Designation: D5254/D5254M – 92 (Reapproved 2010)ε1

Standard Practice for Minimum Set of Data Elements to Identify a Groundwater Site[1]

This standard is issued under the fixed designation D5254/D5254M; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

ε[1] NOTE—The units statement in 1.3 and the designation were revised editorially in August 2010.

1. Scope

1.1 This practice covers what information should be obtained for any individual groundwater site, also known as monitoring location or sampling station. As used in this practice, a site is meant to be a single point, not a geographic area or property. A groundwater site is defined as any source, location, or sampling station capable of producing water or hydrologic data from a natural stratum from below the surface of the earth. A source or facility can include a well, spring or seep, and drain or tunnel (nearly horizontal in orientation). Other sources, such as excavations, driven devices, bore holes, ponds, lakes, and sinkholes, that can be shown to be hydraulically connected to the groundwater, are appropriate for the use intended (see 6.4.2.3).

NOTE 1—There are many additional data elements that may be necessary to identify a site, but are not included in the minimum set of data elements. An agency or company may require additional data elements as a part of their minimum set.

1.2 This practice includes those data elements that will distinguish a site as to its geographical location on the surface of the earth, political regimes, source identifiers, and individual site characteristics. These elements apply to all groundwater sites. Each category of site, such as a well or spring, may individually require additional data elements to be complete. Many of the suggested components and representative codes for coded data elements are those established by the Water Resources Division of the U.S. Geological Survey and used in the National Water Information Systems computerized data base (**1**).[2]

NOTE 2—The data elements presented in this practice do not uniquely imply a computer data base, but rather the minimum set of groundwater data elements that should be collected for entry into any type of permanent file.

1.3 The values stated in either SI units or inch-pound units [presented in brackets] are to be regarded separately as standard. The values stated in each system may not be exact equivalents; therefore, each system shall be used independently of the other. Combining values from the two systems may result in non-conformance with the standard.

1.3.1 The gravitational system of inch-pound units is used when dealing with inch-pound units. In this system, the pound (lbf) represents a unit of force (weight), while the unit for mass is slugs. The rationalized slug unit is not given, unless dynamic (F = ma) calculations are involved.

1.4 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

1.5 *This practice offers a set of instructions for performing one or more specific operations. This document cannot replace education or experience and should be used in conjunction with professional judgment. Not all aspects of this practice may be applicable in all circumstances. This ASTM standard is not intended to represent or replace the standard of care by which the adequacy of a given professional service must be judged, nor should this document be applied without consideration of a project's many unique aspects. The word "Standard" in the title of this document means only that the document has been approved through the ASTM consensus process.*

2. Referenced Documents

2.1 *ASTM Standards:*[3]

D653 Terminology Relating to Soil, Rock, and Contained Fluids

3. Terminology

3.1 *Definitions:*

[1] This practice is under the jurisdiction of ASTM Committee D18 on Soil and Rock and is the direct responsibility of Subcommittee D18.21 on Groundwater and Vadose Zone Investigations.

Current edition approved Aug. 1, 2010. Published September 2010. Originally approved in 1992. Last previous edition approved in 2004 as D5254–92(2004). DOI: 10.1520/D5254_D5254M-92R10E01.

[2] The boldface numbers given in parentheses refer to a list of references at the end of the text.

[3] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

3.1.1 For definitions of terms applicable to this practice refer to Terminology D653.

4. Summary of Practice

4.1 This practice includes the following data elements to identify a groundwater site:

4.1.1 *Geographic Location*—Including latitude, longitude, latitude-longitude coordinate accuracy, altitude, and altitude accuracy.

4.1.2 *Political Regimes*—Including state or country identification, and county or county equivalent.

4.1.3 *Source Identifiers*—Including owner's name, source agency or company and address, unique identification, and date of first record for the groundwater site.

4.1.4 *Individual Site Characteristics*—Including hydrologic unit, setting, type of groundwater site, use of site, use of water from site, and reason for data collection.

5. Significance and Use

5.1 Normally, the basic groundwater data are gathered by trained personnel during the field investigation phase of a study. Each agency or company has its own methods of obtaining, recording, and storing the information. Usually, these data are recorded onto forms that serve both in organizing the information in the field and the office, and many times as entry forms for a computer data base. For groundwater data to be of maximum value to the current project and any future studies, it is essential that a minimum set of key data elements be recorded for each site. The data elements presented in this practice do not uniquely imply a computer data base, but rather the minimum set of groundwater data elements that should be collected for entry into any type of permanent file.

5.2 When obtaining basic data concerning a groundwater site, it is necessary to identify thoroughly that site so that it may be readily field located again with minimal uncertainty and that it may be accurately plotted and interpreted for data parameters in relationship to other sites. For example, information can be presented on scientific maps and in summary tables.

6. Documentation

6.1 *Geographic Location:*

6.1.1 *Introduction*—The universally accepted coordinates defining the absolute two-dimensional location of a site on the Earth's surface are latitude and longitude. The coordinates are determined by careful measurement from an accurate map or by survey. The third-dimension of the location is established by determining the altitude at the site, usually from topographic maps or by surveying techniques (**2**).[4]

NOTE 3—If sites are located by plane coordinates, plant location grids, or referenced to recoverable benchmarks, they may be recorded if the position is converted to absolute location coordinates by an acceptable method.

6.1.2 *Documentation Procedures:*

6.1.2.1 *Latitude*—Latitude is a coordinate representation that indicates locations on the surface of the earth using the earth's equator as the respective latitudinal origin. Record the best available value for the latitude of the site in degrees, minutes, seconds, and fractions of a second (DDMMSSss). If latitude of the site is south of the Equator, precede the numbers with a minus sign (–). The use of *N* or *S* is also appropriate (**1-8**).

6.1.2.2 *Longitude*—Longitude is a coordinate representation that indicates locations on the surface of the Earth using the prime meridian (Greenwich, England) as the longitudinal origin. Record the best available value for the longitude of the site, in degrees, minutes, seconds, and fractions of a second (DDDMMSSss). If longitude of the site is measured east of the Greenwich Meridian, precede the numbers with a minus sign (–). The use of *E* or *W* is also appropriate (**1-8**).

6.1.2.3 *Latitude-Longitude Coordinate Accuracy*—Record the accuracy of the latitude and longitude values. Suggested coordinate accuracy components and representative codes are as follows (**1, 6, 7, 8**):

H — The measurement is accurate to ±0.01 s.
U — The measurement is accurate to ±0.1 s.
S — The measurement is accurate to ±1 s.
F — The measurement is accurate to ±5 s.
T — The measurement is accurate to ±10 s.
M — The measurement is accurate to ±1 min.

NOTE 4—Components and corresponding codes listed under data elements, such as latitude-longitude coordinate accuracy and setting, are only suggestions. An agency or company may require additional components to fully describe their groundwater sites. Also, having the data element components written out, for example, "accurate to within 1 s" for the latitude-longitude accuracy, may be preferred to the use of codes. The important factor is that each data element in the "minimum set of data elements" be included with every groundwater site.

6.1.2.4 *Altitude*—Record the altitude of land surface or measuring point. Altitude of the land surface is the vertical distance in feet (or metres) either above or below a reference datum surface. The reference datum surface must be noted.

NOTE 5—In the United States, this reference surface should be the North American Vertical Datum (NAVD) of 1988 or National Geodetic Vertical Datum (NGVD) of 1929. If another vertical reference datum is used to determine the altitude, describe the system. Altitudes below the reference datum must be preceded by a minus sign (–) (**1, 2, 4, 7, 8**).

NOTE 6—The measuring point is usually a clearly defined mark or permanently fixed object at a groundwater site that is used for conducting repeated evaluations, such as water levels in a monitoring well.

6.1.2.5 *Altitude Accuracy*—Record the accuracy of the altitude. As an example, record 1.0 for an accuracy of ±1 m or 0.1 for ±0.1"th" m to denote the judged error of the measurement (**1, 3**).

6.2 *Political Regimes:*

6.2.1 *Introduction*—The placement of the groundwater site into a political jurisdiction assists in the proper identification of the site.

6.2.2 *Documentation Procedures:*

6.2.2.1 *State or Country Identification*— Record the state or country in which the site is physically located. The common systems for identifying states and countries are the Federal Information Processing Standard code (FIPS), a two-digit numeric code or the American National Standard abbreviation

[4] Available from National Technical Information Service (NTIS), 5285 Port Royal Rd., Springfield, VA 22161, http://www.ntis.gov.

two-letter code. The country codes are a two-character and a set of three-character alphabetic codes (**1**, **3**, **9**, **10**, **11**).

NOTE 7—The publications (**9**, **10**, **12**) containing the codes for countries, states, and counties are available from the National Technical Information Service.[4]

6.2.2.2 *County and County Equivalent*—Record the county or county equivalent in which the site is physically located. The common code system for identifying counties is the FIPS code, a three-digit numeric code. The documentation of political subdivisions will depend on the system used in each individual country (**1**, **3**, **7**, **11**).

NOTE 8—In many cases, it is necessary to record a subdivision of the local government to further identify the area where the groundwater site is located. Some of the local subdivisions are a city, town, village, municipality, township, or borough. Identify the local subdivision, for example "City of Rockville," to clearly denote the unit.

6.3 *Source Identifiers:*

6.3.1 *Introduction*—The groundwater site must be identified as to the owner, the agency or company that recorded data, and its distinctive classification.

6.3.2 *Documentation Procedures:*

6.3.2.1 *Owner's Name*—Record the name of the property owner of the groundwater site. The recommended format for an individual's name is: last name, first name, middle initial. If a company's name is lengthy, use meaningful abbreviations (**1**, **8**).

6.3.2.2 *Source Agency or Company and Address*—Record the name and address of the agency or company that collected the data for the groundwater site. This data element is necessary to determine the original source of the data for the site. A coded list of agency and company names is available through National Water Data Exchange (NAWDEX);[5] the list has over 1200 organizations that actively collect and store water data throughout the United States (**1**, **3-6**, **12**).

6.3.2.3 *Unique Identification*—Record the unique naming that the agency or company uses to identify the groundwater site. This identification is called by several terms such as "local site number," "site identification," "well number," etc. The description is commonly a combination of letters and numbers that could represent a land-net location or a sequential assignment for a site in a county, city, or company. This identification is very important to precisely differentiate a site in the records of an agency or company (**1**, **5-8**).

6.3.2.4 *Date of First Record for the Groundwater Site*—Record the date that the first valid transaction occurred for any element of the specified site. This could be the date of permit application, start of construction, or first used as a monitoring site. This element is important to facilitate in the proper identification of the record (**1**, **3**, **12**).

6.4 *Individual Characteristics of the Site:*

6.4.1 *Introduction*—Each groundwater site has very specific features that, in combination, uniquely identify that site, that is, water from a groundwater sustained pond used for aquaculture. These characteristics should be recorded as a means of further defining the site.

6.4.2 *Documentation Procedures:*

6.4.2.1 *Hydrologic Unit*—Record the hydrologic unit code for the Office of Water Data Coordination (OWDC) cataloging unit in which the site is located. This eight-digit code consists of four 2-digit parts (**1**, **4**, **5**, **6**, **13**, **14**): hydrographic region code, subregion code designated by the Water Resources Council, accounting unit within the National Water Data Network, and cataloging unit of the USGS's "Catalog of Information on Water Data."

NOTE 9—An explanation of a hydrologic unit code, for example Code 07080107, is the following; Region Code "07" is the Upper Mississippi River Basin above the confluence with the Ohio River; Subregion Code "08" is the Mississippi River Basin below Lock and Dam 13 to the confluence with the Des Moines River Basin, excluding the Rock River Basins; Accounting Unit Code "01" is the Mississippi River Basin below Lock and Dam 13 to the confluence with the Des Moines River Basin, excluding the Iowa and Rock River Basins; and Catalog Unit Code "07" is the Skunk River Basin of Iowa.

NOTE 10—State hydrologic unit maps delineating the hydrographic boundaries of these units are available[6] (see Ref (**13**)).[4]

6.4.2.2 *Setting*—Record the information that best describes the setting in which the site is located. Setting refers to the topographic or geomorphic features in the vicinity of the site. Suggested setting components and representative codes are as follows (**1**, **8**):

A — Alluvial fan
B — Playa
C — Stream channel
D — Local depression
E — Dunes
F — Flat surface
G — Flood plain
H — Hilltop
I — Inland wetlands
J — River delta
K — Sinkhole
L — Lake
M — Mangrove swamp or coastal wetlands
O — Offshore (estuary)
P — Pediment
S — Hillside (slope)
T — Alluvial or marine terrace
U — Undulating
V — Valley flat (valleys of all sizes)
W — Upland draw
X — Unknown
Y — Wetlands
Z — Other (describe)

6.4.2.3 *Type of Groundwater Site*—This data element helps to identify the physical type of groundwater site. Record the type of site to which these data apply. Suggested site type components and representative codes are as follows (**1**, **8**):

C — Collector (radial-collector) well
D — Drain dug to intercept the water table or potentiometric surface to either lower the groundwater level or serve as a water supply
E — Excavation
H — Sinkhole
I — Interconnected wells, also called connector or drainage wells; that is, a well interconnected via an underground lateral
M — Multiple wells—Use only for well field consisting of a group of wells that are pumped through a single header and for which little or no data about the individual wells are available
O — Outcrop
P — Pond that intercepts the water table or potentiometric surface

[5] Available from National Water Data Exchange, U.S. Geological Survey, 421 National Center, Reston, VA 22092.

[6] Available from USGS Books and Reports Sales Federal Center, P.O. Box 25425, Denver, CO, 80225.

S — Spring
T — Tunnel, shaft, or mine from which groundwater is obtained
W — Well, for single wells other than wells of the collector (radial collector) type
X — Test hole, not completed as a well
Z — Other (describe)

6.4.2.4 *Use of Site*—Record the use of the site or the purpose for which the site was constructed (the former always holds precedence over the latter). If site is used for more than one purpose, also record the subordinate uses. Suggested site use components and representative codes are as follows (**1**, **4**, **7**, **8**):

A — Electrical anode
C — Standby emergency supply
D — Drain or dry well
E — Geothermal—for geothermal extraction or injection
G — Seismic exploration
H — Heat reservoir—fluid circulated in closed system
M — Mine—primary use for extraction of minerals
O — Observation/monitoring
P — Oil or gas well
R — Recharge
S — Repressurize—to increase pressure in aquifer
T — Test—for hydrologic testing
U — Unused
W — Withdrawal of water
X — Waste disposal
Y — Other (describe)
Z — Destroyed

6.4.2.5 *Use of Water from Site*—Record the use of the water from the site. If water from the site is used for more than one purpose, also record the subordinate uses. Suggested water use components and representative codes are as follows (**1**):

A — Air conditioning
B — Bottling
C — Commercial
D — Dewater
E — Power
F — Fire
G — Hydrogeologic interpretation
H — Domestic
I — Irrigation
J — Industrial (cooling)
K — Mining
L — Chemical screening for contaminants
M — Medicinal
N — Industrial (manufacturing)
P — Public supply
Q — Aquaculture
R — Recreation
S — Stock
T — Institutional
U — Unused
Y — Desalination
Z — Other (describe)

6.4.2.6 *Reason for Data Collection*—Record the reason for which data were collected from the site. If the data were collected for more than one purpose, record the subordinate reasons. Suggested data collection components and representative codes are as follows:

A — Construction/dewatering
B — Research
C — CERCLA
R — RCRA
D — Drinking water regulations
E — Exploration (water)
L — Local ordinance
S — State regulations, other than CERCLA or RCRA
F — Federal regulations, other than CERCLA or RCRA
G — Geothermal
H — Hydrologic benchmark
I — Environmental issues
J — Judicial/litigation
M — Mining regulations
N — Natural resources exploration
U — Unknown
Z — Other (describe)

7. Sample Form

7.1 An example of a generalized form for recording a minimum set of data elements for a groundwater site is shown in Fig. 1. An example of a filled-out form is shown in Fig. 2.

8. Keywords

8.1 groundwater; groundwater sampling site; hydrologic unit; key data elements; monitoring location; setting; site coordinates; site identification; site location

Ground–Water Site Minimum Set of Data Elements	Date prepared:
GEOGRAPHIC LOCATION	
Latitude:	Accuracy:
Longitude:	Accuracy:
ALTITUDE	
Land Surface: (meters/feet)	Accuracy:
Other (Specify): (meters/feet)	Accuracy:
Altitude Reference Datum:	
POLITICAL REGIMES	
State (or Country) Identification:	
County (or County Equivalent) Identification:	
SOURCE IDENTIFIERS	
Owner's Name:	
Source Agency (or Company):	
Address of Source Agency:	
Unique Identification of Site:	
Date of First Record for Site:	
INDIVIDUAL CHARACTERISTICS OF THE SITE	
Hydrologic Unit:	
Setting:	
Type of Ground-Water Site:	
Use of Site:	
Use of Water from Site:	
Reason for Data Collection:	

FIG. 1 Example of Minimum Set of Data Elements Form

Ground–Water Site Minimum Set of Data Elements		Date prepared: SEPT 4,1991	
GEOGRAPHIC LOCATION (5.1)			
Latitude: 39° 18′ 26″		Accuracy: ± 1 SEC	
Longitude: 74° 37′ 09″		Accuracy: ± 1 SEC	
ALTITUDE (5.1.2.4)			
Land Surface: 10.00 FT	(meters/feet)	Accuracy: 0.01 FT	
Other (Specify): 9.34 FT RECORDER SHELF	(meters/feet)	Accuracy: 0.01 FT	
Altitude Reference Datum: NGVD (1929)			
POLITICAL REGIMES (5.2)			
State (or Country) Identification: NEW JERSEY			
County (Or County Equivalent) Identification: ATLANTIC COUNTY			
SOURCE IDENTIFIERS (5.3)			
Owner's Name: U.S. GEOLOGICAL SURVEY			
Source Agency (or Company): U.S. GEOLOGICAL SURVEY			
Address of Source Agency: 810 BEAR TAVERN ROAD, SUITE 206 WEST TRENTON, N.J. 08628			
Unique Identification of Site: JOBS POINT OBS, NJ-WRD WELL # 01-0578			
Date of First Record of Site: OCTOBER, 1959			
INDIVIDUAL CHARACTERISTICS OF THE SITE (5.4)			
Hydrologic Unit: 02040302			
Setting: UNKNOWN; NEAR EXIT 29-GARDEN STATE PRKWY.			
Type of Ground-Water Site: WELL			
Use of Site: OBSERVATION/MONITORING			
Use of Water from Site: HYDROGEOLOGIC INTERPRETATION			
Reason for Data Collection: HYDROLOGIC BENCHMARK/RESEARCH			

FIG. 2 Example of Filled-Out Minimum Set of Data Elements Form

REFERENCES

(1) Mathey, S. B., ed., *National Water Information System User's Manual*, Vol 2, Chapter 4, "Ground-Water Site Inventory System," U.S. Geological Survey, Open-File Report 89-587, 1990.

(2) U.S. Department of Commerce, Representation of Geographic Point Locations for Information Interchange, *Federal Information Standards (FIPS) Publication 70-1*, National Institute for Standards and Technology, Washington, DC, June 23, 1986.

(3) Perry, R. A. and Williams, O. O., *Data Index Maintained by the National Water Data Exchange*, U.S. Geological Survey, Open-File Report 82-327.

(4) Texas Natural Resources Information System, *Ground-Water Data INTERFACE, Users Reference Manual*, Texas Natural Resources Information System, November 20, 1986.

(5) U.S. Environmental Protection Agency, *STORET Users Handbook*, Vols 1 and 2; U.S. EPA, Washington, DC, February 1982.

(6) U.S. Environmental Protection Agency, *Ground-Water Data Management With STORET*, Office of Ground-Water Protection, U.S. EPA, Washington, DC, March 1986.

(7) U.S. Environmental Protection Agency, *Definitions for the Minimum Set of Data Elements for Ground Water Quality*, U.S. Environmental Protection Agency (Draft), July 22, 1991.

(8) U.S. Geological Survey, *National Handbook of Recommended Methods for Water-Data Acquisition*, Chapter 2, "Ground Water," Office of Data Coordination, Reston, VA, 1980.

(9) U.S. Department of Commerce, "American National Standard Codes for the Representation of Names of Countries, Dependencies, and Areas of Special Sovereignty for Information Interchange," *Federal Information Standards (FIPS) Publication 104-1*, National Institute for Standards and Technology, Washington, DC, May 12, 1986.

(10) U.S. Department of Commerce, "Codes for the Identification of the States, the District of Columbia and Outlying Areas of the United States, and Associated Areas," *Federal Information Standards (FIPS) Publication 5-2*, National Institute for Standards and Technology, Washington, DC, May 28, 1987.

(11) U.S. Department of Commerce, "Counties and Equivalent Entities the United States, Its Possessions, and Associated Areas," *Federal Information Standards (FIPS) Publication 6-4*, National Institute for Standards and Technology, Washington, DC, August 31, 1990.

(12) Edwards, M. D., and Josefson, B. M., "Identification Codes for Organizations listed in Computerized Data Systems of the U.S. Geological Survey," U.S. Geological Survey, Open-File Report 82-921, 1982.

(13) U.S. Geological Survey, "Codes for the Identification of Hydrologic Units in the United States and the Caribbean Outlying Areas," U.S. Geological Survey, Circular 878-A, Reston, VA, (also *FIPS PUB 103*), 1982 .

(14) Seaber, P. R., Kapinos, F. P., and Knapp, G. L., State Hydrologic Unit Maps, U.S. Geological Survey, Open-File Report 84-708, Reston, VA, 1984.