

EPIC CASE STUDY

AL FANATEER CORNICHE

ROYAL COMMISSION FOR JUBAIL & YANBU · JUBAIL INDUSTRIAL CITY, SAUDI ARABIA

A 400 m^2 plot the client asked to see monitored against a 50% saving target. The sand it was built with was too salty for turf, so the system flushed itself.

2.05	>80%	0.91 → <0.4
L/M²/DAY	SAVING DEMONSTRATED	SALINITY, FLUSHED
vs 20 on site	against a 50% target	by the system itself

EVIDENCE LEVEL

MEASURED · Jointly monitored, RCJY/SATCO with EPIC · daily water-meter log Dec 2011 to Mar 2012 · salinity readings

Turf growth after two months at the Al Fanateer Corniche plot, Jubail, February 2012.

PROJECT RECORD

CLIENT	Royal Commission for Jubail & Yanbu (RCJY)
LOCATION	Community Area, Danah Road × Danah 3, Jubail Industrial City, Saudi Arabia
MONITORING	Eng. Faisal Al Khatib, SATCO, designated main coordinator on behalf of the Royal Commission, with two Epic Green Solutions team members stationed in the eastern province
CONTRACT	SATCO Contract No. 951-S24
AREA AND WATER	400 m^2, planting type turf (carpet grass); water source TSE
INSTALLATION	10 to 17 December 2011; turf installed 17 December 2011
INITIAL CHARGE	19 m^3 from lorry tanker plus 19 m^3 from main supply line, to saturate the sand profile
INITIAL FERTILISER	100 kg slow release 15-15-15 plus 10 kg slow release 20-20-20
CLIENT'S TARGET	50% water saving, on which the Commission would look to award installation contracts

THE PROBLEM

In October 2011 Sheikh Faisal Al Rasheed, Director of Planning at RCJY, invited EPIC to carry out a pilot in Jubail, monitored by the Commission. The condition was explicit: achieve 50% water saving against existing systems, and RCJY would look to award installation contracts for environmental remediation and irrigation in areas under its control.

Two site conditions worked against the trial from day one. The soil condition at the time of landscaping is recorded as “Very Poor (High Salinity Content in Sand (Not Washed)”, the turf supplied was of poor quality, and the plot went in during the grass hibernating season.

There is also a structural problem at Al Fanateer that the liner solves incidentally: a high water table and proximity to the sea mean sea water permeates into traditionally landscaped areas run by the Commission. It cannot permeate into an EPIC profile.

WHAT EPIC BUILT

One self-contained 400 m^2 plot, turfed, with reservoir tank, float valve, inlet and 90° elbow, and an observation port through which the standing water level in the cell could be read daily.

On 28 December, eleven days after turfing, soil salinity was found above acceptable levels (0.91 on the soil probe scale against a recommended 0.1 to 0.4 for turf), caused by unwashed sand and excess fertiliser mix. Electrical conductivity readings in the tank and drain line were 9 and 16, translating to 5,760 ppm and 10,240 ppm TDS.

The system flushed itself. A hose is attached to the inlet valve at the supply vault and the pump turned on; the water level in the cell is raised enough to flood most of the depth of the profile in fresh water and is then drained, carrying the excess salinity out with it. “No modification to the system or special equipment is required to perform this flushing procedure.”



Dec 2011 Chambers and liner going in at Al Fanateer Corniche.



Chamber and connector before the sand layer.

2.05
L/M²/DAY
VS 20 ON SITE

>80%
SAVING DEMONSTRATED
AGAINST A 50% TARGET

0.91 → <0.4
SALINITY, FLUSHED
BY THE SYSTEM ITSELF

THE RECORD

Water consumption over 105 days from turfing on 17 December 2011.

JUBAIL CORNICHE PARK PLOT	LESS FLUSHING	LESS FLUSHING AND CHARGING
Water added, tanker	22.5 m³	22.5 m³
Water added, pump	79.5 m³	79.5 m³
Total	102 m³	102 m³
Removed for flushing	16 m³	16 m³
Used for charging the profile		38 m³
Water attributable to the plot	86 m³	48 m³
Days · plot area	105 days · 400 m²	105 days · 400 m²
Litres / m² / day	**2.05**	**1.14**

Readings are from the SATCO daily water meter log and run to 17 March 2012. The March 2012 project report to the Royal Commission states that no further water was added before 1 April 2012; the per day figures are calculated on that basis, as water attributable to the plot divided by 105 days and 400 m². Charging and flushing are one-time operations, not ongoing use. The comparison figure for the existing pop-up sprinkler system at Al Fanateer is 20 L/m²/day; industry averages for turf and landscaping in this part of the world are given as 12 to 18 L/m²/day.

SALINITY AND ROOTING

DATE	READING	NOTE
28 Dec 2011	0.91 at ~25 cm depth	Above the 0.1 to 0.4 recommended for turf; 7 m³ added for soil leaching
29 Dec to 3 Jan	Flushing	System flushed 29 Dec, 31 Dec (a further 9 m³ added) and 3 Jan
4 Jan 2012	below 0.4	Accepted as the optimum recommended level for turf
21 Feb 2012	Roots to at least 20 cm	Good progress on greening and rooting

Soil activity at depth against a normal sprinkler system, from the Royal Commission installation summary, December 2011: at 10, 15 and 25 cm, EPIC 0.22, 0.33 and 0.65 against sprinkler 0.04, 0.07 and 0.06.

ALSO ON THE RECORD

THE RESULT AGAINST THE TARGET

> "At this time we are demonstrating water savings in excess of 80% over normal water usage from typical irrigation systems for this climate."
>
> March 2012 project report to the Royal Commission. The client's target was a 50% saving.

- **Why there is a rest cycle.** "One of the reasons the Epic system has a rest cycle between adding water is to allow the sand profile to absorb oxygen as it dries out and the pore space opens up. When the water is periodically added carbon dioxide is pushed from the sand profile… This constant exchange of oxygen and carbon dioxide is very beneficial for the plants and sand profile."
  March 2012 project report to the Royal Commission

- **Operating rule.** The report records that someone at site inadvertently added 1 m^3 of water on 25 December which was not needed and should not have been added, and uses it to set the operating rule that water is added only at the direction of the EPIC representatives on site.

- **Brown spots.** Turf growth after two months showed some brown spots, attributed in the report to the poor quality turf supplied for installation.



New roots into the sand profile.



Root plug lifted from the plot after two months.



Conductivity and soil activity readings taken on site.



The plot, greening up as the weather warmed.

RECORDS Project report to the Royal Commission for Jubail & Yanbu, March 2012, with the SATCO daily water meter log (Contract No. 951-S24); Royal Commission installation summary, December 2011.