Waterworks Project Clues

Cut out each clue and distribute one to each student group.

Project 1. Wetlands Project

Project Type: Wetland restoration

Description: This project is in the southeastern region of the country. Industrial wastewater that holds high nitrogen and phosphorus is treated using manmade wetlands. Nitrogen and phosphorus are nutrients that can result in algal blooms. These nutrients hurt aquatic life and pollute surface water. A wetland is an area of land that is either covered by water or saturated with water. Wetlands naturally filter water. In this area, 90% of the natural wetlands have been destroyed. For this reason, the engineering firm developed a 15-hectare manmade wetland, bigger than 18 soccer fields, by planting thousands of plants from more than 15 species of native plants. It is now home to more than 85 varieties of animals that come and go with the seasons, including birds, foxes, turtles, and deer.

Project 2. Water Supply Project

Project Type: A solar pump, storage tank, water treatment unit, and new pipes

Description: This village is in the central region of the country. The existing water infrastructure was old, inadequate, and contaminated. During the dry season, residents have to walk two miles one way to the nearest river for water. The villagers and an Engineering Without Borders team decided to upgrade the system. They installed a new solar powered pump and disinfection system in the local schoolyard. They also repaired the old pipes and water storage tank. The community has agreed to a community water tax for future maintenance of the system. The local parish has agreed to match the amount raised by that tax by 100%.

Project 3. Rainwater Project

Project Type: Rainwater Harvesting System

Description: The village where this project is located lies near the border between two countries. There are no permanent surface water or groundwater aquifers. The village near this project depends on seasonal watering holes. These are large depressions where water collects during the rainy season. The watering holes serve as the community's only water resources. Humans, livestock, and wildlife share the watering holes because the village is near a national park. The watering holes often evaporate during the dry season. Then, the villagers are left with only contaminated water stored in tanks or they have to get water from neighboring communities. A team of engineers worked with local contractors and community members to combat the problem. They created a rainwater harvesting system and solar energy system at a nearby school. The water system includes two 60,000-liter tanks that collect rainwater from the school roof and a bio-sand filter to provide safe and reliable water.

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Project Clues, continued

Project 4. Tunnel Project

Project Type: Sewage System

Description: This program modernizes this capital city's 150-year-old sewer system. The old sewer system is currently causing weekly sewage discharges into the tidal area of a nearby river. That river is the longest river that runs entirely within this country. The construction of a new 32 km tunnel under the city and a 10 km tunnel under a nearby river will carry storm water and sanitary overflows to expanded and upgraded wastewater treatment plants. This tunnel dives down to 98 m below ground at its lowest point. This extreme depth makes it possible for the storm sewage to flow downwards to the wastewater treatment plant while avoiding other cables, pipelines, and tunnels, such as the tunnels built for the Olympics several years ago.

Project 5. Desalination Project

Project Type: Desalination Plant

Description: The environments and source waters of these three plant sites differ dramatically. This presents unique design and engineering challenges. The desalination plant lies on a gulf that has salinity levels among the highest in the world for seawater bodies. The other two plants are located on the opposite side of a peninsula on the east coast of a country, facing the sea. The engineering challenges have been addressed with a variety of advanced desalination technologies. Two of the sites use filters for treatment of the raw seawater before the seawater moves to the high-pressure desalination system. Both plants use modern desalination technologies and energy recovery devices to minimize energy usage. One of the sites uses another filtration system to better protect against accidental oil spills and seasonal algal blooms. The desalination plant will use special filters specifically designed for this sort of plant. All three plants use the highest efficiency energy-recovery devices available.

Project 6. Water Treatment Project

Project Type: Water Treatment Plant

Description: By 2005, severe drought had caused this reservoir's levels to drop below 20% of total capacity. This area is one of the most heavily urbanized regions on its continent. It continues to experience population growth, and it is expected to grow from 2.8 million to 4.4 million people by 2026. This project in the southern hemisphere uses a multi-step treatment process to recycle treated wastewater from the region's major wastewater treatment plants into water that is safe to drink. The water reuse plant will provide a water source for power stations, industry, and agriculture. It will also supplement drinking water supplies in regional dams and contribute to longer-term water management.

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Waterworks Project Clues ANSWER KEY

1. Wetlands Project - 37°N, 77°W (Bermuda Hundred, Virginia, U.S.)

2. Los Palis Water Supply Project - 19°N, 71°W (Los Palis, Haiti)

3. Orkeeswa Secondary School - 3°S, 36°E (Lashaine Village, Monduli District, Arusha Region, Tanzania)

4. London Tideway Tunnels - 51°N, 0°W (London, England, United Kingdom)

5. Sharjah Desalination Plants - 25°N, 55°E (Sharjah, United Arab Emirates)

6. Luggage Point Advanced Water Treatment Plant - 27°S, 153°E (Brisbane, Queensland, Australia)

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