Horizontal Well
(Radial Collector’s Well)
Introduction of Collector Well System

1. What is Collector well?
   Collector well system refers to the one of tubewell systems being abstracted groundwater from aquifers in the alluvium such as sand and gravel layer through radial tubewells which are drilled and installed horizontally inside concrete caisson.

2. Investigation
   A. Site Survey
      1) Adjacent Basin Status Survey
         Survey on catchment area, available quantities of groundwater and the status of existing facilities
      2) Soil Investigation
         Investigate the condition of subsoil layer, aquifer and elastic wave exploration through drilling investigation

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<tr>
<th>Drilling Investigation</th>
<th>Typical Drawing of Drilling Investigation</th>
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<tbody>
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<td><img src="image1.jpg" alt="Drilling Investigation" /></td>
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3. Design Process

• A. Identify Collectable Quantities

   Determine optimum collectable quantities of groundwater based on size of catchment area, condition of aquifer and existing intake works.

• B. Determine Concrete Caisson

   Determine the depth of concrete caisson based on the condition of aquifer and pumping water level. Determine the diameter of concrete caisson based on equipment size for collectable quantities of groundwater

• C. Determine Horizontal Drilling Extention

   Determine the numbers, diameter and length of horizontal borehole to be drilled based on the condition of aquifer and collectable quantities of groundwater.
4. Construction Process
A. Erection Of Concrete Caisson

1) Plate Work
2) Installing Mold & Filling Concrete
3) Digging Out Subsoil
4) Singking Down Concrete Caisson
5) Collector Well Completed
6) Power System Panel Completed
B. Horizontal Well Drilling

1) Horizontal Drilling Machine

Horizontal drilling machine should be able to perform “SHIELD BORING”.

SHIELD BORING proceeds drilling works simultaneously with CASING and ROD, and is required for drilling with mud.
B. Horizontal Well Drilling

2) Drilling

Rotate the drill rod attached with internal tricone bit using horizontal drilling machine and insert external casings together.

The horizontal drilling machine is operated by hydraulic oil system, and length of casing and drill rod are designed 1.5-2.0M long each for drilling to complete a borehole with 300MM dia.

Casing and Drill Rod

As key tools for drilling, a tricone bit is attached forehead at most of the internal drill rod of a horizontal drilling machine and this provides internal space for insertion of the casing (SHIELD PIPE).
B. Horizontal Well Drilling

3) Installation of Well Material

After reaching the required depth, drill rod and drill bit are pull out in casings and dismantled to prevent the inflow of sand and gravel followed by the insertion of well materials.

STS Wire Wound Screen is used as a well material with an opening ratio of 25 – 30% and a SLOT spacing of 0.5-1.5mm depending on the condition of subsoil.

4) Pulling Out Casing

After the installation of well materials is completed, pull out the casings using a packer.
5) Completion
After installing well materials and pulling out casings, horizontal drilling process is completed. Install the valves on the completed horizontal well and continue the well drilling process for the next tubewell until required numbers to be constructed. The water that comes out at first is mixed with slime. However, it clears up after air jetting, air surging and natural surging process.

6) Pumping Test
Conduct a pumping test to determine the optimum pumping rate
B. Horizontal Well Drilling

7) Installation of Pump

After the pumping test, install submersible pump and motor in accordance with the pumping test results.

Pumps and motors installed must be submersible type and prepared with spare pumps and motors for maintenance purposes.
Example 1: Rhine River (Germany)
Example 2: Water supplied for the maintenance of river of Jangjichon, South Korea
Groundwater enhances public water supply
C. Project with Air Kelantan Sdn Bhd

Setting Borehole

Groundwater enhances public water supply
C. Project with Air Kelantan Sdn Bhd

Soil Test

BH 1 – Soil Test – Loji Pintu Geng Kelantan

BH 2 – Soil Test – Kg. Checah, Kelantan

BH 1 – Soil Test – Pasir Tumboh, Kelantan

BH 1 – Soil Test – Air Lanas, Kelantan

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Soil Test - Samples

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Site Activities
C. Hydrogeologist Survey

Groundwater enhances public water supply
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C. Hydrogeologist Survey

Water Treatment Plant