INTAKES

INTRODUCTION

An intake is a device or structure placed in a surface water source to permit withdrawal of water from this source and its discharge into an intake conduit through which it will flow into the water works system. Types of intake structures consist of intake towers, submerged intakes, intake pipes or conduits, movable intakes, and shore intakes. Intake structures over the inlet ends of intake conduits are necessary to protect against wave action, floods, stoppage, navigation, ice, pollution, and other interference with the proper functioning of the intake.

Intake towers are used for large waterworks drawing water from lakes, reservoirs and rivers in which there is either or both a wide fluctuation in water level or the desire to draw water at a depth that will give water of the best quality to avoid clogging or for other reasons.

Operating and Maintenance Procedures of Intakes

Problems in Operations

- Fluctuations in water level,
- Water withdrawal at various depths,
- Hydraulic surges, ice, floods, floating debris, boats and barges,
- Withdrawal of water of the best available quality to avoid pollution, and to provide structural stability,
- Operation of racks and screens to prevent entry of objects that might damage pumps and treatment facilities,
- Minimizing damage to aquatic life,
- Preservation of space for
- ❖ Equipment cleaning,
- ❖ Removal and repair of machinery,
- ❖ Storing, movement and feeding of chemicals.

ROLE OF OPERATOR

- Cleaning of work area (sweeping, cutting bush around the source and pumping area)
- Painting of pump and generator house and surrounding
- Inspection, greasing and replacement of worn out parts of equipment
- Inspection, cleaning and replacement of pipe work and in storage tanks
- Systematic arrangement of maintenance activities so that components of equipment and other facilities will not

TYPES OF INTAKES

- River intakes
- Spring intakes
- Lake Intake
- Infiltration gallery

Operation and Maintenance Activities

- Patrol catchment area for damage/harmful activities;
- Report catchment degradation to WRUA and WRMA;
- Patrolling the gravity or the rising main.
- Patrol perimeter fence and repair;
- Clear weir wall and screens of any debris;
- Check walls or supports for any damage, undercutting, bypassing and repair;
- Open washout on weir wall and remove accumulated silt;
- Open washouts to clear out silt from chambers;
- Clear screen of any material and replace if damaged;
- Disinfect spring box if someone has entered;
- Read master meter.

Materials

- pipe wrench
- Tools – shovel, rake
- Valve key/ wheel

Spares & Tools

- Steel brush
- Die-stock
- Joining compound
- Pipe cutter
- Chain wrenches
- Pipe wrenches
- Mesh for screens;
- Valves
- Masonry materials
- Masonry trowel
- Spirit level
- Mason hammer
- Shovel

TROUBLE SHOOTING

SPRING INTAKES		
Problems	**Probable Cause**	**Possible Solutions**
Leaking gate valve	Worn out valve	Replace stuffing box packing in gate valve replace entire valve
No/ little water flowing into intake chamber	Inlet pipe blocked	Inspect source and unblock pipe
Overflow from intake chamber	Gate valve blocked Blockage in pipeline (e.g. airlock) Damaged strainer Clogged strainer	Remove and clear valve(replace if necessary) Check/open nearest air valve Replace strainer Clean strainer
Dirty water	Silt in chamber	Clean out chamber
River Intakes with Weir Wall or Sump		
Problems	**Probable Cause**	**Possible Solutions**
No/ little water flowing into intake chamber or sump	Screens on inlet chamber clogged	Clean screens
Erosion around side of weir wall	Insufficient height of wing and cut off walls to prevent flow around the weir	Construct or raise wing and cut off walls to prevent flow around weir
Undercutting of weir wall on downstream toe or undercutting of sump	Excessively turbulent flow over weir wall and insufficient width of downstream apron	Provide protected apron (concrete, grouted rip rap, etc.) at toe of weir wall or around base of sump.
Dirty water	Excessive sediments upstream of weir wall Silt in intake chamber or sump	Clean out sediments from area immediately upstream of weir Clean out chamber Protect catchment from severe erosion.

TROUBLE SHOOTING

INFILTRATION GALLERY		
Problems	**Probable Cause**	**Possible Solutions**
No/ little water flowing into intake chamber or sump	👍 No water within sandy material in river bed 👍 Perforated pipe is blocked or damaged	👍 Excavate shallow well to determine whether there is water in the sand in the river bed 👍 Remove filter drain and draw off pipe and reconstruct infiltration gallery. Consider additional protection for draw off pipe
Dirty water	👍 Filter material (gravel/sand) washed away and replaced with silt or silt laden sand 👍 Silt in intake chamber or sump	👍 Check condition of filter drain. Replace filter material if required. Consider additional protection of filter material. Clean out sump

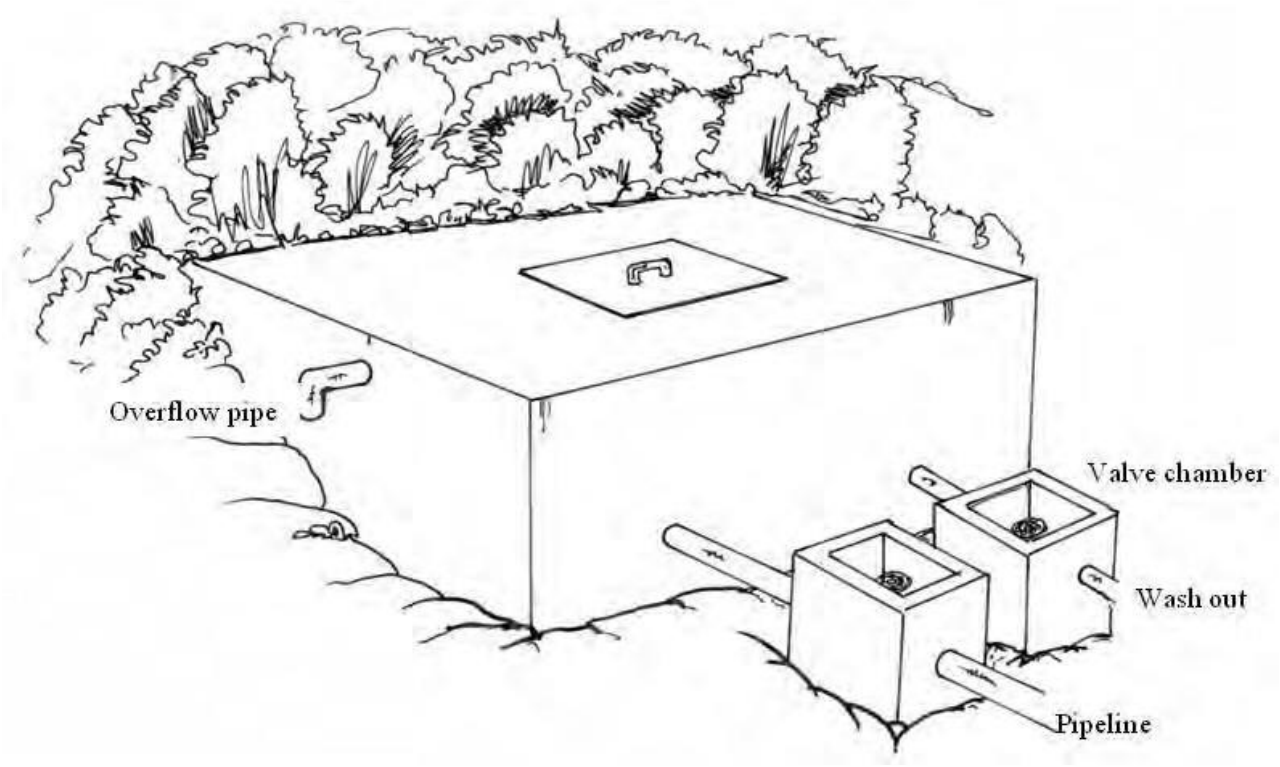


Fig. Spring Intake

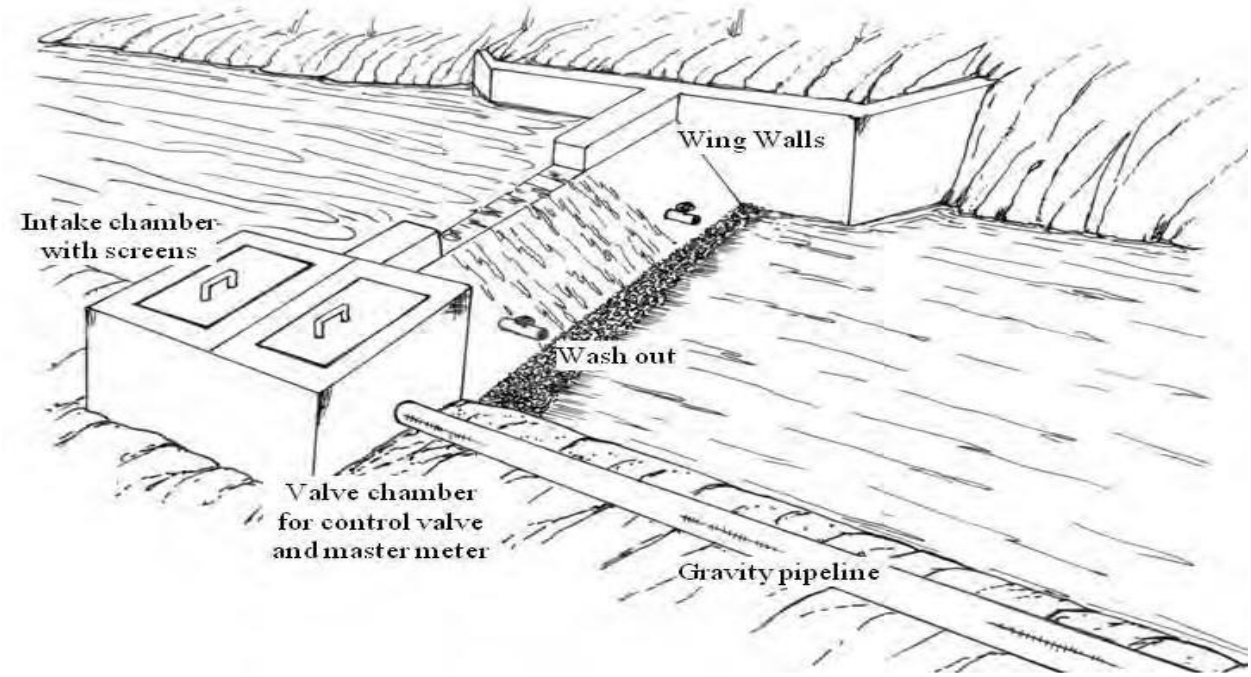


Fig. River intake with Weir

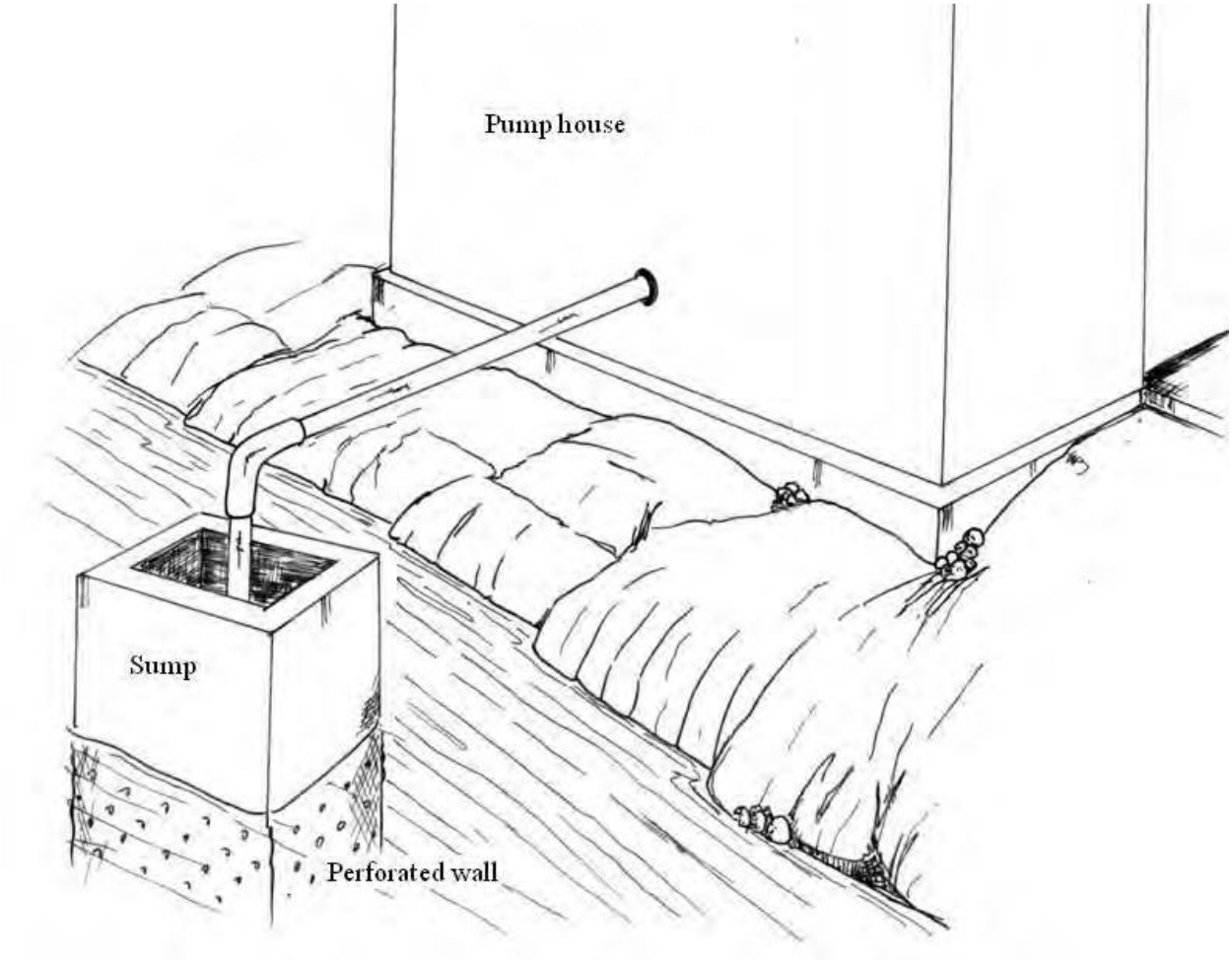


Fig. River Intake with sump