

**12. General Purpose Buildings, Office Buildings, and Operation and Maintenance Facilities.** The Introduction (Chapter 1) for these design data collection guidelines contains additional information concerning: preparing a design data collection request, design data collection requirements, and coordinating the design data collection and submittal. (Use specifications design data for both feasibility and specifications.)

**A. General Map Showing:**

- (1) A key map locating the general map area within the State.
- (2) The development site or sites.
- (3) County, township, range, and section lines.
- (4) Existing towns, highways, roads, railroads, and public utilities.
- (5) Locations of potential construction and permanent access roads, sites for contractor's staging areas, and construction facilities.
- (6) Locations of borrow areas for natural construction materials and disposal areas for waste excavation.
- (7) Existing or potential areas or features having a bearing on the design, construction, operation, or management of the development such as: recreation areas, fish and wildlife areas, building areas, and areas of archeological, historical, and mining or paleontological interest. The locations of these features should bear the parenthetical reference to the agency most concerned; for example, Reclamation, NPS, or FWS.

**B. General Description of Local Conditions Covering:**

- (1) The approximate distance from the nearest railroad shipping terminal to site; load restrictions and physical inadequacies of existing roads and structures and an estimate of remedial improvements to accommodate construction hauling; estimate of length and major structures required for new construction access road; and possible alternative means for delivering construction materials and equipment at the building site.
- (2) Local freight or trucking rates.
- (3) Availability or accessibility of public facilities or utilities such as: water supply, sewage disposal, and electric power for construction.
- (4) Climatic conditions that will affect design, construction, and operation and maintenance procedures such as: amount, rate, and distribution of rain and/or snow; ice conditions; summer and winter temperatures, with

extremes; extreme wind velocities and prevailing directions; floods; and probability of excessive dust or sand.

- (5) Copy of county or city development Master Plan, if available, along with codes and regulations for development of land.
- (6) Design code. Unless otherwise stated, the architectural and engineering design shall be in accordance with the latest adopted version of the International Building Code (IBC), as developed by the International Code Council (ICC).

**C. Surface Data:**

**(1) Topographic Map:**

- (a) Covering an area that will accommodate all expected arrangements of buildings and facilities, and rights-of-way, and extending sufficiently to allow for control and disposal of drainage at the site and to indicate the general drainage of the vicinity.
- (b) Normally at a scale of 1 inch equals 50 feet.
- (c) Giving elevation above sea level and having a contour interval of 1 foot, depending on the degree of slope.
- (d) Giving dimensions and bearings of the property lines, and a dimensional tie to a known section corner.
- (e) Showing the suggested location and size of all proposed utilities and facilities.
- (f) Showing the location and size of all existing utilities and other existing facilities within the area.

**(2) Color Photographs:**

- (a) Taken from a high oblique angle, showing the area covered by the topographic map. (Aerial photographs if practicable.)
- (b) Closeups showing any features which may affect design; photographs of existing facilities, especially in the vicinity of additions; and any facilities or structures which are to be revised.

**(3) Vegetation to Be Cleared:**

- (a) Include kinds, sizes, and density of growth of trees and brush.

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(b) Include depth of stripping required to remove organic matter or objectionable material.

(4) **Seeding or Replanting Requirements.** Seeding or replanting requirements for erosion control and aesthetics.

**D. Foundation Data:**

(1) **General Engineering Requirements.** The amount and detail of foundation data required will vary with the site and with the type of construction. The guiding criteria should be to provide sufficient data to allow the designer to determine the type of foundation required for each building or facility and to identify major foundation problems. Adequate foundation data may be obtained for small structures from an inspection of surface conditions and one or two exploratory holes to determine foundation conditions some distance below the footings of the structure. Maximum use should be made of existing data. For larger structures and/or for more complex geological areas a field conference should be held to determine the geologic investigations program required.

(2) **Geologic Data.** The following list of geologic design data provides general guidelines for the collection and reporting of geologic information for this type of facility. The geologist should apply these guidelines with good judgment and sound reasoning, elaborating upon them as required by the particular geologic setting and engineering requirements. Because the collection of geologic data is dynamic process and often continues into the preparation of final designs, all stages of the specifications design geologic exploration program must be constantly coordinated with the designer through the appropriate geology office. The TSC geologic and geophysical staff will provide necessary assistance and guidance in the gathering of these design data.

(a) Compilation, summary, and reporting of Reclamation and non-Reclamation geologic information on the area, with attention being paid to the sequence of explorations and historical geologic events.

(b) Surface geologic map showing location of explorations. Locations of all existing explorations should be indicated by coordinates or stationing of the permanent survey control system for the facility.

(c) Factual narrative description of surficial deposits with attention being paid to engineering geologic matters, such as swelling minerals, presence of gypsum and other sulfates, caliche, erodibility (see *Earth Manual*).

(d) Factual narrative description of bedrock with attention being paid to engineering geologic matters such as swelling minerals,

presence of gypsum and other sulfates; and to depth, weathering, joints, faults, and other planes of weakness.

- (e) Photographs, preferably in color, of representative or particular geologic conditions.
- (f) Selected determination of engineering properties of surficial deposits and bedrock.
- (g) Summary and data of exploration geophysical surveys (seismic, resistivity, etc.).
- (h) Determine ground water conditions with attention being paid to water levels and their seasonal fluctuation, occurrence of unconfined and confined aquifers, water producing capabilities, chemistry, and subsidence.
- (i) Logs of explorations. An effort should be made to run appropriate borehole geophysical logs in all drill holes.
- (j) Evaluation of landslide, snowslide, and rockfall conditions.
- (k) If a building is in a high seismic risk zone and near an active fault, determine age of faulting in vicinity, especially if suspected to be late Pleistocene or Holocene, to assist in the determination of the seismic loading by specialists in the TSC
- (l) Document past, present, and possible future petroleum, water, and mineral extraction operations in vicinity.
- (m) Determine geologic conditions which may affect construction methods such as boulders on ground surface, marshes, drilling conditions, and stability of grout or footing holes, ground temperatures, gases. Any potential surface water runoff problems should be brought to the attention of a regional hydrologist.
- (n) A determination by tests of the corrosive properties and sulfate content of geologic materials and ground water as affecting the choice of cement.

**E. Corrosion Survey:**

- (1) In situ electrical resistivity measurements of geologic materials in the area of construction. Additional measurements should be made in the areas where there is a pronounced change in type of geologic materials, drainage, and/or moisture conditions.

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- (2) Performance history of materials of construction that have been used in the area.
- (3) List of structures in the vicinity of (within ¼ mile) the proposed structure and appurtenant features. Determine if buried structures in the vicinity have corrosion protection and, if so, the type of corrosion protection.
- (4) List location, output, and purpose of the direct-current sources in the earth situated within ¼ mile of the proposed structure and appurtenant features. If the purpose of the direct current is for cathodic protection, describe the structure protected and its location.
- (5) Chemistry of geologic materials, ground water, and/or product water.

**F. Construction Materials Data Including:**

- (1) Inventory of available impervious and pervious embankment materials and rock for riprap and rockfill. Location of and distance to borrow areas and approximate quantities available.
- (2) Information on concrete aggregates. (See *Concrete Manual*.)
- (3) Information on sources and character of acceptable road surfacing materials. Consider required excavation material as a possible source.
- (4) Data on commercial concrete plants within practical hauling distances from the structure site.
- (5) References to results of sampling and analysis of materials including previous tests and photographs of sources.
- (6) Report alkali conditions in soil and water which might affect the choice of sulfate resisting cement.
- (7) Statement of availability of timber for structural work and lumber for other purposes.
- (8) Environmental impacts associated with removing or obtaining construction materials.
- (9) Requirements concerning permanent stockpiles and suggested permanent stockpile locations.
- (10) Information including catalogues on firms, within practical hauling distance from the site, manufacturing precast concrete products and brick or other masonry units.

G. **Environmental Considerations.** Design data should include as a minimum a brief description of the setting and the resources that would be affected by the proposed development.

- (1) The environmental setting.
- (2) Cultural (historical, archeological, architectural, and paleontological) resources within the project area.
- (3) The need for blending the development with the surroundings.
- (4) The need for a field conference to resolve critical environmental problems with participation of other agencies.
- (5) Review of designs by other agencies.
- (6) Anticipated public use around the development.
- (7) Indicate the suitability and possibility of developing Government land adjacent to our development for use by the public for recreation, hobbies, sports, leisure, education, health, etc.
- (8) Comment on any ecological, aesthetic, or other environmental aspects peculiar to this location which would affect layout or conceptual design.
- (9) Landscaping and other special environmental requirements.
- (10) A brief listing of the area's native and/or commonly used plant materials.

H. **Miscellaneous Data:**

- (1) For housing:
  - (a) Type of natural growth on land.
  - (b) Number and occupancy of permanent houses.
  - (c) Number and occupancy of temporary houses.
  - (d) Expected length of service for housing area.
  - (e) Type of fuel to be used for heating, air-conditioning, cooking, and water heating.
- (2) Type and size of office building, dormitory, laboratory, garage, fire station, warehouse, or other buildings.
- (3) For domestic water supply system:

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- (a) Location of sources and amount of water available. If from river, give high water and low water elevations, also ice conditions during winter. If from ground water, give location of several wells within 2 miles of proposed site with data on depth of well, water levels, yield, logs if available, and chemical analyses of water. If from municipal system provide as-built of connection point and a detailed description of connection requirements.
  - (b) If source of potable water is from ground water or surface water submit water quality data to include major ions, and cations, corrosivity, and all contaminants listed as maximum contaminate levels in the Safe Drinking Water Act, based on this data the type and degree of treatment will be determined.
  - (c) Depth of water pipes to prevent freezing.
  - (d) Recommended type of material for pipelines.
  - (e) Type of foundation for water tank.
  - (f) Profile of ground for proposed water-supply line with type of material and percent of rock excavation expected in trench.
- (4) For sewage disposal system:
- (a) Reference to local and State codes or guidelines for treatment and disposal of sewage.
  - (b) Results of soil absorption test made at absorption trench. In order to determine the suitability of any area for subsoil effluent disposal, test holes approximately 1 foot square should be dug to the proposed depth of the tile or absorption trench at several points and then filled with water to a depth of about 1 foot. After this water has seeped away and while the bottom of the hole is still wet, it should be filled with water to a depth of 6 inches, and the average time required for the water level to drop 1 inch should be noted.
  - (c) Feasibility of placing the sewage treatment plant at such an elevation that excess sludge can be removed by gravity.
  - (d) Furnish a copy of required plumbing code if other than Uniform Plumbing Code (note deviations).
  - (e) Direction of prevailing winds.

- (f) If sewage discharge is to a community sewer, provide the location and as built information on the connection point along with a detailed description concerning the connection requirements.
- (5) Types of surfacing for walks and streets in temporary and permanent areas.
- (6) Separate preliminary cost estimate for the following: water and sewage systems, electrical distribution system, streets and sidewalks, and each type of building or house required.
- (7) Fire protection plan for the community, including information on available fire protection services.

I. **Electrical Data.** Data listed below will be required to initiate design. The data furnished should be sufficient to permit designers to complete the basic design (single-line diagram) for the visitors' center. After designs have progressed enough to develop details of electrical system needs, designers will prepare a list of additional data required to complete final design of electrical installation.

- (1) Names and telephone numbers of electrical power suppliers and contacts within those organizations.
- (2) Location of point where connection to power supply will be made.
- (3) Source and description of power for the facility. If a transmission line is to be built by Reclamation, the information listed under "Transmission Lines" of this chapter should be furnished.
- (4) System voltage at which power will be supplied, number of phases, and whether service will be overhead or underground.
- (5) Number of buildings to be served, segregating residences and other types, with anticipated load and recommended supply voltage for each type.
- (6) Discuss requirements for an alternate power source. If an alternate supply is required, indicate:
  - (a) If required by State or local authority.
  - (b) If source should be an engine-generator.
  - (c) If a threat to life or property will result if normal power supply is lost.
  - (d) Loads requiring service from alternate source.
- (7) Requirements for remote monitoring of conditions at the facility, such as fire protection or security systems. Discuss location of remote station, and items required to be monitored.



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- (8) Use of electric ranges, electric water heaters, and/or electric heating in residences.
- (9) Desire for a series-type street lighting system.
- (10) Other requirements for power, such as water pumps, warehouse cranes, machine shops, etc.
- (11) Fire protection plan for the community, including information on available fire protection services.

J. **Site Security.** Many Reclamation projects may require a security risk assessment. The need for a site-specific security risk assessment should be considered for feasibility designs where an assessment may impact the field cost estimate and for specifications designs. Specific issues to consider are contained in Section 14 of Chapter 7 – Site Security and Public and Worker Safety. If assistance is required to determine specific design data needs, contact the Office of Security, Safety and Law Enforcement. Where design data and designs include site-specific security assessment, compliance with Reclamation Manual DM Part 444 – Physical Protection and Facility Security, Chapters 1 and 2 is required.