



Verification Report for

Project : Hasnapur Earthen Dam, Storage and Water Supply
Project Activity Junagadh, Gujarat, India.

UCR Project ID : 304

Name of Verifier	SQAC Certification Pvt. Ltd.
Date of Issue	June 30, 2023
Project Proponent	Junagadh Municipal Corporation, Water Works Division, Junagadh, Gujarat
UCR Project Aggregator	Gram Vikas Trust, Gujarat, India.
Work carried by	Mr. Santosh Nair
Work reviewed by	Mr. Praful Shinganapurkar

Summary:

SQAC Certification Pvt. Ltd. has performed verification of the “Hasnapur Earthen Dam, Storage and Water Supply Project Activity Junagadh, Gujarat, India”. Junagadh Municipal Corporation is the project proponent (PP), which maintains the project activity and ensures that safe drinking water (SDW) is supplied to the residents within the Junagadh city area limit. The project activity is a man-made construction structure involving a large catchment area that conserves and stores excess rainwater for future requirements in the Junagadh city of Gujarat. The project activity fulfills the UCR RoU requirements for “measures undertaken for conservation and storage of excess surface water for future requirements.”

The project activity meets the following UN SDG's:



Verification for the period: **01/01/2014 to 31/12/2022.**

Accredited by 5 Jupiter House, Callera Park, Aldermaston, Reading Berkshire RG7 8NN, United Kingdom (UK).

India Office: Off. No. 4, Fifth Floor, Buildmore Business Park, New Canca Bypass Road, Khorlim, Mapusa, Goa – 403 507

Web: www.sqac.in

Email: info@sqac.in Tel: 7219716786 / 87





In our opinion, the total RoU's over the crediting / verification period stated in the Project Concept Note and Monitoring Report, PCNMR submitted to SQAC are found to be correct and in line with the UCR guidelines.

The verification was done remotely by way of video calls / verification, phone calls and submission of documents for verification through emails.

SQAC is able to certify that the RoU's from Hasnapur Earthen Dam, Storage and Water Supply Project Activity Junagadh, Gujarat, India (UCR ID – 304) for the period 01/01/2014 to 31/12/2022 amounts to **9000000** RoUs

Detailed Verification Report:

The project activity is pre-approved under the UCR RoU program for the following scope:

- Scope 2 (Measures for conservation and storage of excess surface water for future requirements.)

Purpose:

The project activity Hasnapur Earthen Dam, Storage and Water Supply Project Activity Junagadh, Gujarat, India, is a man-made construction structure involving a large catchment area that conserves and stores excess rainwater for future requirements in the Junagadh city of State: Gujarat. The project activity fulfils the UCR RoU requirements for “measures undertaken for conservation and storage of excess surface water for future requirements.” The project activity achieves universal and equitable access to safe and affordable drinking water for all. The project activity ensures sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity. The project activity protects and restores water-related ecosystems, including surrounding forests in the area.

Project Name	Hasnapur Earthen Dam, Storage and Water Supply Project Activity Junagadh, Gujarat, India.
UCR Scope	RoU Scope 2
Catchment Area	8.86 sq. miles
Reservoir	Area: 420.4 acres Capacity (FSL): 324 million Ft ³
Type of Structure	Earthen Dam
Length (ft)	1201
Top Width (ft)	16
Height (ft)	75
Base Width (ft)	400



Commissioning	1964
Purpose	Rainwater runoff storage and water supply
Average Rainfall	42 inches
Run off Coefficient	30.00%
Evaporation and absorption losses	270 million ft ³
Replenishment	260 million ft ³
Catchment Capacity	324 million ft ³
Net Storage for SDW	270 million ft ³
Waste Weir Type	Ogee Type
RoU Crediting Period	01/01/2014 - 31/12/2022 (Both Days Inclusive)
Total RoUs Generated for the Crediting Period	9,000,000 RoUs (1 RoU = 1000 litres)

JUNAGADH WATER SUPPLY SCHEME (145)

APPENDIX No.5,
HASNAPUR RESERVOIR,
SALIENT FEATURES.

I. GENERAL:-	
1. Catchment Area.	8.86 Miles.
2. Average Annual Rainfall.	42 Inches.
3. Run Off Coefficient.	30%
4. Replenishment.	260M.Cft.
II. RESERVOIR:-	
5. Area at F.S.L. (R.L. 396.00).	420.4 Acres.
6. Capacity at F.S.L. (R.L. 396.00)	324 M.Cft.
7. Capacity at sill of outlet. (R.L. 362.00).	22.5 M.Cft.
8. Evaporation and absorption losses.	55.10M.Cft.
9. Net storage available for water supply.	270. M.Cft.
III. EARTHEN DAM:-	
10. Length.	1201. Feet.
11. F.S.L. R.L.	396.00
12. H.F.L. R.L.	403.00
13. Top of Dam R.L.	410.00
14. Top width of Dam.	16 Feet.
15. Maximum height.	75 Feet.
16. Maximum base width.	400 Feet.
17. Slopes 1. Upstream.	2:1 Upto H.F.L. (403.00)
	3:1 Below H.F.L. R.L. (403.00)
2. Downstream.	2:1 Upto R.L. 380.00
	4:1 Below R.L. 380.00
18. Top of pitching.	407.00
19. Free Board.	7 Feet.
IV. WASTE WEIR:-	
20. Type.	High coefficient ogee type weir. (C = 3.98)
21. Length.	200 Feet.
22. Maximum Flood Discharge.	17,230 Cusec.
23. Flood depth.	

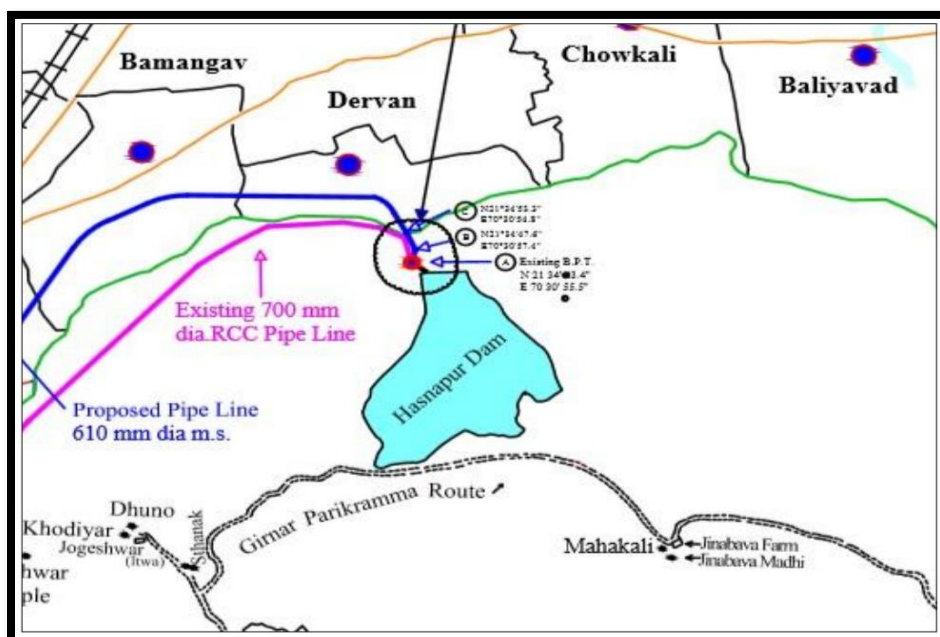
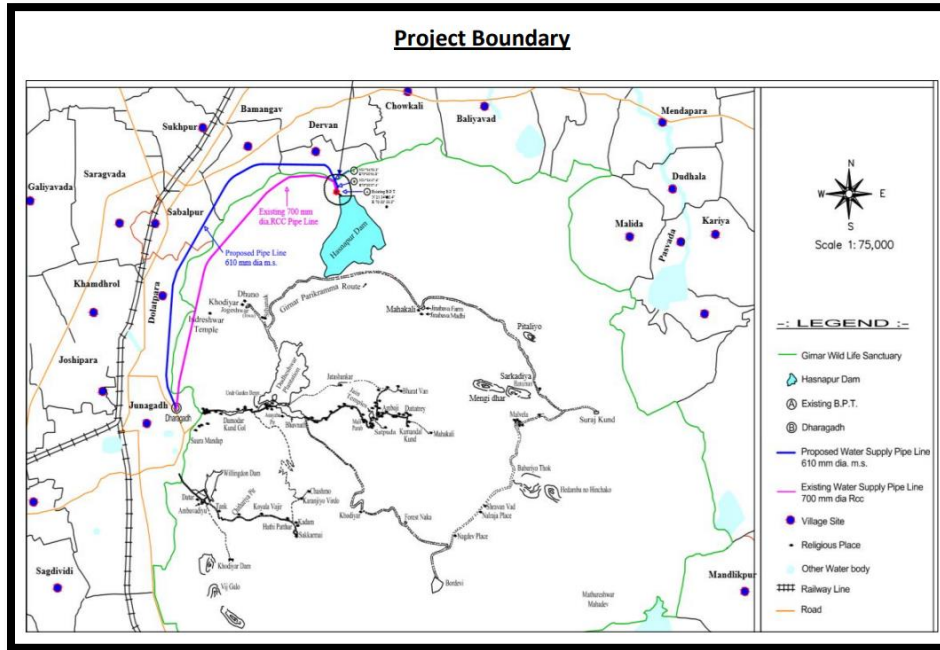
Hasnapur Dam Water Supply Scheme

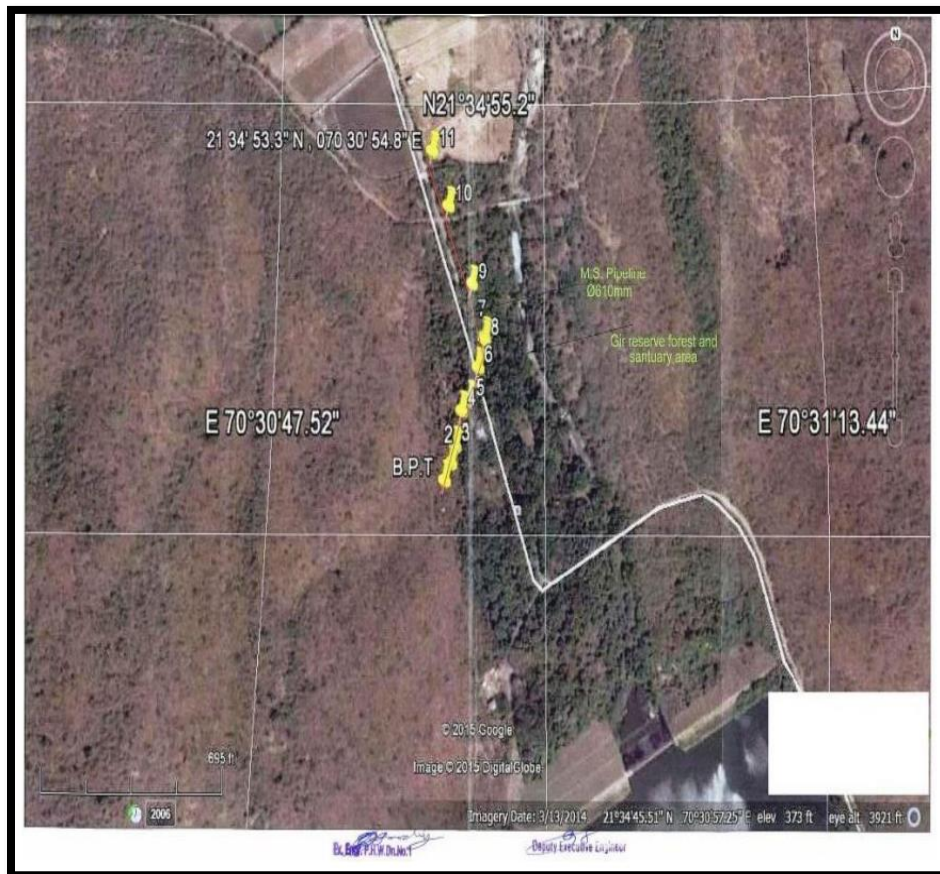
General	
Salient Features	
1. Catchment Area	8.86 Sq Miles
2. Avg. Annual Rain Fall	800 mm
3. Run-off Coefficient	30 %
Reservoir	
1. F.S.L. RL	148.13 Mtrs
2. H.F.L. RL	150.28 Mtrs
3. Intake Level RL	137.76 Mtrs
4. Top of Dam RL	152.40 Mtrs
5. Sub mergeance at H.F.L.	418.00 Acres
6. Live storage	8,194 M Cum
7. Dead storage	0,209 M Cum
8. Capacity at F.S.L.	8,403 M Cum
9. Free Board	2.10 Mtrs.
Earthen Dam	
Length of Earthen Dam	
a) Left bank	170.38 Mtrs.
b) Right bank	164.28 Mtrs.
Maximum height	
a) Left bank	22.25 Mtrs.
b) Right bank	18.90 Mtrs.
c) Top Width	4.85 Mtrs
Slope	
a) Left bank	
Up stream	3 to 1
Down Stream	2.5 to 1 with 1.50 Mtr. width of berm at 6.00 Mtr intervals.
b) Right bank	
Up stream	3 to 1
Down Stream	2 to 1 with 1.50 Mtr. width of berm at 6.00 Mtr intervals.
Waste weir	
1. Type	Clear overfall of Ogee shape
2. Length of Waste weir	62.18 Mtrs.
3. Maximum designed flood discharge (As per Inglis)	14734 Cusec
4. Flood depth	2.10 Mtrs.
5. Crest of weir RL	148.13 Mtrs.
6. Maximum height above the bed	17.67 Mtrs.
7. Maximum height above the Foundation	23.77 Mtrs.
Intake Well	
1. Intake Well level RL	137.76 Mtrs.
2. Sill of the outlet pipes RL	131.05 Mtrs.
3. Dia of the C.I. Flanged pipe	27.00 Inch - C.I. 'B' Class Pipe
4. No. of C.I. Sluice Gate valve - 600 mm dia	5.00 Nos.

The project activity, Hasnapur Earthen Dam, Storage and Water Supply Project Activity Junagadh, Gujarat, India, is a man-made earthen dam / earth fill dam / earth dam / embankment dam is the main source of water for Junagadh city. It is built up by compacting successive layers of earth, using the most impervious materials to form a core and placing more permeable substances on the upstream and downstream sides. A facing of crushed stone prevents erosion by wind or rain, and an ample spillway, usually of concrete, to protect against catastrophic washout should water overtop the dam.



Compared with concrete, soils and rock fragments lack strength, are much more permeable, and possess less resistance to deterioration and disturbance by flowing water. These disadvantages are compensated for by a much lower cost and by the ability of earth fill to adapt to deformation caused by movements in the dam foundation. This assumes, of course, sufficient usable soil or rock-fill is available near the dam site. Earth fill is often quite economical, provided that a suitable “borrow” area can be utilized close to the construction site.





NATIONAL REGISTER OF LARGE DAMS (updated as on MARCH 2015) STATE : GUJARAT

Sl.No.	Project Identification Code	Name of Dam	Operated & Maintained by	Location of Dam		Year of completion	River Basin	River	Nearest City	Seismic zone	Type of dam	Height above lowest foundation (m)	Length of dam (m)	Volume content of dam (10 ⁶ m ³)	Gross Storage capacity (10 ⁶ m ³)	Reservoir Area (10 ³ m ²)	Effective Storage capacity (10 ⁶ m ³)	Purpose	Designed Spillway capacity (m ³ /sec)
				Longitude of dam	Latitude of dam														
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
121	GJ04LH0123	Deohia	Govt of Guj	70-45 E	23-34 N	1961	Local Stream	Deohiya		TE	12.97	2021.34	860.76	2940.00	1157.00	2510.00	I	456.53	
122	GJ04MH0124	Demi I	Govt of Guj	70-45 E	23-34 N	1961	Demi	Tankara		IV TE/PG	17.00	4023.00	567.00	22174.00	5504.00	22100.00	I	1225.00	
123	GJ04MH0125	Dhobiyara	Govt of Guj	71-11 E	21-57N	1961	Local Stream	Babara		IV TE	15.00	190.00		1579.00		1252.00	I	203.00	
124	GJ04MH0126	Fulzar I	Govt of Guj	70-17 E	22-14 N	1961	Fulzar	Kalavad		IV TE/PG	25.41	1932.00	529.00	11360.00	4370.00	11220.00	I	1274.00	
125	GJ04LH0127	Jadwas	Govt of Guj			1961	Local River	Rapar		V TE	13.91	883.00	825.00	2420.00		2420.00	I	245.00	
126	GJ04MH0128	Kodoli	Govt of Guj			1961	Local Stream	Abdasa		V TE	17.00	808.00	108.00	3506.00		3283.00	I	541.00	
127	GJ04MH0129	Mevasa	Govt of Guj	70-46 E	23-26 N	1961	Local River	Rapar		V TE	21.50	878.00	1240.00	8250.00		8250.00	I	1445.00	
128	GJ04LH0130	Phot	Govt of Guj			1961	Phot	Tappar		V TE	14.14	1421.00	699.53	2303.00		797.00	I	304.50	
129	GJ04LH0131	Vayor	Govt of Guj	69-44 E	23-23F347 N	1961	Local River	Naliya		V TE	12.80	960.00	429.00	1120.00		1120.00	I	154.00	
130	GJ04LH0132	Bharmiya	Govt of Guj	73-23 E	23-04 N	1962	Vahela	Balsanor		IV TE	11.80	396.00		13727.00	720.00	12428.00	I	1010.00	
131	GJ04LH0133	Dhruvana	Govt of Guj	71-33 E	21-44N	1962	Localstream	Lathi		IV TE	11.00	549.00		1491.00		1313.00	I	354.00	
132	GJ04MH0134	Gheho(i)	Govt of Guj	71-25 E	21-58 N	1962	Gheho	Babara		IV TE	21.18	883.00	1003.45	10090.00	3430.00	9660.00	I	1190.00	
133	GJ04LH0135	Guhedia	Govt of Guj	73-01 E	23-01 N	1962	Vahela	Balsanor		III TE	12.20	1920.00		45872.00	4240.00	45872.00	I	9000.00	
134	GJ04MH0136	Koyadam	Govt of Guj	73-29 E	23-14 N	1962	Vahela	Vipur		IV TE	18.68	175.00		25485.00	138.00	24168.00	I	9900.00	
135	GJ04LH0137	Kundo Tank	Govt of Guj	73-20 E	23-54 N	1962	Kundovaga	Bhioda		IV Te	11.00	320.00		1430.00		1416.00	I	236.00	
136	GJ04MH0138	Limdi Bhogavo I	Govt of Guj	71-30 E	22-28 N	1962	Bhogavo	Sayala		IV TE/PG	42.68	2744.00	879.00	22483.00	8520.00	21973.00	I & S	1472.00	
137	GJ04MH0139	Chang	Govt of Guj			1963	Chang	Bhachau		V TE	18.31	1440.36	363.40	6943.00	1957.00	6470.00	I	806.00	
138	GJ04LH0140	Chavaska	Govt of Guj			1963	Local River	Nakhtrana		V TE	10.68	173.30	80.00	1560.00		1560.00	I	196.00	
139	GJ04MH0141	Ekalia	Govt of Guj	71 - 51 E	21 - 41 N	1963	Localstream	Sihor		V TE	17.00	314.00		2680.00		2570.00	I	329.00	
140	GJ04MH0142	Faradi	Govt of Guj			1963	Manvli	Kachhli		V TE	17.40	2017.00	466.00	6179.00	11720.00	5494.00	I	502.00	
141	GJ04MH0143	Gheho(S)	Govt of Guj	71-34 E	22-03 N	1963	Gheho	Jasdan		III TE	19.41	883.00	351.29	6067.00		3630.00			
142	GJ04LH0146	Shivnagar	Govt of Guj	71 - 17 E	22 - 03 N	1963	TKeri	Jasdan		IV TE	13.55	220.00		188140.00	44850.00	187910.00	I & S	5660.00	
143	GJ04MH0147	Thorala M Tank	Govt of Guj	71 - 58 E	21 - 03 N	1963	T/Shetruj	Talaja		IV TE	18	640		3640					
144	GJ04MH0148	Umbari	Govt of Guj	72-56 E	24-13 N	1963	T/Sabarmati	Danta		IV TE	17.00	154.00	19.00	1513.00					
145	GJ04MH0149	Vamaka	Govt of Guj			1963	Vamaka	Bhachau		V TE	21.25	183.00	145.00	680.00					
146	GJ04LH0150	Wada tharawada	Govt of Guj			1963	Local Stream	Anjar		V TE	12.50	1018.00		1008.00					
147	GJ04LH0151	Baranda	Govt of Guj			1964	Local River	Dayapar		V TE	13.45	725.57	111.73	1630.00	283.02	1300.00	I	351.83	
148	GJ04MH0152	Bhadar	Govt of Guj	70-46 E	21-50 N	1964	Gondal	Bhadar		IV TE/PG	20.26	4429.00	1735.00	188140.00	44850.00	187910.00	I & S	5660.00	
149	GJ04MH0153	Bhadar	Govt of Guj			1964	Bhadar												
150	GJ04MH0154	Hesampur	Junagadh Munic Corp			1964	Lol	Junagadh		IV TE	21.53	408.00	2839.00	8530.00		8389.00	S	488.00	

Abbreviation:
 Lath: T&R Rock FILLER
 Gravity/Masonry/PG Imps
 Hydro/H&R Flood Control C
 Water Supply/S& Navigation/N Pisc Cult/F

**Scope:**

The scope covers verification of RoUs from the project - Hasnapur Earthen Dam, Storage and Water Supply Project Activity Junagadh, Gujarat, India. (UCR ID – 304)

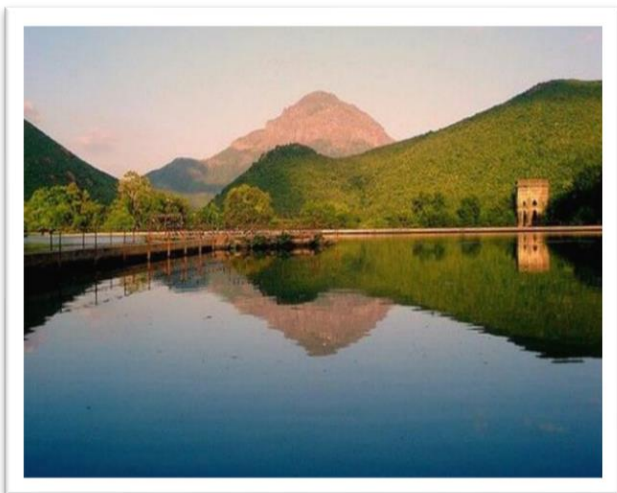
Criteria:

Verification criteria is as per the requirements of UCR RoU program for the scope – 2.



Objectives of project:

The impact assessment or objectives of this project activity can generally be enumerated as follows:



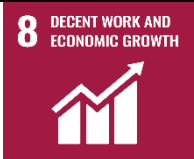


- ✓ Conservation and harvesting of surplus monsoon runoff in ground water reservoir which otherwise would go un-utilized outside the watershed/ basin and to sea.
- ✓ Rise in ground water levels due to additional recharge to ground water. In cases where continuous decline of ground water level was taking place, a check to this and/or the intensity of decline subsequently reduces. The energy consumption for lifting the water is also reduced.
- ✓ The ground water structures (wells) in the benefitted zone of artificial structures gain sustainability and the wells provide water in lean month when these were going dry.
- ✓ The domestic wells will become sustainable and many of the areas become tanker free.
- ✓ Green vegetation cover has increased in the zone of benefit and also along the structures due to additional availability of soil moisture.
- ✓ The quality of ground water has improved due to dilution.
- ✓ Besides the direct measurable impacts, the artificial recharge scheme generates indirect benefit in terms of decrease in soil erosion, improvement in fauna and flora, influx of migratory birds, etc.





Ecological or Sustainable Development Goals (SDGs) Aspects:

Sustainable Development Goals Targeted	Most relevant SDG Target / SDG Impact	Indicator (SDG Indicator)
 13 Climate Action (mandatory)	13.2: Integrate climate change measures into national policies, strategies and planning	Amount of water conserved
 1 – No Poverty	1.4: By 2030, ensure that all men and women, in particular the poor and the vulnerable, have equal rights to economic resources, as well as access to basic services, ownership and	Number of people employed in the construction and maintenance of SDW systems and monitoring units.



	control over land and other forms of property, inheritance, natural resources, appropriate new technology and financial services, including microfinance	
 <p>3 – Ensure healthy lives and promote well-being for all at all ages.</p>	3.9: By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination.	Number of households having access to SDW
 <p>6 - Clean Water and sanitation</p>	6.1: By 2030, achieve universal and equitable access to safe and affordable drinking water for all	Number of households having access to SDW
 <p>8 – Promote inclusive and sustainable economic growth, employment and decent work for all</p>	8.5: By 2030, achieve full and productive employment and decent work for all women and men, including for young people and persons with disabilities, and equal pay for work of equal value. 8.6 By 2020, substantially reduce the proportion of youth not in employment, education or training	Number of jobs created and people trained during the installation and maintenance process of the project activity
 <p>10 - Reducing inequalities and ensuring no one is left behind</p>	10.2: By 2030, empower and promote the social, economic and political inclusion of all, irrespective of age, sex, disability, race, ethnicity, origin, religion or economic or other status	Improved water security and therefore a stronger sense of independence and trust amongst villagers.
	15.2: By 2020, promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests and	Promotes forest biodiversity in the surrounding areas.



<p>15 – Sustainably manage forests, combat desertification, halt and reverse land degradation, halt biodiversity loss</p>	<p>substantially increase afforestation and reforestation globally</p>	
 <p>11 - Making cities and human settlements inclusive, safe, resilient and sustainable</p>	<p>11.1: By 2030, ensure access for all to adequate, safe and affordable basic services.</p>	<p>The PP provides SDW as a basic human right.</p>
 <p>17 – Strengthen the means of implementation and revitalize the global partnership for sustainable development</p>	<p>17.7: Promote the development, transfer, dissemination and diffusion of environmentally sound technologies to developing countries on favourable terms including on concessional and preferential terms, as mutually agreed</p>	<p>PP working with UCR in India to generate carbon credits to build scale and climate resilience before 2030.</p>

Solving for Recharge:

Water Budget Component	Typical Estimated Uncertainty (%)	Description
Surface Inflow	1.00%	Typical range of accuracy from meters to minimum delivery accuracy requirements of delivery and diversion measurement devices.
Precipitation	5.00%	Typical range of accuracy from field-level rain gauges to extrapolation of local weather station data.
Surface Outflow	20%	Typical range of accuracy from meters to estimated outflow relationships
Evapo-transpiration & Absorption	53.1 million ft ³ (1.5 million m ³)	Data provided by PP
Change in Storage	15%	Estimated accuracy of change in storage calculation based on field scale water budget calibration to observed water levels.
Uncertainty (%)		41%



PROJECT NAME : Hasnapur Earthen Dam, Storage and Water Supply Project Activity
Junagadh, Gujarat, India.

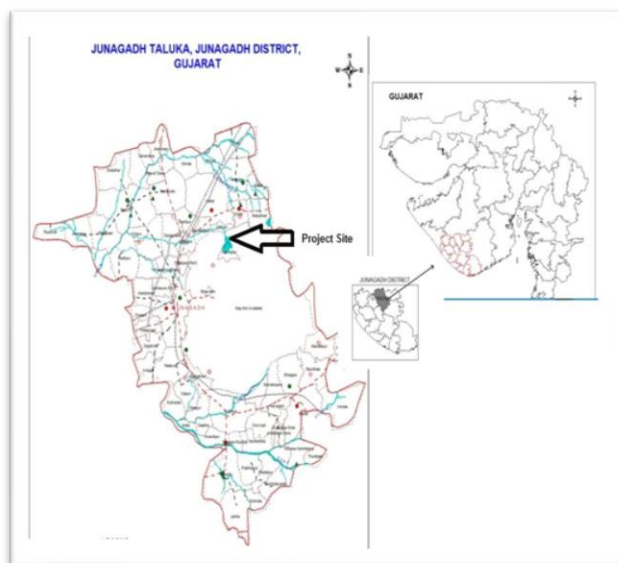
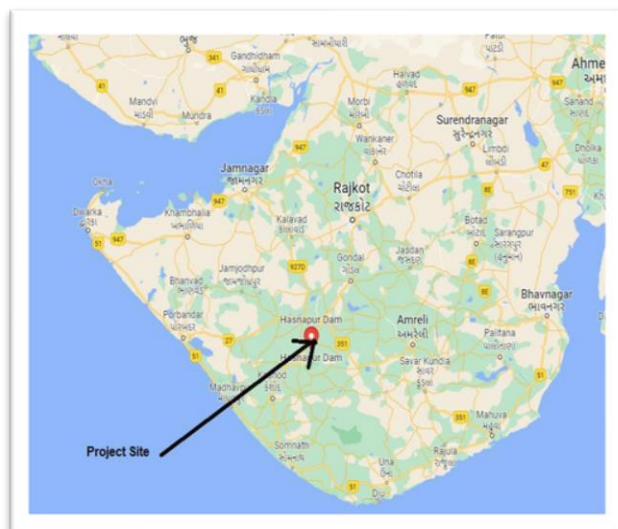
UCR Scope : RoU Scope 2: Measures for conservation and storage of excess surface
water for future requirements.

PCNMR Prepared on : 24/02/2023.

Latitude : 21°34'35"N

Longitude : 70°31'5"E

Project Commissioning Year : 1964





Rainfall

Junagadh city falls under the semi-arid zone and has characteristics of high variation in rainfall. The average rainfall recorded in Junagadh district is between 900mm-881 mm. 90-95% of the rainfall occurs between the months of June and September while other months are generally dry with occasional showers. Annual rainy days range between 22 to 29 days. Depth to water level ranges between 14.41 to 52.75 m bgl during studies undertaken in May 2015. The central part of the taluka observed shallow water level whereas the Northern and Southern parts are deeper.

Water table ranges between 5.86 m to 74.98 m above msl and groundwater flow direction are diverting from Girnar Hill from all the directions and forming one ground water trough in the northern part of the taluka.

Decadal average water level mostly between the period of 2006 and 2015 ranges from 10.59 to 32.77m bgl. Major parts of the taluka shows decadal average water level ranges between 10 and 20 m bgl.

Pre-monsoon(1987-2015)				Post-monsoon(1987-2015)			
Rise		Fall		Rise		Fall	
Min	Max	Min	Max	Min	Max	Min	Max
0.20	2.90	1.50	4.25	1.10	7.15	3.06	

Baseline scenario

The baseline scenario is the situation where, in the absence of the project activity, unutilized water flows uncollected and is not conserved. Baseline scenario, if not directly measurable, is calculated by using:

Harvested water or Volume of water utilized (m³) = Area of Catchment/Roof/Collection Zone (m²) X {Amount of rainfall (mm) X Runoff coefficient *Uncertainty Factor (1-0.41 = 0.59).

Area: 22947293 m²

As per UCR RoU Standard: Different Surfaces	Runoff Coefficient (K)
Forest	0.2 (conservative)

**Level of Assurance:**

The verification report is based on remote audit, information collected through tele interviews, supporting documents provided during the verification, Project Concept Note - Monitoring Report (PCNMR) submitted to SQAC. The verification opinion is assured provided the credibility of all the above.

Verification Methodology:

Review of the following documentation was done by SQAC Verifiers, Mr. Santosh Nair who is experienced in such projects.

- Project Concept Note / Monitoring Report (PCNMR)
- Commissioning report of the dam.
- Calibration report of flow meters.
- Water level log book reading
- Joint reading with concerned authorities report

Sampling:

Not applicable


Persons interviewed:

1. Mr. Alpesh Chavda : Chief Engineer, Junagadh Water Works.

Documentation Verified:

- Project Concept Note / Monitoring Report (PCNMR)
- Commissioning report of the dam.
- Calibration report of flow meter.
- Water level log book reading
- Joint reading with concerned authorities report






JUNAGADH MUNICIPAL CORPORATION
 * Swami Vivekanand Bhawan * Azad Chowk, Junagadh-362001
 Phone No. 0285-2622089 Fax No. 0285-2651510
 E-mail - municipalcorporationjund@yahoo.co.in


Date: 15/06/23

-- : To Whom So Ever It May Concerned : --

This is to be certified that, Hasnapur Dam is a Fresh Water Reservoir, situated at 15 Kms in West direction of Junagadh town. It was constructed in the year 1965 by the Gujarat Water Supply & Sewerage Board as a part of Junagadh Water Supply Scheme. The Hasnapur reservoir has a storage capacity of 100 MCFT (Million Cubic Feet). It is an earthen dam. It is one of the major sources of fresh water supply for the western part of Junagadh city and equally important for runoff water capture from the surrounding Girnar hills.

Thank you.


Executive Engineer
Water Supply
Municipal Corporation Junagadh



An ISO 9001:2015 Certified Company CIN No. U31909GJ2017PTC096649
AAROHI EMBEDDED SYSTEMS PVT. LTD.
 Plot No. G 1004 To 1008/A, No. Durga Weigh Bridge, Kishan Gate No. 3,
 G.I.D.C. METODA, RAIKOT - 360021 (GUJARAT) INDIA. PH. 02827-297280
 Mo. +91 95129 99942 E-mail : info@aarohies.com Web : www.aarohies.com

CE ITC0000013

To,
JUNAGADH MUNICIPAL CORPORATION
 Junagadh,
 Hasnapur Dam Sources,
 (Vishal Hindocha)

CALIBRATION CERTIFICATE


Report No. : AES/23-24/052 **Date of Calibration** : 26/06/2023
Name of Instrument : Electro-Magnetic flow meter **Make** : Endress+Hauser
Model : Promag 400 **Sr. No.** : MB039B20000
Least count : 0.01m3/hr **Range** : m3/hr 9600
Line size : 600 MM **Due date** : 25/06/2024
Accuracy : +/- (0.5% of Reading)

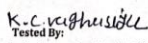
OBSERVATIONS:


Sr. No.	Standard Reading In m3/hr	DUC Reading In m3/hr	% Error
1	346.46	347.64	0.34
2	303.21	304.51	0.43
3	291.75	292.84	0.37
4	262.84	263.69	0.32


DETAILS OF REFERENCE STANDARD & MAJOR INSTRUMENTS USED

Instrument Name : Handheld Ultrasonic Flowmeter
Sr. No. : 160520-H-81602497
Certificate No. : AES/FL/23-24/016
Due date : 27/04/2024
Traceability to : Calibration Laboratory of AESPL
For, AAROHI EMBEDDED SYSTEMS PVT.LTD.


 SEAL
 Note: This report pertains to particular sample/Instrument submitted for test. This report may not be reproduced, except in full, without prior written permission.


 K.C. Vaghhasiya
 Tested By:


 Checked By:



AAROHI EMBEDDED SYSTEMS PVT. LTD.

Inside Draft Calibration / Test Report

M/S:- JUNAGADH MUNICIPAL CORPORATION, Junagadh, Hasnapur Dam Sources (Vishal Hindocha)	Draft Report No. Date of Calibration	26/06/2023
--	---	------------

Pipe Details			
O.D. (Outer Diameter)	600mm	Liner Thickness	No Liner
Pipe Thickness	6mm	Transducer Spacing	528mm
I.D. (Inner Diameter)	588mm	Pipe material	M.S.

Description and Identification of Instrument/Item			
Instrument Name :-	Endress+Hauser (E&H)	Serial No. :-	MB039B20000
Model No. :-	PROMAG 400	Range :-	9600m3/h
Make :-	Endress+Hauser	Least Count :-	0.01
Line Size :-	600mm		

Environmental Conditions		
Temperature	31'	Humidity

Standard Equipment Used					
Instrument Name	Model No.	Sr. No.	Calibrated At	Certificate No.	Valid Upto
Handheld Ultrasonic	TDS - 100H	160520-H-81602497	AESPL	AES/FL/23-24/016	27/04/2024

Calibration/Test Result					
Sr. No.	Master meter Flow Rate		DUC Flow Rate		Error%
	Unit	m3/h	Unit	m3/h	
1		262		277	
2		291		307	
3		303		321	
4					
5					

%Error is (Measured Value-Reference Value) / Reference Value

CALIBRATION BY
Kevin Vaghhasiya

WITNESS BY
Dilip Bhai





Corrective Action Requests (CARs)

Not applicable as no non-conformities has been evidenced.

Applied methodologies:

Verification criteria is as per the requirements of UCR RoU program for the scope – 2.

According to the UCR RoU Standard principles, the project activity accomplishes the following:

- ❖ **Increases the sustainable water yield in areas where over development has depleted the aquifer**
- ❖ **Conserve and store excess water for future use**

Applicability of double counting emission reductions

Currently not applicable for water credits.



Rainfall Statistics of India (Reference - hydro.imd.gov.in)

2014						2015												
GUJARAT						GUJARAT												
AHMEDABAD	1.5	6.6	681.2	8.8	698.1	AHMEDABAD	2.0	13.0	400.7	0.0	415.7							
AMRELI	3.8	7.6	503.2	22.5	537.1	AMRELI	2.2	31.3	743.1	6.3	782.9							
ANAND	9.1	2.2	984.4	5.4	1001.1	ANAND	0.1	26.5	452.6	0.0	479.2							
BANASKANTHA	3.4	5.7	520.9	0.0	530.0	BANASKANTHA	2.1	9.2	823.5	0.0	834.8							
BARODA	20.6	0.2	689.8	5.0	715.6	BARODA	0.0	7.6	421.4	2.6	431.6							
BHAVNAGAR	0.8	1.9	476.8	16.3	495.8	BHAVNAGAR	1.4	13.4	541.0	0.4	556.2							
BROACH	1.1	0.0	619.7	0.2	621.0	BROACH	1.2	12.7	437.9	1.6	453.4							
DAHOD	19.2	0.0	537.7	5.4	562.3	DAHOD	1.4	10.0	426.8	1.1	439.3							
DANGS	1.0	11.0	1125.5	65.5	1203.0	DANGS	0.0	73.5	1036.2	64.0	1173.7							
GANDHINAGAR	0.8	13.2	663.5	0.0	677.5	GANDHINAGAR	14.8	14.3	666.7	0.0	695.8							
JAMNAGAR	0.0	0.0	536.1	5.4	541.5	JAMNAGAR	1.1	2.4	435.3	11.2	450.0							
JUNAGARH	0.0	1.7	892.2	36.5	930.4	JUNAGARH	3.4	12.8	598.9	8.1	623.1							
KHEDA	22.7	0.3	777.8	0.0	800.8	KHEDA	2.7	13.3	503.5	0.1	519.6							
KUTCH	0.0	2.1	285.9	2.8	290.8	KUTCH	0.8	5.4	473.6	3.9	483.7							
MEHSANA	0.0	2.1	766.6	0.2	768.9	MEHSANA	5.1	12.6	670.6	0.0	688.4							
						NARMADA	4.1	33.1	650.2	1.2	688.6							
2016						2017												
GUJARAT						GUJARAT												
AHMEDABAD	0.0	1.5	382.2	52.4	436.1	AHMEDABAD	0.0	0.0	0.0	0.0	0.2	88.3	490.9	100.1	52.0	0.0	0.0	3.0
AMRELI	0.0	5.0	578.9	103.9	687.8	AMRELI	0.0	0.0	0.0	0.6	0.0	74.1	309.6	111.5	66.4	29.9	0.0	3.9
ANAND	0.0	3.0	436.9	54.7	494.5	ANAND	0.0	0.0	0.0	0.0	0.9	95.6	376.8	168.7	59.3	0.0	0.0	1.8
ARAVALLI	0.0	0.0	880.0	72.8	952.8	ARAVALLI	0.0	0.0	0.0	0.0	0.0	61.2	618.7	151.2	56.0	0.0	0.0	8.8
BANASKANTHA	0.0	0.0	388.3	78.3	466.6	BANASKANTHA	0.0	0.0	0.0	0.1	0.3	76.8	939.7	95.0	25.3	0.0	0.0	0.6
BHARUCH	0.0	1.6	414.0	66.4	482.1	BHARUCH	0.0	0.0	0.0	0.0	0.0	181.5	265.2	234.7	62.5	21.6	0.0	6.3
BHAVNAGAR	0.0	0.4	576.1	66.3	642.8	BHAVNAGAR	0.0	0.0	0.0	0.0	0.0	72.6	222.5	210.0	63.0	22.3	0.0	5.7
BOTAD	0.0	0.0	412.5	124.8	537.3	BOTAD	0.0	0.0	0.0	0.0	0.0	72.3	340.3	196.0	63.8	0.0	0.0	6.3
CHHOTA UDEPUR	0.0	1.6	795.3	34.9	831.8	CHHOTA UDEPUR	0.0	0.0	0.0	0.0	0.0	83.0	404.1	236.0	101.9	9.2	0.0	9.4
DAHOD	0.0	0.0	731.1	48.9	780.0	DAHOD	0.0	0.0	0.0	0.0	1.0	111.2	363.2	113.0	58.7	1.2	0.0	6.2
DANGS	0.0	12.5	1946.6	75.3	2034.3	DANGS	0.0	0.0	0.0	0.0	0.0	289.7	955.0	361.7	187.0	114.0	0.0	56.7
DEVBHOO MI DWARKA	0.0	0.3	523.1	49.7	573.1	DEVBHOO MI DWARKA	0.0	0.0	0.0	0.0	0.0	110.2	280.7	222.7	6.6	0.0	0.0	0.0
GANDHINAGAR	0.0	1.6	588.4	63.6	653.6	GANDHINAGAR	0.0	0.0	0.0	0.0	0.5	70.9	889.2	144.8	94.9	0.0	0.0	6.9
GIR SOMNATH	0.0	0.0	907.4	67.6	975.0	GIR SOMNATH	0.0	0.0	0.0	0.0	0.0	99.5	582.5	276.3	74.1	19.8	0.0	4.6
JAMNAGAR	0.0	0.0	629.7	99.7	729.3	JAMNAGAR	0.0	0.0	0.0	0.0	0.0	79.2	426.2	156.5	6.7	0.0	0.0	0.0
JUNAGADH	0.0	0.5	732.6	142.7	875.8	JUNAGADH	0.0	0.0	0.0	0.0	0.0	129.3	366.0	291.2	82.2	8.4	0.0	1.5
KHEDA	0.0	0.7	479.6	77.8	558.1	KHEDA	0.0	0.0	0.0	0.0	0.0	104.8	518.8	154.7	77.5	2.0	0.0	1.6



2018

GUJARAT												
AHMEDABAD	0.0	0.0	0.0	0.0	0.0	13.1	128.1	128.4	16.3	0.0	0.0	0.0
AMRELI	0.0	0.0	0.0	0.0	0.0	33.5	407.1	39.0	18.7	4.7	0.0	0.0
ANAND	0.0	0.0	0.0	0.0	0.0	53.0	482.2	253.9	38.2	0.0	0.0	0.0
ARAVALLI	0.0	0.0	0.0	0.0	0.3	134.7	285.3	175.3	119.2	0.0	0.0	0.0
BANASKANTHA	0.0	0.0	0.0	0.0	0.0	32.1	123.0	54.3	5.1	0.0	0.0	0.0
BHARUCH	0.0	0.0	0.0	0.0	0.0	79.8	475.7	145.4	44.3	0.1	0.0	0.0
BHAVNAGAR	0.0	0.0	0.0	0.0	0.0	23.7	292.2	78.0	18.9	4.7	0.0	0.0
BOTAD	0.0	0.0	0.0	0.0	0.0	43.3	259.0	68.3	8.5	0.0	0.0	0.0
CHHOTA UDEPUR	0.0	0.0	0.0	0.0	0.0	80.5	376.3	258.2	63.8	0.0	0.0	0.0
DAHOD	0.0	0.0	0.0	0.0	0.0	77.1	230.8	199.3	64.5	0.0	0.0	0.0
DANGS	0.0	0.0	0.0	0.0	0.0	298.9	1311.4	444.7	128.0	7.0	0.0	0.0
DEVBHOOMI DWARKA	0.0	0.0	0.0	0.0	0.0	0.5	195.3	27.3	22.7	0.0	0.0	0.0
GANDHINAGAR	0.0	0.0	0.0	0.0	0.0	12.4	114.5	157.3	42.4	0.0	0.0	0.0
GIR SOMNATH	0.0	0.0	0.0	0.0	0.0	9.4	1153.7	61.6	26.1	2.8	0.0	0.0
JAMNAGAR	0.0	0.0	0.0	0.0	0.0	7.0	255.8	56.8	20.3	1.7	0.0	0.0
JUNAGADH	0.0	0.0	0.0	0.0	0.0	4.7	721.7	63.8	39.9	0.0	0.0	0.0
MORBI	0.0	0.0	0.0	0.0	0.0	63.2	493.2	222.8	31.1	0.0	0.0	0.0

2019

GUJARAT REGION												
AHMEDABAD	0.0	0.0	0.0	0.7	0.0	72.6	83.1	353.5	216.6	47.9	3.9	0.0
AMRELI	0.0	0.0	0.0	0.0	0.1	115.5	126.2	246.4	315.1	67.2	16.0	0.0
ANAND	0.0	0.0	0.0	0.0	0.0	66.9	169.6	541.1	226.7	83.3	5.0	0.0
ARAVALLI	0.0	3.7	0.0	0.7	0.0	76.3	192.0	447.2	282.7	96.0	0.8	0.0
BANASKANTHA	0.0	0.5	0.0	3.5	0.1	73.5	116.2	229.7	180.4	83.2	21.1	4.6
BHARUCH	0.0	0.0	0.0	0.0	0.0	150.8	320.5	596.3	260.9	48.5	15.5	0.0
BHAVNAGAR	0.0	0.0	0.0	0.0	0.0	110.5	163.6	262.8	223.2	40.2	12.9	0.0
BOTAD	0.0	0.0	0.0	0.0	0.0	89.0	162.5	379.3	290.3	38.3	21.5	0.0
CHHOTA UDEPUR	0.0	0.0	0.0	0.0	0.0	125.0	301.0	993.8	339.4	56.6	15.3	0.0
DAHOD	0.0	0.0	0.0	0.0	0.0	65.0	155.9	350.3	277.4	44.4	3.0	0.0
DANGS	0.0	0.0	0.0	0.0	0.0	198.0	994.7	1158.3	688.3	112.0	31.0	0.0
DEVBHOOMI DWARKA	2.2	0.0	0.0	0.0	0.0	37.9	127.7	229.6	590.7	5.3	16.2	0.8
GANDHINAGAR	0.0	0.0	0.0	0.0	0.0	123.3	48.6	411.8	264.0	56.3	2.7	0.0
GIR SOMNATH	0.0	0.1	0.0	0.0	0.0	260.0	158.5	233.8	463.1	20.1	23.4	3.9
JAMNAGAR	0.0	0.0	0.0	0.0	0.0	69.7	184.8	318.0	540.3	22.1	22.5	1.8
JUNAGADH	0.0	0.0	0.0	0.0	0.0	175.7	185.5	339.8	639.9	46.9	16.0	0.5
MORBI	0.0	0.0	0.0	0.0	0.0	73.4	146.5	536.3	253.0	65.1	6.9	0.0

2020

भारत के वर्षा आँकड़े - 2020

Rainfall Statistics of India - 2020 Page | 11

DISTRICT-WISE RAINFALL STATISTICS

SNo.	Met Subdivision/ States/ UTs/ Districts	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
22	SAURASHTRA & KUTCH	0.2	0.0	0.8	0.2	0.0	123.3	303.9	621.5	97.5	35.3	0.0	2.0
1	AMRELI	0.0	0.0	0.5	2.3	0.3	177.7	263.5	525.8	149.3	37.0	0.0	5.6
2	BHAVNAGAR	0.0	0.0	0.5	0.3	0.1	141.0	153.8	303.6	124.6	27.9	0.0	8.0
3	BOTAD	0.0	0.0	0.0	0.0	0.0	198.3	171.3	542.8	90.8	4.3	0.0	3.0
4	DEVBHOOMI DWARKA	0.1	0.0	0.1	0.0	0.0	162.5	926.9	905.9	136.6	34.2	0.0	0.0
5	DIU	0.0	0.0	0.0	0.0	0.0	185.7	543.2	664.5	137.1	2.4	0.0	36.7
6	GIR SOMNATH	0.0	0.0	0.6	0.0	0.0	151.6	433.8	815.8	100.4	25.3	0.0	10.8
7	JAMNAGAR	0.0	0.0	0.0	0.0	0.0	96.8	575.8	628.3	113.2	30.5	0.0	0.3
8	JUNAGADH	0.6	0.0	0.4	0.3	0.0	193.2	439.1	825.9	146.5	59.1	0.0	0.0
9	KUTCH	0.5	0.0	1.5	0.0	0.0	87.7	245.7	641.0	71.2	42.7	0.0	1.0
10	MORBI	0.0	0.0	0.0	0.0	0.0	123.2	196.0	676.8	81.6	21.8	0.0	0.0

2021

22	SAURASHTRA & KUTCH	0.0	0.0	0.0	2.0	42.6	68.5	116.4	18.3	423.4	28.6	5.7	2.8
1	AMRELI	0.0	0.0	0.0	4.0	127.3	94.6	134.4	89.9	410.2	14.7	0.3	8.2
2	BHAVNAGAR	0.0	0.0	0.0	0.5	137.3	161.2	52.3	44.2	380.3	20.6	0.0	11.4
3	BOTAD	0.0	0.0	0.0	3.5	111.8	103.8	148.3	18.8	330.5	14.8	0.0	0.0
4	DEVBHOOMI DWARKA	0.0	0.0	0.0	0.0	0.0	76.7	164.5	10.2	652.6	59.5	5.6	1.6
5	DIU	0.0	0.0	0.0	0.0	87.4	39.8	106.2	114.0	357.8	5.8	0.0	55.8
6	GIR SOMNATH	0.0	0.0	0.0	0.0	140.8	48.1	232.6	40.1	561.7	30.6	0.5	13.4
7	JAMNAGAR	0.0	0.0	0.0	1.3	16.0	59.5	162.8	7.4	654.0	26.4	0.4	0.6
8	JUNAGADH	0.0	0.0	0.0	0.2	44.1	63.2	246.1	34.8	808.9	45.9	6.1	1.1
9	KUTCH	0.0	0.0	0.0	2.3	7.6	46.3	78.3	2.8	310.7	26.6	11.6	1.6
10	MORBI	0.0	0.0	0.0	6.4	36.2	72.0	126.0	8.0	306.6	22.2	6.6	0.0
11	PORBANDAR	0.0	0.0	0.0	0.0	3.5	30.2	229.2	11.1	674.6	17.5	0.0	0.0
12	RAJKOT	0.0	0.0	0.0	1.9	42.7	77.0	173.1	15.3	631.1	46.2	0.2	0.4
13	SURENDRANAGAR	0.0	0.0	0.0	0.8	52.2	80.9	56.3	12.0	279.1	26.1	0.2	1.3



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TABLE-I: DAILY RAINFALL (mm) AT JUNAGADH -YEAR-2022

Date	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1								2.5				
2							43.7	0.3				
3							126.3	6.6	2.0			
4							1.5	1.4				
5							11.0	50.4				
6							81.6	10.0				
7	0.2						16.3	28.3				
8							83.4	4.6				
9							48.7	39.8	12.0			
10							26.8	11.7	3.3	51.2		
11							2.0	10.2	0.5			
12						13.2	6.5	4.0	5.5			
13						27.1	64.0	6.3	84.9			
14						3.5	35.3	3.4	0.5			
15						0.5	50.1	12.4	3.5			
16						8.1	18.0	41.2	2.5			
17						10.0	7.9	40.9				
18							5.0	93.5				
19						1.6	1.2	6.2				
20						0.7	0.2	0.1				
21							0.0	0.2				
22							4.6	1.0				
23							6.0	1.6				
24						6.2	10.0					
25						24.1	7.9	0.4				
26						9.3	0.6					
27							3.0		2.4			
28							0.2	0.3				
29								0.5				
30								6.5				
31												
Total	0.2	0.0	0.0	0.0	0.0	104.3	661.8	384.3	117.1	51.2	0.0	0.0
R. Days	0	0	0	0	0	8	20	18	6	1	0	0
Grand Total : 1318.9						Rainy Days: 53						
<2.5	31	28	31	30	31	22	11	13	24	30	30	31
2.5-10	0	0	0	0	0	5	8	9	4	0	0	0
10-30	0	0	0	0	0	4	5	0	1	0	0	0
30-60	0	0	0	0	0	0	4	4	0	1	0	0
>60	0	0	0	0	0	0	4	1	1	0	0	0

Issuance Period: (09 years) – 01/01/2014 to 31/12/2022

Year	2014	2015	2016	2017	2018	2019	2020	2021	2022
Rainfall (mm)	930.4	623.2	482.9	878.6	830.1	1404.3	1665.1	1250.4	1318.9



Conclusions:

Based on the audit conducted on the basis of UCR Protocol, which draws reference from UCR RoU program, the documents submitted during the verification including the data, Project Concept Note (PCNMR), SQAC is able to certify that the Water Credits from the project - Hasnapur Earthen Dam, Storage and Water Supply Project Activity Junagadh, Gujarat, India (UCR ID – 304) for the period 01/01/2014 to 31/12/2022 amounts to 9000000 **RoUs**

Santosh Nair
Lead Verifier (Signature)



Praful Shinganapurkar
Senior Internal Reviewer
(Signature)

Date: 30/06/2023