolid state.
Sieve:	A frame enclosing a wire, cloth, or perforated plate used to separate materials by particle size.
Silt:	Soil passing a 0.075 mm (No. 200) sieve that is non-plastic or very slightly plastic and that exhibits little or no strength when air-dried.
Soil:	Sediments or other unconsolidated accumulations of solid particles produced by the physical and chemical disintegration of rocks, and which may or may not contain organic matter.
Soil Mechanics:	The study of engineering properties and behavior of soils.
Specific Gravity:	The ratio of a mass of a given volume of material, to the mass of an equal volume of water.
Statistical Analysis:	The systematic collection, analysis and interpretation of numerical data.

Subbase:	A layer used in a pavement system between the subgrade and base coarse.
Subgrade:	The soil prepared and compacted to support a structure or a pavement system.
Sublots:	A portion of a lot that represents a certain quantity of the material from a lot.
Surface Tension:	The lifting of water against gravity in a narrow (capillary) tube.
Talus:	A slope formed by an accumulation of rock debris; rock debris at the base of a cliff.
Thermal Neutron Detector:	An electronic device that counts Neutrons as they pass through a special gas.
Topography:	The configuration of a surface including its relief and the position of its natural and man-made features.
Topsoil:	Surface soil, usually containing organic matter.
Traction:	The pushing, dragging, or rolling of particles too large to be lifted by the transporting force.
Unit Weight:	A ratio of weight to volume
Volumetric Flask:	A large glass bottle of known volume, with an etched calibration line on its stem.
Weathering:	The action of the elements in altering the texture, composition or form of exposed objects; the physical degradation and chemical decomposition of earth materials.
Zero Air Voids Curve:	The curve showing the zero air voids unit weight as a function of water content. Also known as the Saturation Curve.

