Glossary

A

Active sensors – A solid-state chip that collects the return of a transmitted signal from an emitting source, for example, the return signal from a radar or light detection and ranging (LiDAR) camera.

Advection – Transport of solutes by flowing groundwater.

Alluvial – Unconsolidated rock or sediment that has been shaped by water and redeposited in a non-marine setting

Alluvial channel – A feature formed by the scouring effect of a river, typically under high energy conditions. It is therefore often coarser grained and more permeable than adjacent geological units.

Aperture – The ratio of the focal length to the diameter of the opening that allows light into the camera or onto the sensor.

B

Bedrock fabric – When applied to rocks, includes the complete spatial and geometrical configuration of all those components that make up the rock. It covers terms such as texture, structure and preferred orientation and so is an all-encompassing term that describes the shapes and characters of individual parts of a rock mass and the manner in which the parts are distributed and oriented in space. The individual parts are only considered as contributing to a fabric if they occur repeatedly in a reproducible manner form one sample of rock to another. (Hobbs B. E. 1976)

C

Capillary boundary – The pore spaces in soil just above the water table that may contain water above the static level from interactive forces between the water and soil.

Charged coupled device (CCD) sensors – A type integrated circuit made-up of a capacitor array that accumulates electric charge relative to light intensity and converts the charge to voltage.

Complementary metal–oxide–semiconductor (CMOS) sensors or active-pixel sensor – A type integrated circuit with amplifiers in each pixel capacitor that accumulates electric charge relative to light intensity and converts the charge to voltage.

Conceptual site model (CSM) – Representation of the site that summarizes and helps project planners visualize and understand available information. The CSM is the primary planning and decision-making tool used to identify the key issues and the data necessary to transition a project from characterization through post-remedy. It documents current site conditions and serves to conceptualize the relationship between chemicals in environmental media, sources, and receptors through consideration of potential or actual migration and exposure pathways.

Constituents/contaminants of concern (COCs) – Chemicals, compounds, elements detected in environmental media (soil, ground water, surface water, sediment, air) above regulatory criteria or that pose an unacceptable risks to human health and the environment, as identified in the risk assessments.

Continuously operating reference system (CORS) – A network of continuously operating ground stations, maintained by the United States National Geodetic Survey, that provide global satellite data consisting of carrier phase and code range measurements to support of three-dimensional positioning throughout the United States, its territories, and a few foreign countries.

D

Dense non-aqueous phase liquid (DNAPL) – A liquid (for example, tetrachloroethene) that has a density greater than water and is immiscible with water.

Dielectrical permittivity – A measure of the ability of a material to store an electric charge by separating opposite polarity charges in space; it effectively measures a material's ability to be polarized by electric displacement due to an electric field and has units of farads per meter. Also known as dielectric constant.

Diffusion – The process of ionic or molecular constituents moving in the direction of a concentration gradient.

Digital elevation models (DEM) – A digital image, where each pixel has an elevation value, that representation of the ground surface terrain or relief not the contour of trees, building, or other objects that may obscure the ground surface or protrude above the ground surface.

Digital surface model (DSM) – A digital image, where each pixel has an elevation value, that representation of the surface relief such as the tree canopy, buildings, or bare ground when it is exposed.

Direct-push technology – Casing is pushed into the subsurface without drilling or auguring. Little or no annular space is created using this method.

Dispersion – The spreading of dissolved substances due to the combined effects of physical forces such as mechanical mixing, diffusion, and browning movement.

Dissolution – The process of dissolving.

Drive rod – The sections of direct push drilling rod added to the direct sensing probe to extend the depth.

Drone – The airframe, propulsion system, navigation equipment, and flight controller (often composed of GPS, on-board stabilization, and autonomous flight computer), and its payload (for example, camera).

E

Electrical resistivity – The intrinsic resistance of the subsurface to transport an electrical charge via conduction mechanisms.

F

Field of view (FOV) – A measure of the area on the surface of the ground that is observed by a single sensor.

Focal length – The distance between the lens and sensor when the camera is correctly focused on an object.

G

Gimbal – A camera mount that allows the camera to move up and down and left to right.

Ground control points (GCPs) – Manually surveyed ground targets that are clearly visible in in the collected data which can be used to measure vertical and horizontal error between the calculated point coordinates and the surveyed coordinates.

Ground sampling distance (GSD) – A description of spatial resolution in terms of the dimension of a square pixel per area on the ground.

H

Halogenated – Natural and synthetic chemicals that contain one or more halogens (fluorine, chlorine, bromine, or iodine) combined with carbon and other elements.

Heavy NAPL – Commonly DNAPL due to their higher density including coal tars, creosote, tank bottoms, bunker (marine) fuel, and chlorinated solvents that were used for degreasing.

Hydraulic conductivity – The rate that water can move through a saturated porous medium; defined as a proportionality constant (which includes the intrinsic permeability, the fluid density, a gravitational constant and the

dynamic viscosity).

Hyperspectral camera – A camera that collects spectral data on tens to hundreds of narrow spectral bands over its coverage range.

I

Inertial measurement unit (IMU) – Electronic measurement of roll, pitch, and yaw, which is combined with GPS data to determine the drone's geolocation.

ISO – Is a scale of light sensitivity for a digital sensor which is comparable to ISO of film.

J

[bedrock] Joint – A fracture or break in rock that lacks any visible or measurable movement parallel to fracture surface.

K

Karst – Rock formations, typically limestone or dolomite, formed by dissolution of rock and often characterized, topographically, by sinkholes, sinking streams, closed depressions and characterized in the subsurface and by porosity features such as bedding planes, pinnacles, conduits, and caves.

L

LiDAR – A camera that uses pulses of laser light, near-infrared (about 1,000 nm), to image objects and measure distances.

Light non-aqueous phase liquid (LNAPL) – A liquid (e.g., petroleum oil, gasoline, diesel fuel) that has a density less than water and is immiscible with water.

Lines of evidence – Pieces of evidence organized to show relationships among multiple hypotheses or complex interactions among agent, events, or processes. A weight of evidence approach includes the assignment of a numeric weight to each line of evidence.

Lithology – Soil or rock type and origin.

Long-wave infrared camera (LWIR) – A camera having a sensor to detect wavelengths above 10,000 nm, a range that is referred to as thermal infrared.

M

Membrane – A semi-permeable, thin film polymer that is permeable to gas but impermeable to liquids.

Multispectral camera – A camera that collects data on three to nine relatively wide bands in near-infrared and red spectra.

N

Navigational GPS – Satellite-based system that provides geolocation and time information to a global positioning system (GPS) receiver using four or more GPS satellites.

Non-aqueous phase liquid (NAPL) – A liquid that is immiscible with water.

O

[fracture] Orientation – The strike and dip of an inclined plane.

Orthomosaic – A consolidated image, built from a collection of aerial images, corrected to remove distortions caused by camera perspective.

P

Passive sensors – A solid-state chip that collects reflected, ambient light across a defined region of the electromagnetic spectrum, for example, the light collected by a camera.

Permeability – Intrinsic measure of the ability of a porous material to allow fluids to past through it.

Photo stitching – The combining multiple photographic images, having overlapping fields of view, to produce high-resolution image or panoramic image.

Pixel pitch – The width of an individual pixel on a sensor relative to the width of the whole sensor.

Plume – An elongated body of groundwater containing contaminants, emanating from a point source and migrating within a hydrogeologic unit(s). The shape and movement of the mass of the contaminated water is affected by the geology, bio/geo chemistry, contaminant(s), and the flow characteristics of the groundwater. Because they often travel through discrete fractures and fracture sets, bedrock plumes are commonly asymmetrical in shape. Therefore, in bedrock, it may be more appropriate to use the terms “contaminant distribution” or “area of impact”.

Point cloud – A collection of data points (latitude, longitude, and altitude) within a defined coordinate system that are assembled in digital space to represent a surface.

Porosity (primary, secondary) – The ratio of the void volume to the total volume in geologic material. For primary porosity the void volume is the intergranular or inter-crystalline space. For fracture porosity the void volume is the space within fractures.

Postprocessed kinematic (PPK) GPS – The use location data from a base station or a network of operating reference system receivers to correct image coordinates after the flight data collection.

Precipitation – The process of chemical deposit formation from a solution.

Preferential pathway – A high-permeability conduit for contaminant migration such as a utility penetrations, lines, or drains; building sumps or drainage pits; elevator shafts; fractures in bedrock; or gravel channels.

Probe – Direct sensing instrument attached to the lead end of a drilling rod.

Q

Qualitative data – Qualitative – An indirect measurement (for example, LIF and PID measurements provide a relative measure of absence or presence but are not suitable as stand-alone tools for making remedy decisions.

Quantitative Data – Compound-specific values in units of concentration based on traceable standards (for example, µg/l, ppm, ppbv).

R

Real-time kinematic (RTK) GPS – The use of at least one additional GPS receiver at a nearby known static position to continuously supplement the GPS data from a satellite-based system.

Receptor – An individual, plant or animal that has the potential to be exposed to a contaminant in the environment media.

Remote-sensing – Gathering of data from distance by use of an airborne detector.

S

Saturated zone – Area below the unsaturated zone in which all the soil pores and rock fractures are filled with water.

Semi-quantitative data – Compound-specific quantitative measurements based on traceable standards but in units other than concentrations (for example, ng or ug) or provides measurements within a range.

Semi-volatile organic compounds (SVOCs) – A subgroup of volatile organic compounds that tend to have a higher molecular weight and higher boiling point temperature.

Sensor – A solid-state chip that converts an optical image to an electronic signal.

Site characterization – Site characterization is the process of developing an understanding of the geologic, hydrologic and engineering properties at the site including the soil, rock, along with groundwater and in many cases, human-modified conditions in the subsurface (e.g. utilities, structures, mines and tunnels) that can impact site conditions

(Benson and Yuhr 2016).

Stakeholder – A stakeholder can be a person, a group, or an organization that is either affected, potentially affected, or has any interest in the project or in the project's outcome, either directly or indirectly (Commission 1997).

Stratigraphy – The sequence of soil and rock layers in the subsurface, typically informed by an understanding of the natural processes that led to that sequence (e.g. deposited in a marine environment vs laid down by a river).

String Potentiometer (aka 'String Pot') – A transducer used to detect and measure linear position and velocity using a flexible cable and spring-loaded spool. Used to measure the depth of a probe in a borehole during advancement.

Surface geophysical tool – A class of nonintrusive geophysical instruments used to evaluate the subsurface. They indirectly measure physical properties of materials from signals produced by natural or generated sources and rely on contrasts in the properties of different materials.

T

Time-resolved – Activities measured with respect to time.

Transmissivity – The product of hydraulic conductivity and aquifer saturated thickness. For a discrete fracture the aquifer saturated thickness is the effective aperture.

Trunk line – Cable connecting a probe instrument to the above ground data acquisition instruments.

U

Unconsolidated formation – A soil or rock that has not been hardened by burial or geologic processes. Typically easy to excavate and penetrate with direct push tools but may collapse easily.

V

Volatile organic compounds (VOCs) – Organic chemicals that have a high vapor pressure at ordinary room temperature.

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