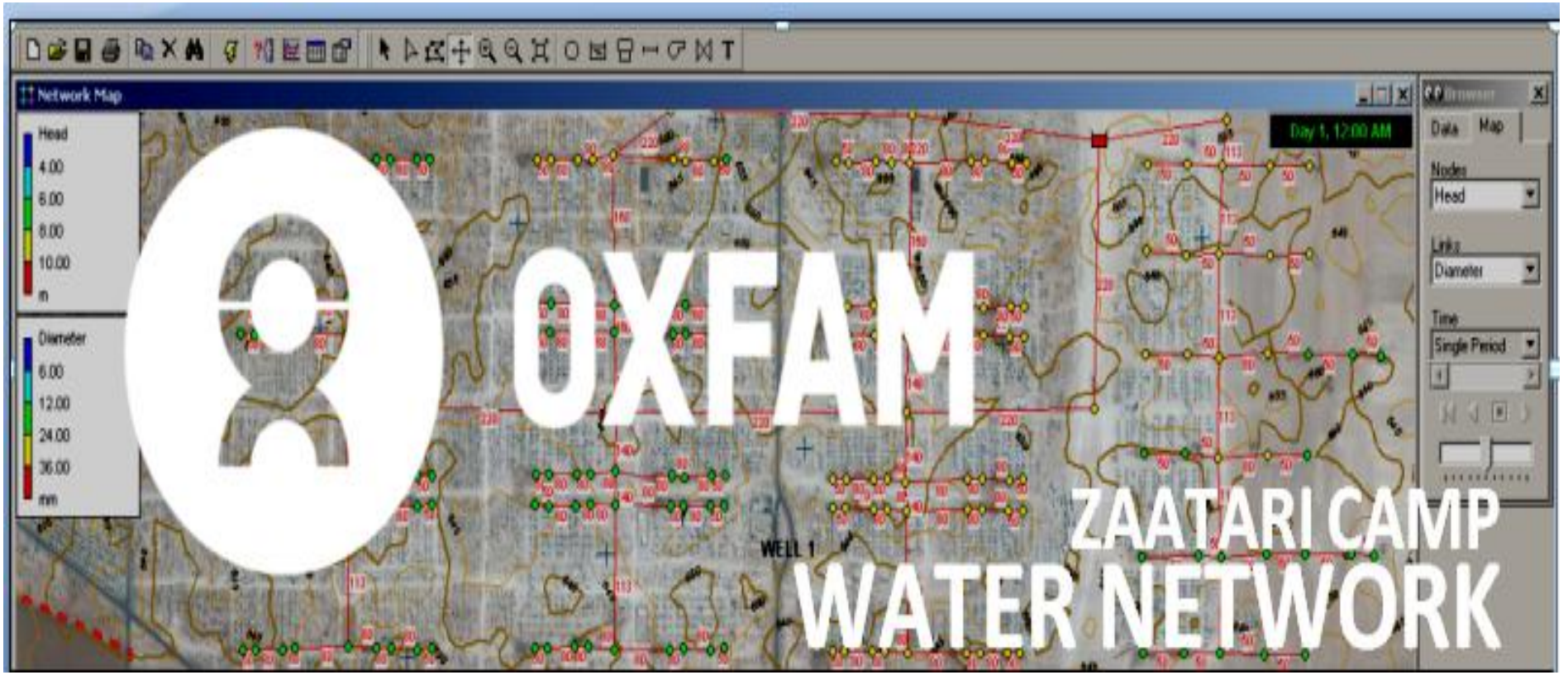


February 2014

ACTED JEN OXFAM MercyCorps unicef UNHCR The UN Refugee Agency

Parameters – Water Demand

- Revised design = 100,000 Refugees
- Water Requirement = 35 l/p/d
- Total Water Demand = 3,500,000 litres
- Total Demand in M3 = 3500 M3

OXFAM

Parameters - Water Availability

- Borehole 1 (50m3/hr) = 1100m3/d
- Borehole 2 (60m3/hr) = 1320m3/d
- Total Water Available = 2420m3/d

  Based on 22 hr/day pumping

Note: Additional water sources required to meet full camp water demand (3,500-2420 = 1080 m3/d (31%) additional needed)

OXFAM

Design Assumptions

- The current water distribution system in the camp is mainly through water trucking from the two private boreholes outside of but close to the Za'atari camp
- Two Boreholes (BH1 and BH2) inside the camp, which will be treated as the main water provision points with add on trucking (31%) as a temp measure till further resources are added to the system
- The water distribution network to be designed in loops and the loops to be inter connected to counter any stoppage due to borehole break downs
- Design to minimize O&M costs
- Currently Gravity fed distribution system for whole camp
- Storage Capacity design includes 1 day storage

OXFAM

WASH block data

- The design to include water will be supplied to all 346 existing WASH blocks to water collection and toilet level
- The breakdown for WASH blocks construction is 247 permanent structures and 99 prefab WASH units. The breakdown of WASH blocks on gender basis:
  - 166 Male and 180 Female
  - 52 Wash blocks missing

OXFAM

Risks

- Vandalism of structures
- Vandalism of pipes (Leakage and Private connections)
- Water distribution equability
- Contamination
- Hand Over?
- Increased cost

OXFAM

Risks Mitigation

- Vandalism of structures- To develop ownership and have Limited numbers
- Vandalism of pipes (Leakage and Private connections)- To develop ownership and have Limited Transmission lines
- Inequitable water distribution – software and operating regime (Demand Management)
- Contamination – Secured distribution system in place- Piped network
- Hand Over – Identification of operators and agree on process and clear way forward

OXFAM

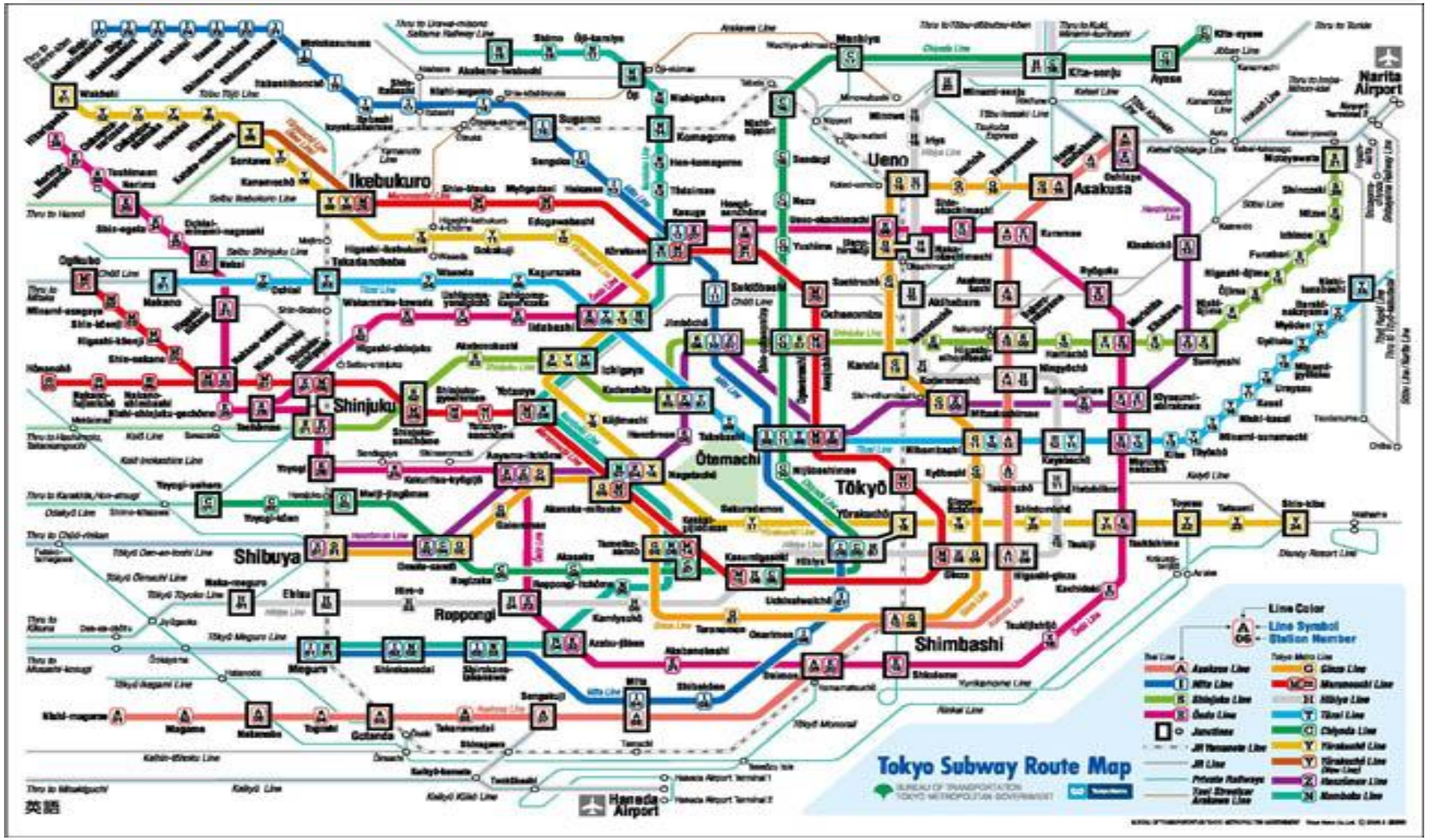
Highest points for Central Storage

Topographic Survey

District Grids

Outline Design Options

Outline Design Option

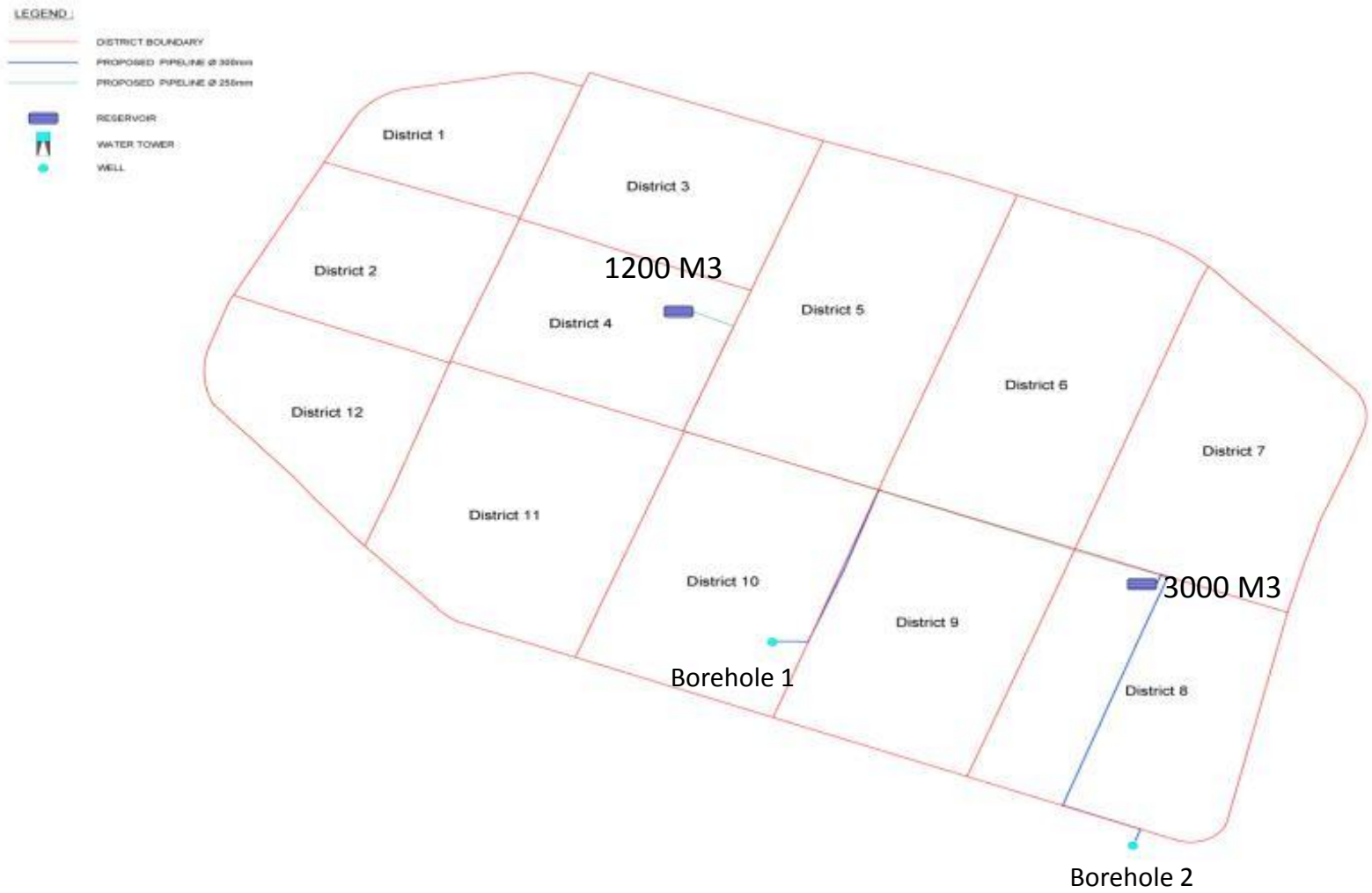


Revised Options considered by the Consultants

- **Option 1:** The Network is supported by combination of ground and elevated water tanks connected to main camp transmission lines
- **Option 2:** Each District to have individual elevated water storage tanks connected to each other through the network rings
- **Option 3:** New camp (District 5,6,7,8,9,10 and 11) to have individual district level combination of ground and elevated water storage tanks connected to each other through the network rings. Old camp to be connected to one central water storage and further connected to the main ring, each district distribution lines can be isolated to cater emergency needs
- **Option 4:** New camp District 5,6,7,8,9,10 and 11 to have individual district level elevated water storage tanks connected to each other through the network rings. Old camp to be connected to one ground level cluster of centrally located T-95, each district distribution lines can be isolated to cater emergency needs

OXFAM

Outline Design Option 1

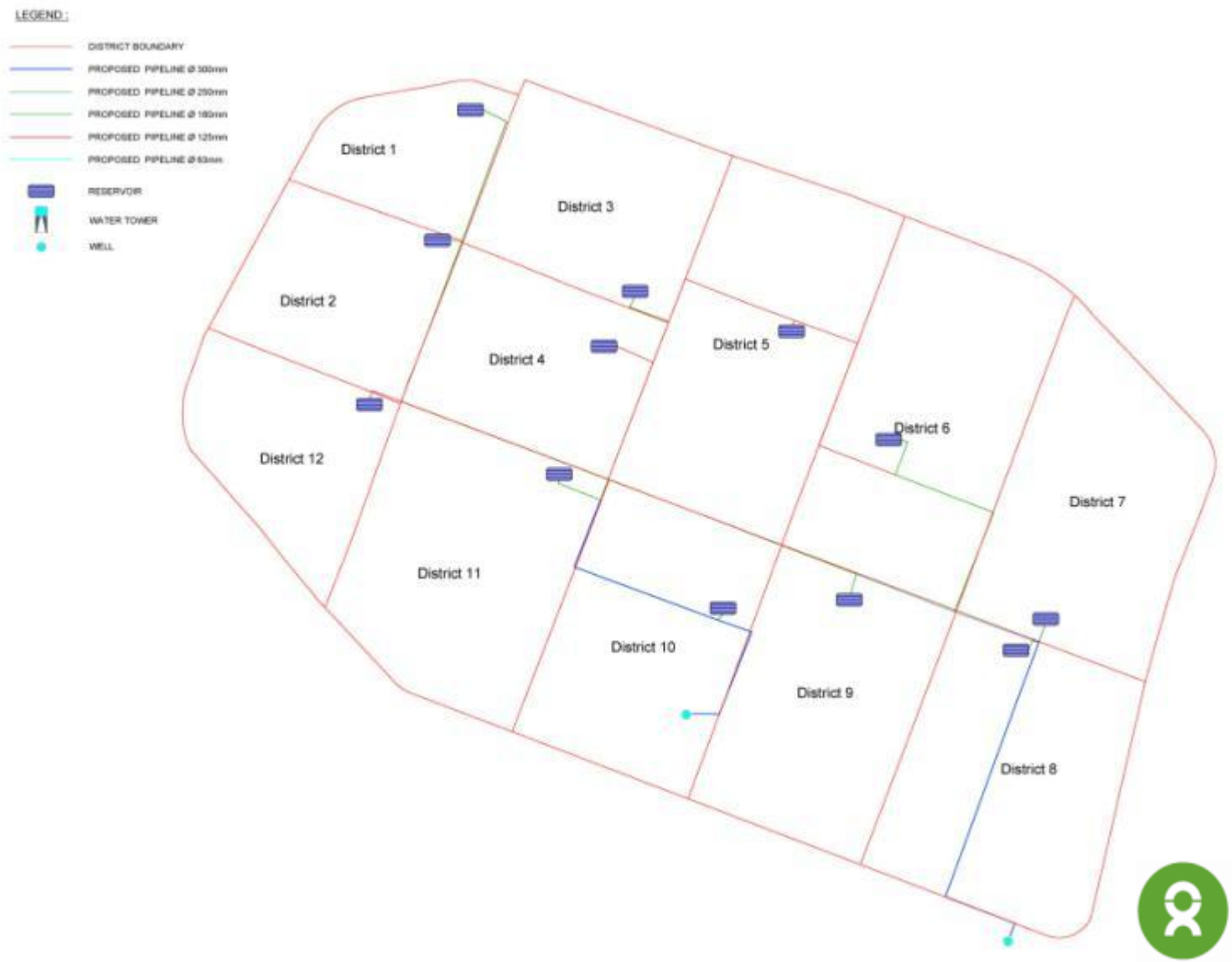


OXFAM

Outline Design Option 1 (New Camp)

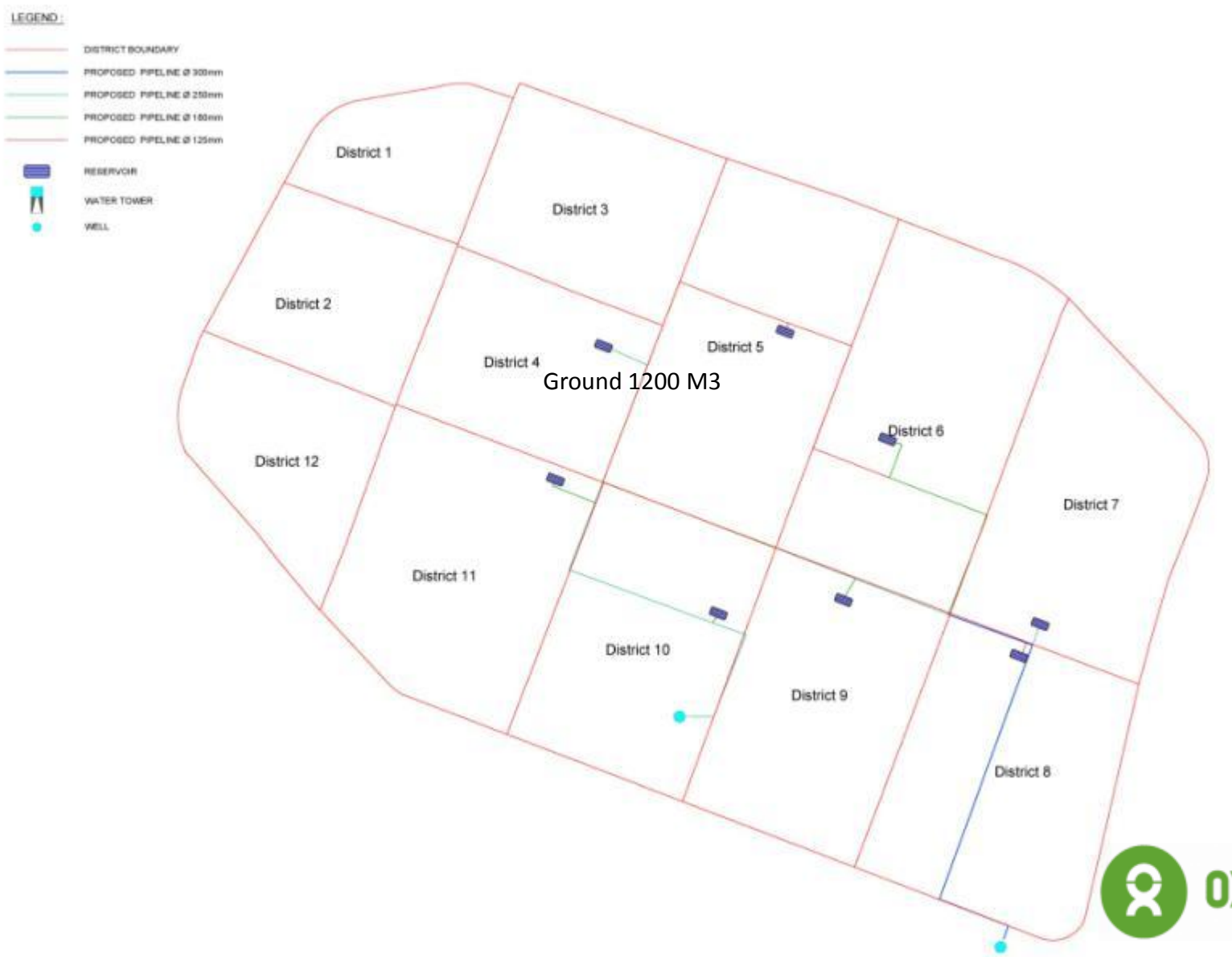
Outline Design Option 1 (Old Camp)

Outline Design Option 2



OXFAM

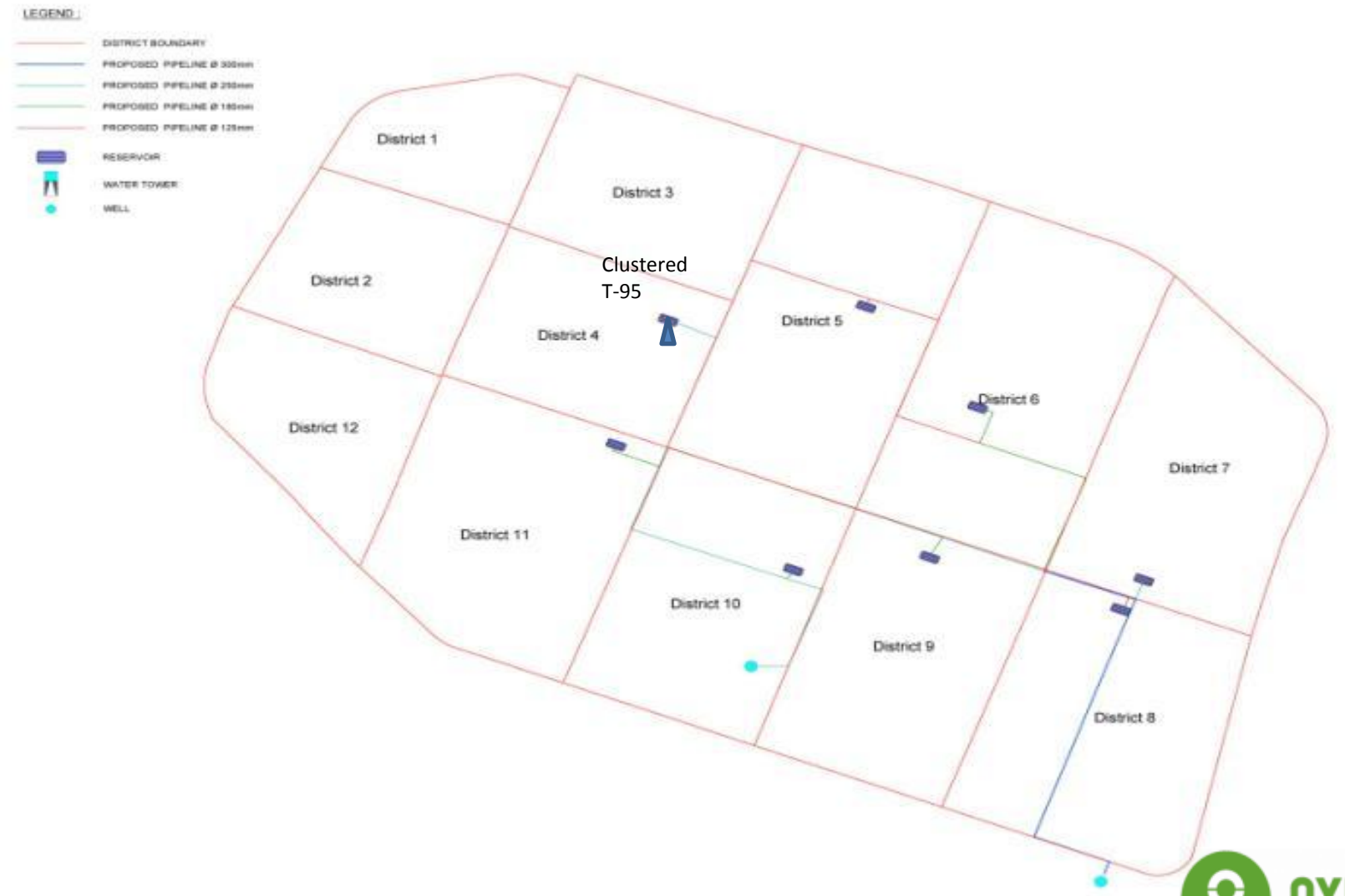
Outline Design Option 3



OXFAM

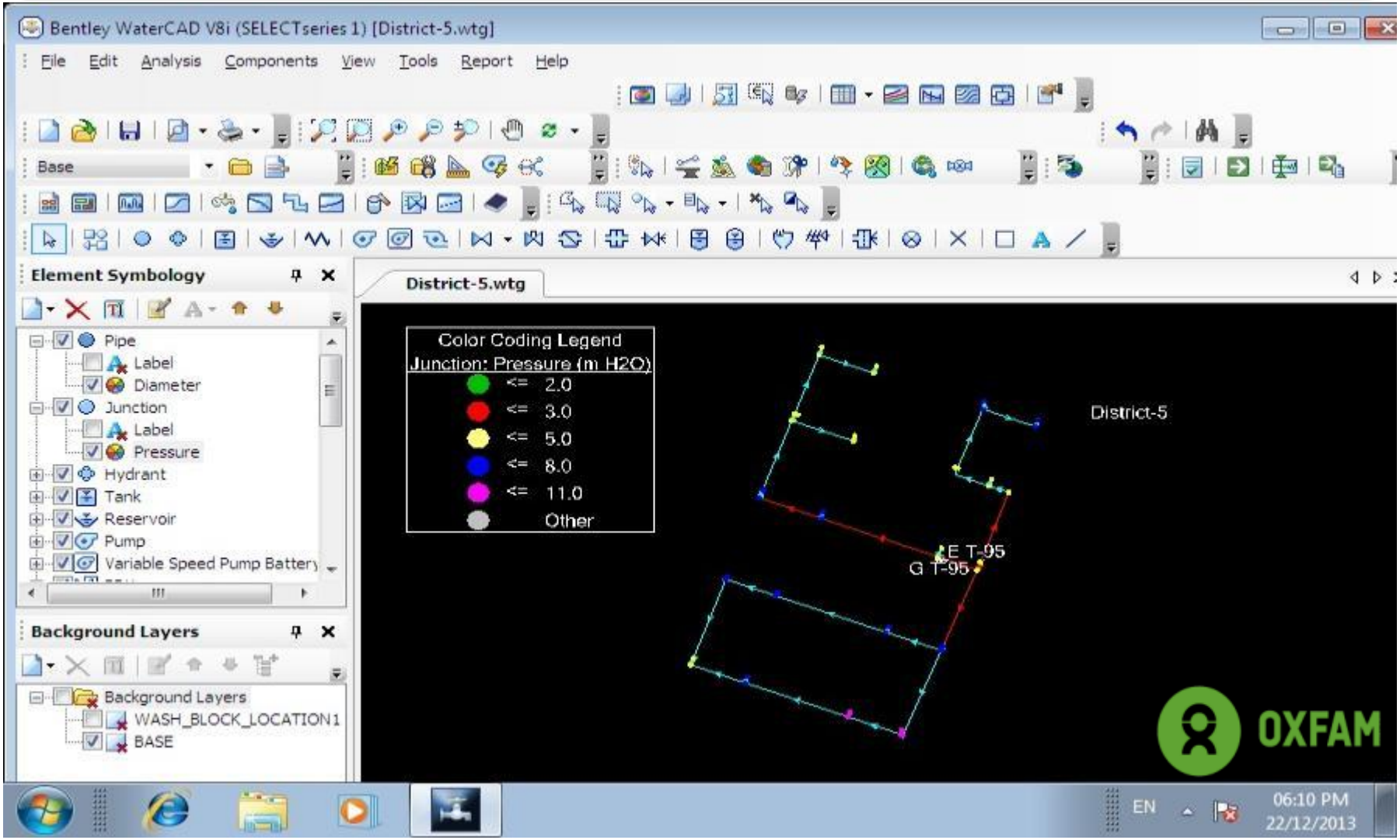
Outline Design Option 3 (Old Camp)

Outline Design Option 4

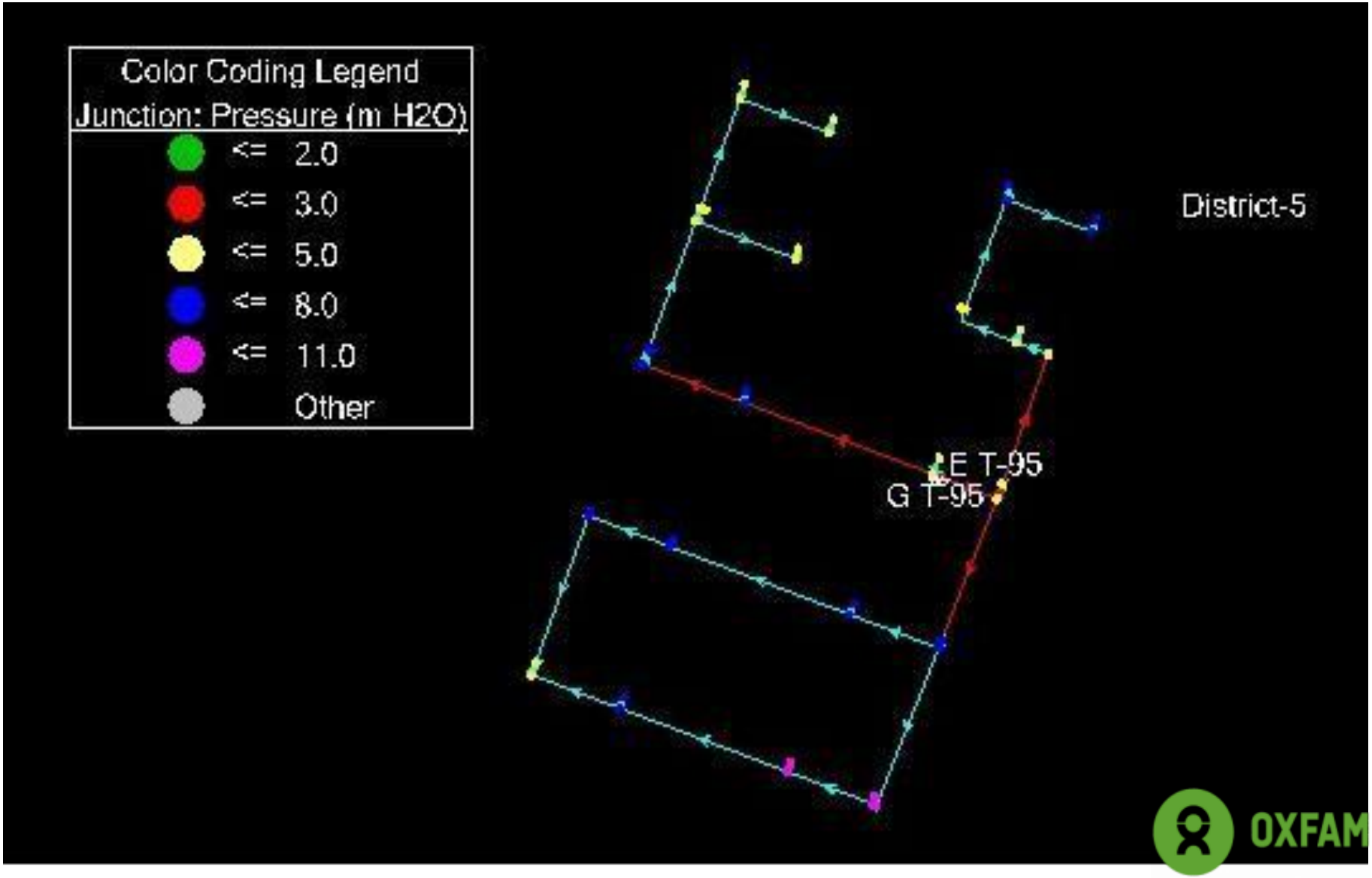


Outline Design Option 4 (Old Camp)

District Network (WaterCAD)



Detailed Engineering Design District 5



SUPPLY SYSTEM OPTIONS ASSESSMENT CRITERIA

Item #	Criteria	Weighting of criteria
1	Capital cost	20
2	Risk to program implementation and time frame .	15
3	Ability to effect water conservation	15
4	Ability to prevent water system contamination	20
5	Ability to maximize technical operating efficiency and monitoring	20
6	Ability to respond, test, trace, isolate, monitor and control water distribution during outbreak.	5
7	Ability to minimize loss of supply due to repairs or maintenance.	5

OXFAM

SUPPLY SYSTEM OPTIONS AND ASSESSMENT CRITERIA

	Options	Criteria for sustainability	%age of Criteria for sustainability	Capital cost		Risk to Programme Implementation and time frames		Ability to effect water conservation		Ability to prevent water system		technical operating		test, monitor, update, monitor and control		loss of supply due to during peak		maintenance
				1		2		3		4		5		6		7		
				Avg	W	Avg	W	Avg	W	Avg	W	Avg	W	Avg	W	Avg	W	
1	OXFAM Option 1	231.67	18.12%	1.6667	33.333	2	30	3	50	3	60	2	40	2	12	1	7	
2	OXFAM Option 2	313.33	24.51%	4	73	2	35	4	55	3	60	3	53	4	18	4	18	
3	OXFAM Option 3	336.67	26.34%	3.6667	73.333	3	40	4	65	3	60	3	67	3	17	3	15	
4	OXFAM Option 4	396.67	31.03%	4.6667	93.333	2	35	4	60	4	80	4	80	5	25	5	23	
	Total	1278.33																

Network Costs

Design Option	Cost (3 Factor)
Outline Design Option 1	**JOD 5,405,291**
Outline Design Option 2	**JOD 4,266,103**
Outline Design Option 3	**JOD 4,937,423**
Outline Design Option 4	**JOD 5,309,796**

OXFAM

The End

Questions Welcome