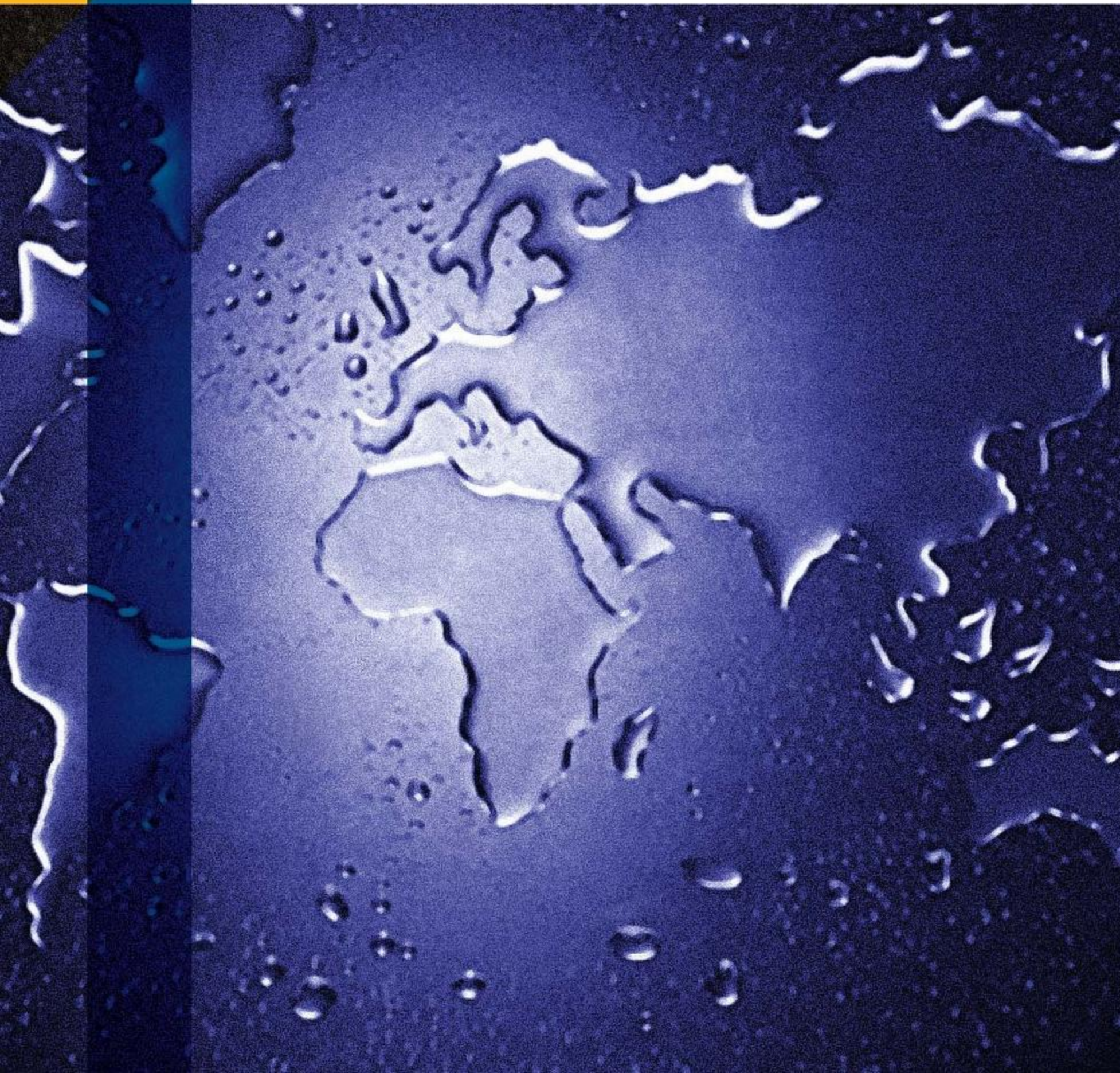


## The CEO Water Mandate

**HCC**







“It is important to understand that water is a profoundly cross-cutting issue – and has environmental, social, developmental and political ramifications. Being a construction company, we are pledged to create responsible infrastructure and have also engaged in the serious practice of reducing the use of water and making sure we are water neutral in every construct. We intend to embed sustainability not only in the structure but also in the operation of those structures as well as in the process of constructing them.”

Yours sincerely,

A handwritten signature in black ink, which appears to read 'Ajit Gulabchand'. The signature is written in a cursive style and is underlined.

**Ajit Gulabchand**  
Chairman and Managing Director



## Hindustan Construction Company Ltd

Hindustan Construction Co. Ltd (HCC) is a leader in engineering & construction, real estate, infrastructure development and integrated urban development & management. The HCC group of companies comprises HCC Ltd (Engineering & Construction) and its subsidiaries, HCC Real Estate Ltd, HCC Infrastructure Ltd, Lavasa Corporation Ltd, and Karl Steiner AG, Switzerland.

Founded by visionary industrialist Seth Walchand Hirachand in 1926, today HCC is executing some of India's most important and challenging infrastructure projects. The Company has created more than 25% of India's hydro power and over 50% of India's nuclear power generation capacity. Projects across India bear HCC's hallmark of world-class innovation; from roads & expressways to tunnels, bridges, dams and barrages.

HCC was the first construction company in India to establish and implement ISO certified quality, occupational health & safety and environment management systems. It has implemented stringent corporate governance processes which go beyond statutory requirements. It has implemented SAP-ERP across all its diverse project construction locations, even at extremely challenging altitudes of over 11,000 feet in the Himalayan ranges. In addition, the Company has a series of firsts to its credit:

- The first tunnelling project awarded to an Indian company: Borghat Railway Tunnel (1926)
- India's only bow string girder rail bridge: Godavari Rail Bridge in Andhra Pradesh

- India's first 6-lane access control expressway: The Mumbai-Pune Expressway
- India's first two metro railway systems: Delhi Metro and Kolkata Metro
- India's first and longest open sea cable-stayed bridge: The Bandra-Worli Sea Link in Mumbai

The early use of advanced engineering equipment and partnerships with international construction majors to form tactical joint ventures, has ensured the speedy adoption of new and innovative technologies.

This strategy has resulted in revenue growth over the last 5 years at an impressive CAGR of 17%. In March 2010, HCC had an order book of US\$ 4.18 billion. Corporate Social Responsibility is intrinsic to the Company's operations. It has implemented programmes addressing HIV/AIDS, Education, Water and Disaster Management. To create greater AIDS awareness in the industry, the Company launched a workplace intervention, covering more than 21,000 construction workers across its countrywide project locations. HCC is the first Indian Company to endorse the United Nations Global Compact's CEO Water Mandate (UNGCWM). HCC's Chairman & Managing Director, Mr. Ajit Gulabchand is one of 18 initial signatories to the Mandate. HCC also received an A+ rating from GRI for its Sustainability Review 2009-10 - Beyond Bread, that showcases the sustainable initiatives that HCC has implemented across all project sites. HCC's most important asset is its talented people. The Group has a knowledge asset of more than 3,000 officers, including approximately 2,000 engineers; and employs more than 35,000 workers across 54 project sites in India.

Nimoo Bazgo Hydro Power Project, Jammu & Kashmir





## Corporate Stewardship at HCC

The five pillars of corporate stewardship at HCC are as follows:

- Community Development
- HIV/AIDS Awareness
- Education
- Disaster Resource Network
- Water

The philosophy of corporate stewardship at HCC is 'Do Good to Do Well and Do Well to Do Good.'

Our rationale behind our initiatives under these five pillars are as follows:

### Community Development

HCC has always worked towards improving the quality of life of the communities it serves. Be it within the organization, the industry, or the society. It believes in a strong sense of corporate stewardship which is reflected in its values and actions. HCC's Corporate Responsibility came into existence with the objective to identify and work closely with the key communities in which it operates, and to undertake practices as a responsible corporate to support and strengthen such groups and fulfill all obligations towards society. HCC uses its economic strength for broader social goals and to demonstrate environmental responsibility, high standards of ethical behaviour and greater transparency and accountability.



### HIV/AIDS Initiative: Facilitate Good Health of our workforce for higher productivity.

The immediate impact of HIV/AIDS on the businesses is the loss of working hours and increased cost of production due to sickness of the workers who require frequent medical care. Thus, HCC views HIV/AIDS more as a socio-economic issue than a purely social one. People most affected by HIV/AIDS include migrant workers, sex workers, injected drug users and truck drivers. HCC has more than 30,000 migrant labourers and truck drivers, and has indeed found a positive correlation between migrant workforce and their vulnerability to HIV/AIDS. HCC does awareness and 'Workplace Intervention Programme' for all its employees. As on 31<sup>st</sup> March, 2010, 22,694 workers and employees have undergone WPI sessions. In addition, HCC launched its HIV/AIDS Workplace Policy in 2008.

### Education

Schools and colleges continue to play an important role in shaping the future of tomorrow's society. At HCC, we believe that 'Teachers can never truly teach unless they are still learning themselves.' HCC provides opportunities for the faculty of selected colleges (Walchand Institute of Technology, Solapur and College of Engineering, Karad) to undergo site execution training at our sites. We are also one of the few companies in the construction industry that provide structured industrial training to the students from different engineering and management institutes. This practical training is designed to provide the students with the opportunity to put theory into practice and thus reduce the existing gap between theory and practice. It benefits the students by helping them develop skills and abilities that support professional studies and prepare them for work later on.

### Disaster Management: Motivate, retain our engineers; provide safety for personnel, assets on project sites.

As an engineering and construction major, HCC has the relevant resources and is well-equipped to handle calamities and disasters with its trained engineers, project management capabilities and the heavy equipment needed for disaster response, evacuation and reconstruction. Our projects are located in remote disaster prone areas and our personnel are trained as First Responders and Emergency Responders to mitigate problems effectively. 9846 employees and workers have been given the First Responder training till 31<sup>st</sup> March, 2010 and man hours spent in this is, 39384 hrs. Another 54 HCC Engineers have undergone the 7-day intensive training on Engineering Response in Emergencies.

### Water: Decrease threat to sustainable business practices; create community goodwill.

HCC is an endorser of UN CEO Water Mandate. This mandate gives us direction on efficient usage of water in our direct operations, recharging groundwater and working with communities and other stakeholders.







## Water @ HCC

The ever-expanding demand of the world's growing population and economy, combined with the impacts of climate change, are already making water scarcity a reality in many parts of the world – and with it, we are witnessing severe damage to livelihoods, human health and ecosystems. According to the report Charting Our Water Futures: By 2030 Water Resource Group (a consortium of mostly private companies from several important sectors of the world economy) demand for water in 2030 will be 40% higher than it is today, and more than 50% higher in the most rapidly developing countries.

The CEO Water Mandate seeks to engage water conscious companies from around the world, willing to undertake serious efforts in partnership with other stakeholders, to address this challenge of water scarcity. Water scarcity is linked to poor education, poverty, disease, and increasing conflicts. HCC endorsed The CEO Water Mandate in March 2008. Endorsers of The CEO Water Mandate recognize that through individual and collective action they can contribute to the vision of the UN Global Compact and the realization of the Millennium Development Goals.

### Progress reporting on The CEO Water Mandate of the United Nations Global Compact

HCC will continue to support the UN Global Compact's CEO Water Mandate initiative. We will, therefore, be working with our stakeholders to develop sustainable strategies for total water management, implementing appropriate solutions in form of water recharge/recycle/reuse and reporting on the progress made.

HCC recognizes the correlation of business sustainability with water resource management and is committed to reduce the amount of water used across our construction project sites; especially in regions where water availability is already under pressure. HCC's water consciousness is elucidated in HCC's Mission: "To contribute and actively participate in the UN CEO Water Mandate" (HCC's Management System Manual Chapter 2.1 of HCC Q 01 02 01).

The following actions listed provide an overview of how HCC is implementing the CEO Water Mandate.

### Budget allocation for effectuation of total water management at project sites

The annual budget proposals for all projects (old & new) have a provision for establishing wastewater treatment units. These are usually linked to water reuse, recycling proposals. The project sites are entitled to carry out such proposals on their own, if value of works is ₹2.0 million or less.

Sites are permitted to invest more than ₹2.0 million in wastewater treatment units/reuse proposals in consultation with the technical team at the HCC Head Office.

### Water Management at Construction Project Sites

The organization structure at HCC project sites has "Water Champions" who are responsible for executing water consciousness proposals of water recycle/recharge/reuse and monthly reporting of water data to the UN Water Mandate team at the Head Office. The activities involving UN Water Mandate Implementation at each project site forms a part of "Key Result Areas" of the Water Champion and linked to the annual performance appraisal. The best performing Water Champion among all project sites is felicitated at every quarterly Project Managers' Meet.

### Water Consumption Reporting

HCC is in the process of installing flow meters across the project sites for the measurement of water withdrawals from nature and consumption from water utilities like the municipality. Purchased water tankers' consumption is recorded in a customized format at the project site itself and consolidated data is reflected in the HCC Water Forms.

For comparison of water withdrawal with consumption, it is mandatory for all project sites to furnish the following forms related to water on 7th of every month:

- a) HCC F 01 18 05 Format for Dust Suppression
- b) HCC F 01 18 28 Format for Wastewater Monitoring
- c) HCC F 01 18 29 Format for Water Balance

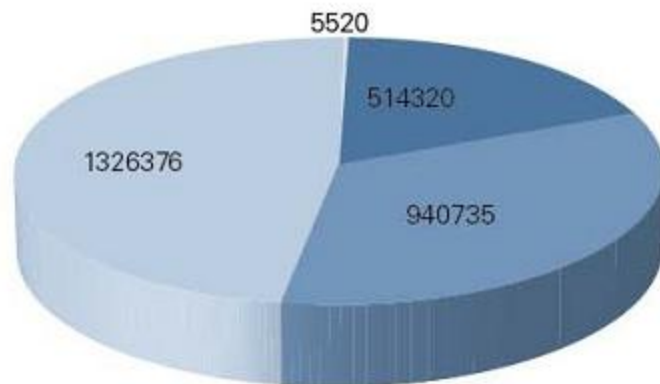
### Water Preservation with SAP

HCC launched the UN Water Mandate at SAP on "World Environment Day" - 5<sup>th</sup> June, 2010. This is a practice wherein all water consumption and conservation activities are reported through SAP. This activity will comprise of a 3-phase implementation process, starting with the accounting of the total water withdrawn by HCC. The next phase, launched around October 2010, involved the evaluation of the total water that is withdrawn, and a check on if the water that has been consumed is reasonable. The third phase, to be launched around January 2011, will focus on the implementation of the UN Water Mandate and complete water management at SAP as per the "Water Master Plan" committed by the Project Manager.

### Water Intake<sup>i</sup> by Source

Our total water consumption for the FY: 2009-10 stands at 2.78 million M<sup>3</sup> including groundwater source, surface water, rainwater and water from municipalities and water tankers.

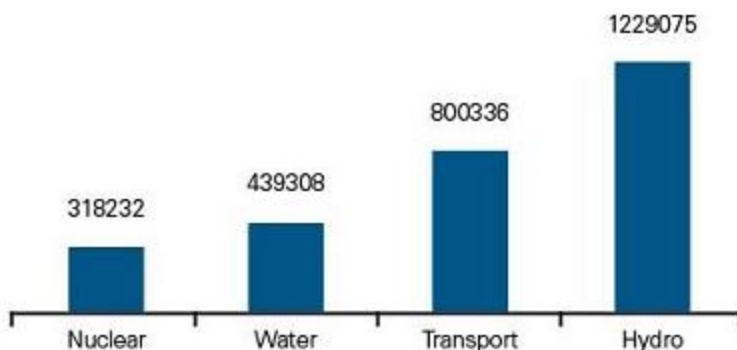
**Water Withdrawal in M<sup>3</sup> (FY: 2009-2010)**



- Water from utilities (Municipality & Tankers)
- Surface water
- Groundwater
- Rainwater

### Consumption in HCC's Four Business Verticals

**Water Consumption in M<sup>3</sup> (FY: 2009-2010)**



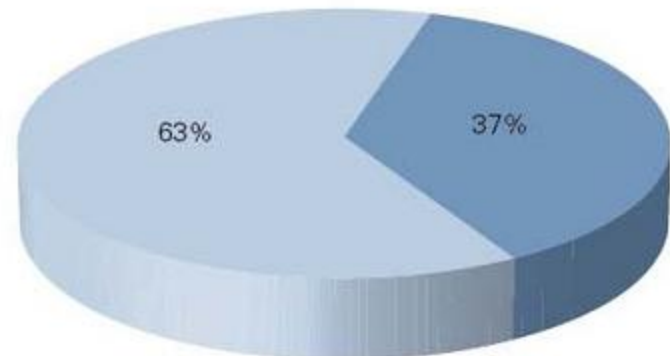
We recycled 502148 M<sup>3</sup> of water across our project sites in the four verticals during the FY: 2009-10.

We take care to monitor the quality of water being discharged from our premises. Owing to the dynamic nature of the construction activity, we are yet to be able to provide figures for total water discharged, but we are in the process of installing water meters at most of our project sites, which would make this possible in the future.

### Investments<sup>ii</sup>

HCC invested ₹8.24 million in implementing 'The UN CEO Water Mandate.' The investments covered various soft activities and water related hardware.

**Investment in UN Water Mandate Implementation: ₹8.24 million**

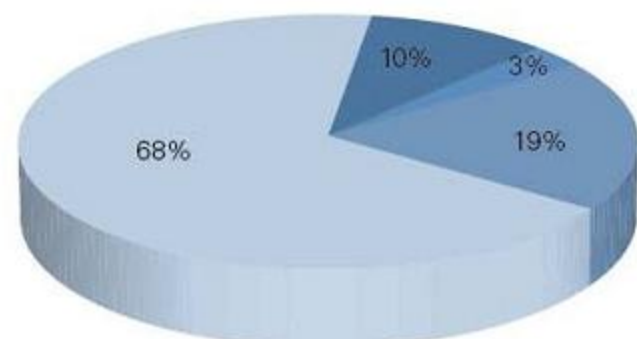


- Hard Investments
- Soft Investments

### Soft Investments

These include participation in conferences, travel expenses, books & periodicals, salaries, cost of specialized training, contribution to UNGC foundation & promotion activities.

Soft Investments: ₹5.22 million



- Conferences, Travel, Books & Office Expenses
- Specialised Training
- Advertisement & Sponsorship
- Salaries

### Hard Investments

The investments made in execution of water consciousness proposals of water recharge/reuse/recycle at HCC project sites are reported under hard investments, which amount to ₹3.02 million.



## Global Level Participation

### Stockholm World Water Week 2009

Sustainable water management is critical to ensuring that local communities, industry and the environment have safe, reliable, and sufficient water supply to meet their combined needs. A critical component of successful water management is the identification and development of 'win-win' investment opportunities that attract public and industry (private) investment.

The World Economic Forum's Water Initiative, through the Confederation of Indian Industry and the NEPAD Business Foundation, has sought to identify and overcome barriers to successful industry-community public-private partnerships (PPPs) through neutral multi-stakeholder platforms.

HCC participated in such PPP session during Stockholm Water Week, to explore different approaches to mainstreaming industry-community water investment, as well as assisted in developing practical & feasible strategy for path forward in Davos 2010.

### COP15: High-level Roundtable on Private Sector Solutions for Climate Change in Asia and the Pacific

On 10<sup>th</sup> December 2009, at Bella Centre, Copenhagen, TERI-Business Council for Sustainable Development (BCSD) India, in association with the Asian Development Bank (ADB), organized a 'High-level Roundtable on Private Sector Solutions for Climate Change in Asia and the Pacific' as an official COP15 side event. The roundtable was chaired by Mr. Nitin Desai, Chairman, TERI-BCSD India, and Former UN Under Secretary-General, and the invited distinguished panelists included Mr. Ajit Gulabchand, Chairman and Managing Director, Hindustan Construction Co Ltd; Meera H. Sanyal, Country Executive, ABN AMRO Bank NV; Leena Srivastava, Executive Director, TERI; Harry Verhaar, Sr. Director, Philips Lighting; Cristina Rumbaitis del Rio, Team Leader, The Rockefeller Foundation; and Philippe Forestier, Executive Vice President, Dassault Systemes. Senior representatives from academia, private sector, non-governmental organizations, and media were also present.

The panel discussed on the role of private sector engagement on climate mitigation beyond renewables and energy efficiency and the technology face of the energy sector and more, looking at 2050 with the GDP being five times larger and a ten-fold increase in productivity. Mr. Ajit Gulabchand spoke of resources depletion, especially water, and how private sector can participate in voluntary initiatives like UN Water Mandate to form a unified platform for development, implementation and disclosure of water sustainability policies and practices. Mr. Ajit Gulabchand further

offered key inputs in integrating climate change adaptation and not just carbon mitigation into its core business and addressed the changes which are unavoidable in the climate and resources of the world.

### World Economic Forum Annual Meeting 2010

The World Economic Forum Annual Meeting in Davos brought together leaders from governments, business, civil society, academia and media to discuss the most pressing issues facing the world today. At a session on "Rebuilding Water Management"; Nestlé Chairman Peter Brabeck-Letmathe, part of a panel comprising Tsakhiagiin Elbegdorj (President of Mongolia), Mr. Ajit Gulabchand (Chairman and Managing Director, Hindustan Construction Company), Michael Mack (CEO, Syngenta), and Ajay Vashee (President, International Federation of Agricultural Producers) explored the challenges water management will face in the next 20 years, its relevance and impact on issues such as health and security as well as how best to implement information systems tools to protect and strengthen water management. Mr. Ajit Gulabchand further emphasized on creating policy drivers based on water cost curve from the report "Charting our Water Future" developed by 2030 Water Resources Group. The implementation of projects featured in the cost curve will serve as a tool to reduce the water demand-supply gap in future and thus, sustaining the scarce water resources.

### United Nations

HCC is the first Indian company to endorse The UN CEO Water Mandate in March 2008. HCC was a part of Policy Engagement Working Group and a member of Steering Committee of the mandate. The policy engagement working group participated in the development of "Guide to Responsible Business Engagement with Water Policy". This guide originates from the CEO Water Mandate's Third Working Conference in Istanbul at the 5<sup>th</sup> World Water Forum (March 2009), where endorsing companies and key stakeholders first expressed their interest in the development of a guidance document for responsible business engagement with water-related public policy. The document developed offers practical guidance for companies wishing to promote sustainable water management in the catchments in which they operate, while providing insights as to the challenges of engaging with external water policy issues. This document was launched by the UN General Secretary Mr. Ban Ki-moon and Mr. Ajit Gulabchand, Chairman and Managing Director, HCC at the UN Leadership Summit in NYC in June 2010.

Steering Committee of the UN CEO Water Mandate is responsible for the governance of the mandate, charged with strategic, administrative and financial

arrangements. Steering Committee consists of corporate representative, representing different geographies and serving one-year terms, and one representative of the UN Global Compact Office. HCC represented the Asia Pacific region in this committee.

### World Sustainable Development Forum: DSDS 2010

#### Beyond Copenhagen: New Pathways to Sustainable Development

The DSDS (Delhi Sustainable Development Summit) – organized each year by TERI since 2001 – brings together the world’s finest minds and leading thinkers on one platform to deliberate over the challenges of sustainable development. The tenth edition of the annual summit was held during 5<sup>th</sup>-7<sup>th</sup> February, 2010. As in previous years, DSDS 2010 also engaged heads of governments, Nobel laureates, corporate CEOs, academics, and representatives of bilateral and multilateral organizations, and research institutions.

Mr. Ajit Gulabchand, Chairman and Managing Director, HCC, participated as a speaker in the session

“The Urgency of Sustainability in Business” and gave inputs on establishing linkages of water with business sustainability. He also shared his experience of being the first Indian company to endorse The UN Water Mandate and the efforts taken by HCC to demonstrate its water consciousness.

Further, the focus of this session was to identify best practices and the way forward for participation of the business community in tackling the issue of climate change, more so in the context of the current economic downturn.

It was emphasized that apart from the government and businesses, the civil society will also play an important role in the future, given its ability to reach the grass-roots level. Various initiatives by the corporate sector were cited in this regard. It was highlighted that the government, with its existing strengths, should be treated as a partner and frame policies to encourage innovation. It was also pointed out that the government has an important role in raising awareness about green consumerism.



# First Responsibility Forum of India

22 March, 2010

Nishith Desai Associates  
Legal & Tax Counseling Worldwide  
Mumbai • Silicon Valley • Bangalore • Singapore • Rasik



circ responsibility



Left to Right: Mr. Hans Reitz - Founder, Grameen Creative Lab; Mr. Ajit Gulabchand - Chairman & Managing Director, HCC; Nobel Peace Prize laureate Professor Muhammad Yunus; Nishith Desai - Founder, Nishith Desai Associates.

## The First Responsibility Forum of India

At the First Responsibility Forum of India on 22<sup>nd</sup> March, 2010, Professor Yunus and creative advisor Hans Reitz spoke about innovations in social business, and how Indian businesses can think more concretely about their social bottom line.

Speakers presented Prof. Yunus' business model and showed best practice cases, involving and inspiring the audience which included a mix of Indian business leaders, lawyers, students, entrepreneurs, NGO employees and creative thinkers.

By visiting Mumbai, Prof. Yunus sowed the first seeds in India to support the Social Business movement and eradicate poverty in South Asia.

Hosted by Nishith Desai Associates and Lavasa Corporation Limited, the event was a great success, since it provided a platform to initiate dialogue about Social Business in India and connect social entrepreneurs.

Apart from creating awareness and sparking interest in Social Business, the results of this event also included several new commitments and projects in India which are under development.

The impact of the First Responsibility Forum of India will not be restricted to this day alone - it will be a continuous international platform for dialogue and exchanges between eminent figures from

the world of business, organizations, and politics.

After the successful completion of this forum, Professor Muhammad Yunus along with Mr. Hans Reitz, and Ms. Saskia Bruysten from Grameen Creative Lab visited Lavasa, India's Planned Hill City, and observed environmental and community associated initiatives. Lavasa follows an Environment Management Plan (EMP), that constantly promotes an ecological enhancement plan at several levels. This includes topsoil management, tree transplantation and mass plantation to the technologically superior processes of hydroseeding, soil, water and air pollution control and monitoring systems. On the community engagement aspect, Lavasa has a number of development initiatives in the areas of Health, Education, Employability Housing & Rehabilitation.



## UN Global Compact Leaders Summit 2010

The UN Global Compact Leaders Summit 2010 – ‘Building A New Era of Sustainability’ was held in New York between June 24-25, 2010. The summit brought together more than 1,200 leaders from business, civil society and governments from across the world to assess the state of corporate responsibility and chart a course towards a new era of sustainability.

On 24<sup>th</sup> June, 2010, the opening Press Briefing for the summit was addressed by H.E. Ban Ki-moon, Secretary-General, United Nations; Mr. Ajit Gulabchand, Chairman and Managing Director, Hindustan Construction Company (HCC); Mr. Mark Foster, Group Chief Executive, Accenture; Ms. Huguette Labelle, Chair of the Board of Directors, Transparency International; and Mr. Paul Polman, CEO, Unilever. The press briefing was intended to provide an overview of the status of the sustainability agenda and the UN Global Compact, and to articulate expectations for the Leaders Summit.

For India, an emerging economy - millennium goals are most essential. HCC, the only Indian company on the dais, represented by Mr. Gulabchand, set a benchmark at the global platform, on the critical role businesses in developing countries play towards sustainable development.

“As we grow, we have the opportunity to get things right the first time and therefore we have been able to espouse the cause of sustainability and join the Global Compact,” said Mr. Ajit Gulabchand. Highlighting the efforts in the field of water, he added, “We have been doing advocacy to create

a water policy framework and have also engaged in the serious practice of reducing the use of water and making sure we are water neutral in every construct. In addition to that, we being a construction company are pledged to create responsible infrastructure. We intend to embed sustainability not only in the structure but also in the operation of those structures as well as in the process of constructing them.”

H.E. Ban Ki-moon, Secretary-General, United Nations, urged the private sector to pitch in their efforts towards upholding human rights and labour rights, protecting the environment and fighting corruption. He appealed to business leaders to highlight in concrete terms, what they intend to do to help the world achieve the Millennium Development Goals by 2015.

On 25<sup>th</sup> June, 2010, a Plenary Meeting was held on ‘Achieving Development’, wherein business leaders from across the world exchanged ideas on how corporate organizations could contribute through ‘social investments’ to ensure holistic development. Mr. Gulabchand, who was a Plenary Leader at this session addressed the crucial issue of water sustainability and highlighted HCC’s active participation in The CEO Water Mandate. “What is important to understand is that water is a profoundly cross-cutting issue – and has environmental, social, developmental and political ramifications. In fact, many businesses are only now realizing the extent to which they are dependent on this scarce resource,” observed Mr. Gulabchand.

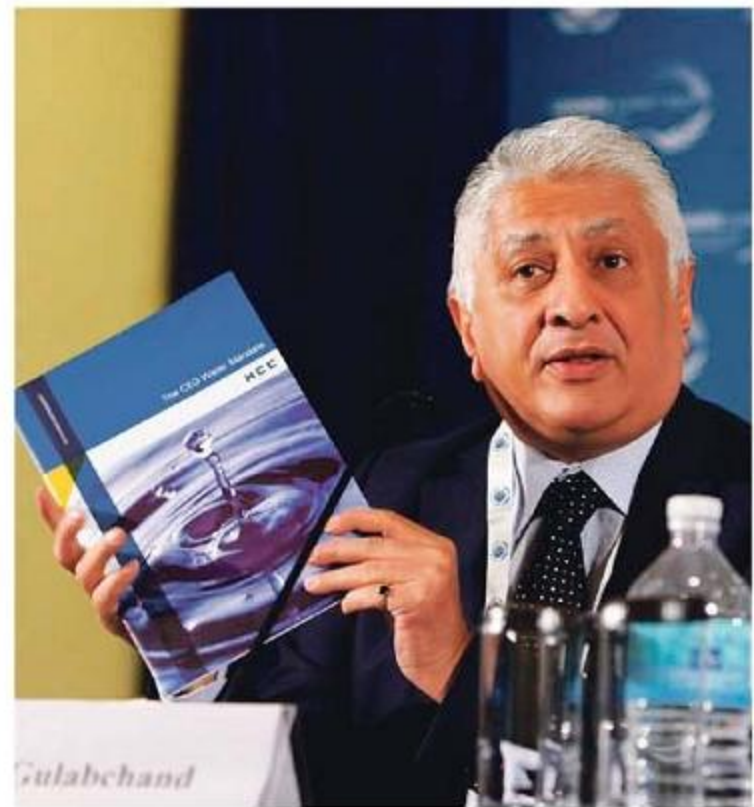
Today, the CEO Water Mandate is going further with respect to improving the interaction between

From Left to Right: Mr. Ajit Gulabchand, Chairman & Managing Director, Hindustan Construction Company; Ms. Huguette Labelle, Chair of the Board of Directors, Transparency International; H.E. Ban Ki-moon, Secretary-General, United Nations; and Mr. Paul Polman, CEO, Unilever, at the opening Press Briefing of the UN Summit



companies and governments on the issue of water. On behalf of all CEO Water Mandate endorsers, Mr. Gulabchand officially released a Guide to Responsible Business Engagement in Water Public Policy. "This Guide will offer corporate leaders a critical tool in working with governments and civil society to address – in a responsible and transparent manner – the range of water-related issues and problems," noted Mr. Gulabchand, as he encouraged all business leaders to consider water as a priority issue, and to consider joining The CEO Water Mandate.

The Global Compact Leaders Summit marks the tenth anniversary of the Millennium Development Goals initiative, launched in July 2000 with then forty-four business making a commitment to adopt universal human rights, labour, environment and anti-corruption principles in their strategies and day-to-day operations. It is a leadership platform, endorsed by Chief Executive Officers, offering a unique strategic platform for participants to advance their commitments to sustainability and corporate citizenship.



Mr. Ajit Gulabchand displays HCC's Communication On Progress (COP) at the opening press briefing.

### Indian Business Alliance on Water: Facilitating Public-Private-Community Partnerships in the Water Sector.

Indian Business Alliance on Water (IBAW) is a non-biased multi-stakeholder platform involving all sectors of society to resolving the water challenges and contributing to the development and sustainable management of India's water resources. In particular, IBAW focuses on building and supporting public-private-community partnerships (PPCP) that are industry-led and seek to promote sustainable water management that have a strong business case while at the same time assuring benefits to poor communities in rural and urban areas by way of enhanced water availability for livelihoods, drinking water security and environmental sustainability.

IBAW generated first state wide alliance PPCP alliance in India on water and is known as the Rajasthan Community Business Alliance on Water. Besides IBAW has mobilized around 1000 corporate organizations through various activities including PPCP projects, attendance in water summit and water awards for industry led initiatives "within and beyond the fence".

HCC is one of the private companies working closely with IBAW, on similar functioning model of RCBAW. This will enable IBAW to benefit from private companies knowhow, use their assistance to approach and advocate with state governments and benefit from their staff skills through deputation of private company staff to IBAW (on short term basis). The deliverables will include - PPCP projects brokered in the state and contribution of projects to achieve Millennium Development Goals, reaching out to poor, disadvantaged and other oppressed groups.

### Participation in advancing CEOWM initiative

HCC actively participated in Policy Engagement Group and steering committee of CEO Water Mandate Initiative. HCC also disseminated its "Communication On Progress 2009" with covering letter signed by Mr. Ajit Gulabchand, Chairman and Managing Director, HCC, to the Central Ministry of Government of India, large public sector companies and planning commission; advocating the water scarcity issue as a prime concern for our sustainability.





## Outreach to Supply Chain

HCC's sub-contractor development cell organized a regional sub-contractors conference on 18<sup>th</sup> June, 2010. HCC invited 56 contractors from the Eastern & Northeastern regions across all four Business Verticals to share the information on forthcoming work opportunities for the sub-contractors. The UN Water Mandate team participated in the conference for awareness and capacity building on the UN CEO Water Mandate initiative.

A presentation given illustrated the six key areas of UN CEO Water Mandate with HCC's expectations from sub-contractors for keeping up endorsement of UN Water Mandate.

The attendees were informed about the system developed for implementation of UN Water Mandate and ways to reuse and recycle water.

The sub-contractors were also informed on cost implication due to the implementation of UN Water Mandate at project sites.

Sub-contractors conference at Kolkata





## Snapshot of Water Consciousness Actions on Ground

### Within Fence

#### A) Rainwater Conservation at the Delhi-Faridabad Elevated Highway Project

HCC's Badarpur project is a 4.4 Km elevated highway corridor project located on the outskirts of the city of Delhi and the Haryana State Border. Its workload is distributed at two locations, i.e., on site - actual road construction and at Mirzapur – the location of the batching plant and concrete segments casting. The UN Water Mandate team assessed the site to identify the water reuse and conservation proposals. In all, 10 proposals were identified at Mirzapur. Proposals for natural pond recharging (BRP-RWH-1) and artificial pond excavation (BRP-RWH-2) were put forward to conserve water by natural percolation. Rooftop rainwater harvesting system proposals were suggested for store building (BRP-RWH-4) and labour camp buildings (BRP-RWH-3). To optimize the use of water, a water recycling system for circulating the curing water (BRP-WW-5) at the casting yard was proposed. Similarly water reuse option for dust suppression was suggested for the treated wastewater from the batching plant (BRP-WW-6). An innovative concept of recharging groundwater by the stormwater from the elevated highway was proposed through proposals (BRP-RWH-7 and 8). As a BOT project, this will continue to recharge the groundwater for the next 18 years. The RWH system for the proposed toll building is also suggested through proposal (BRP-RWH-9). Water saving through installation of water free urinals in the washrooms for the building is also proposed (BRP-WFU-10).

#### Natural Pond Recharge Proposal (BRP-RWH-1)

The deepening of the natural pond on the site location at Mirzapur was proposed to increase its capacity from 800 KL to 1200 KL. This would have augmented the surface water availability and increased percolation. But owing to certain social issues like ownership and livelihood of the community linked to the pond, this proposal was shelved.

Community sentiments may supersede a potentially good proposal.



Artificially excavated pond at Mirzapur site

#### Recharge of Artificially Excavated Pond (BRP-RWH-2)

A 400 sq.m low lying part of the land was used to create an artificial pond with the capacity of 1614 KL. The accumulated stormwater collected at the site was used to fill the pond. With an average 600 mm of rainfall, the projected water conservation was 30000 KL/year. Owing to the scanty rainfall the estimated quantity of groundwater recharge for 2009-2010 is 8400 KL and for 2010-2011 is 6288 KL.

Water accumulation in a pond (natural or artificially created) proved as a good water conservation intervention.

#### Rooftop Rainwater Harvesting (BRP-RWH-3 and 4)

The area receives scanty rainfall of average 600-800 mm. The significant water extraction from the bore well was used for concrete making in the batching plant and curing. Water collected on the roof surface areas of the labour camp buildings adjacent to the bore well was used for recharging the well. Water from the roof area of the store building was used to recharge the pond. The intervention projected total 522 KL/year of water conservation. To some extent, the recharging of the bore well with rainwater compensated for the water extracted from it. Similarly the rainwater collected at the store helped to increase the groundwater table. Though direct measurement of water conservation is not available, the previous year's water conservation may be considered as 316 KL/season with 80% efficiency of system and based on that year's rainfall data.

Rooftop rainwater harvesting is the easiest and effective water conservation intervention towards compensating for the water used on site.



Rooftop Rainwater Harvesting at Mirzapur site

#### Recycling of Curing Water (BRP-WW-5)

The concrete segments at the casting yard were cured in the adjacent curing yard. It was decided to recycle curing water through a proper drainage system with paver blocks forming an impervious layer. It helped in streamlining the flow of water into an equalization tank

to be reused for curing. The mathematical calculation projected the water reuse of 6132 KL/year. The proposal showed significant impact on fresh water consumption. Earlier the water for curing was extracted from bore wells, increasing pressure on groundwater storage. The daily monitoring of water recycled for curing has shown 5930 KL water saving in 11 months.

#### **Batching Plant Wastewater Management (BRP-WW-6)**

The treatment of wastewater from the batching plant was carried out through the sedimentation tank without much attention to de-sludging activity. Proper management of the treatment process helped the site to get clear water. The treated water was reused for dust suppression considerably reducing water extraction from the bore well and conserving the groundwater resource. The monitoring details of tankers used for dust suppression shows that 1050 KL of water was reused in 11 months.

#### **Elevated Highway - Rainwater Harvesting (BRP-RWH-7 and 8)**

The 4.4 Km long elevated highway design incorporates stormwater drains alongside the highway. This proposal suggested an innovative way to conserve the rainwater in the same area through recharge bore wells at predetermined locations along the highway.

The site appointed a hydro geologist who studied the characteristics of ground strata using bore logs and a physical survey of the area to decide on the locations appropriate for maximum percolation of rainwater. The consultant provided the technical knowhow about the bore wells' diameter, depth and locations. During designing, the sophisticated filter system was considered for recharge of the bore wells to avoid clogging which might reduce the efficiency of the recharge system. The project is a BOT project and under maintenance of HCC for 18 years; the system would be taken care of by the Company for the whole period.

#### **Present Status<sup>iii</sup>**

The site has decided to go for a pilot of this intervention by implementing the recharge wells at 2 locations. The drains are designed and executed to divert the stormwater flow towards the recharge wells. The work in HCC's domain is being carried out scientifically and with extra financial overheads on the site. The execution is in progress and the quantity of groundwater recharge will be measured with a flow meter installed within the RWH system. Additionally, it is also proposed to measure the impact of this proposal on the groundwater table in the vicinity of the recharge structure by conducting hydro-geological studies post monsoon season.



## B) Water Conservation at Indira Sagar Right Main Canal - Polavaram Project, Package - 3, Andhra Pradesh

The Indira Sagar Right Main Canal is a 30 Km long canal project in Andhra Pradesh. Though the project is at the termination stage, the proposals for water conservation were accepted and implemented by the site. The water conservation proposal of recharging an artificial pond (PRC-RWH-80) was considered. The other proposals were rooftop rainwater harvesting of the store/office building at the batching plant (PRC-RWH-81) to conserve rainwater. Proposals (PRC-RWH-82 and 83) were given to conserve the grey water through a soak pit near the workers' accommodation at crushing and batching plant sites respectively.

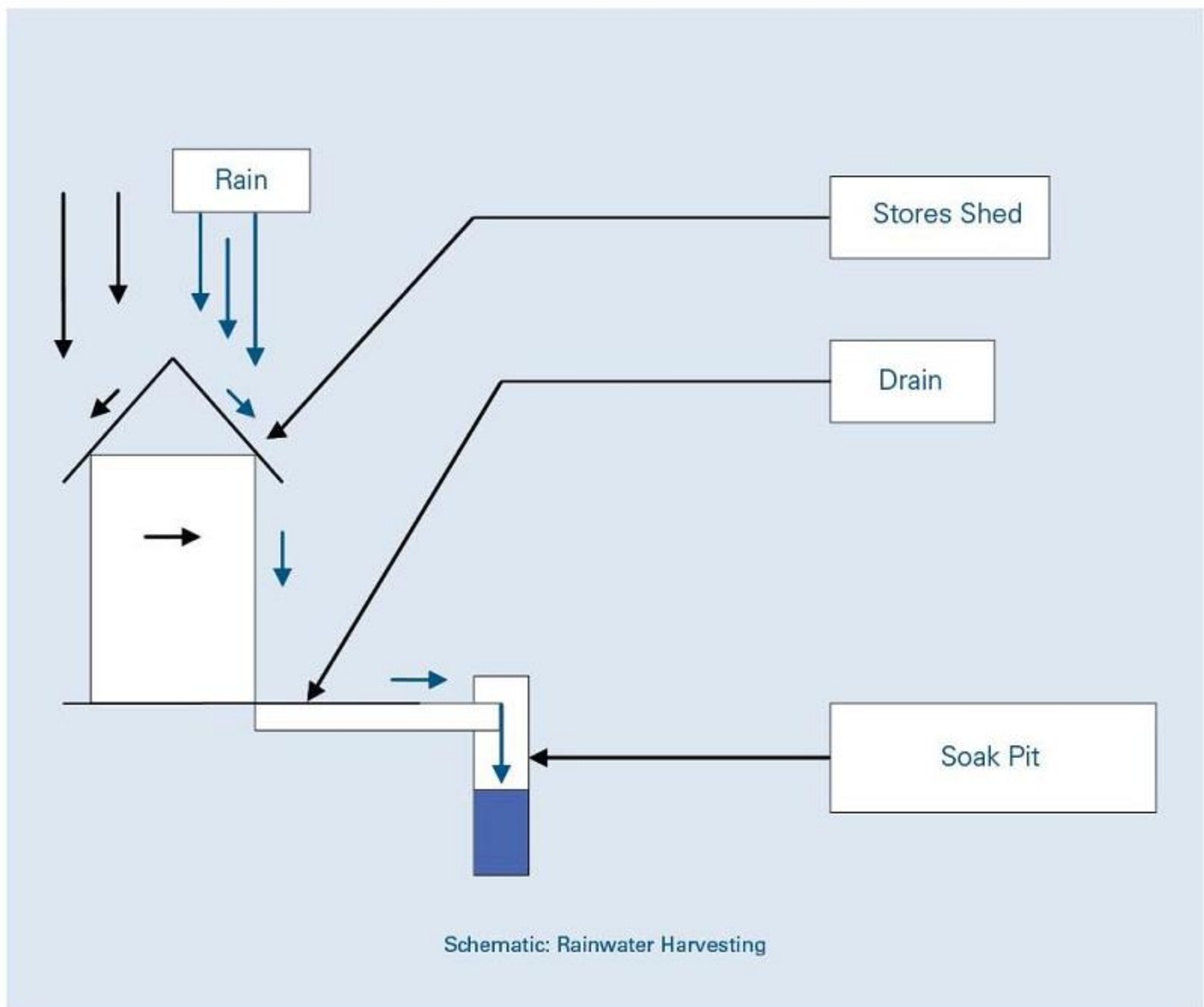
### Rooftop Rainwater Harvesting (PRC-RWH-81)

The rooftop of the store/office building was used as potential catchment to collect the rainwater. The stormwater drains which collected the rainwater were used to divert the water into the soak pit. The projected rainwater collection was 176 KL/season. This arrangement helped in

conserving the rainwater within the site area as all the water collected in the soak pit percolated into the ground. Rooftop Rainwater Harvesting proved to be the easiest and effective water conservation intervention.

### Groundwater Recharge by Grey Water through the soak pit arrangement at workers' Residential Accommodation (PRC-RWH-82 and 83)

Substantial quantity of water used in the washrooms of workers' accommodation at the crushing and batching plant site was producing a high quantity of grey water. Although the accommodation was to be demolished in a few days after the proposal was made, the project site accepted implementation of the proposals recognizing that this would conserve substantial water even in the limited period available. The projected conservation was 126 KL at the crushing plant site in 90 days and 3400 KL at the batching plant site in 270 days. The quantum of water saved was not measurable on either location but it contributed to the groundwater table through percolation.



### C) Water Conservation Measures at HCC's Middle Vaitarna Pipeline Project, Maharashtra

The Middle Vaitarna Pipeline project is located in Thane district, a few kilometres from Mumbai and is being executed for the client, Brihanmumbai Municipal Corporation. As per the contract conditions, the client supplied adequate water to the project free of cost through existing bulk water pipeline. A high quantum of water like 7 KL/m of pipe length is required for hydro testing of pipelines. The methodology earlier adopted by the site was to carry out the hydro testing of the pipeline in stretches of around 2 km and the water after pressure testing of each stretch of pipeline was drained out and allowed to flow through natural drains. The site, with the help of the UN Water Mandate team then undertook to recycle the hydro testing water for the next stretch of pipeline (Proposal No. MV-WW-16). Moreover the site also installed the Rooftop Rainwater Harvesting System at the project office (Proposal No. MV-RWH-11).

As the pipeline passed beside the Ashramshala School, the UN Water Mandate team also made efforts to reuse the hydro testing water for recharging the open and bore wells situated on the grounds of the private school (Proposal No. MV-WW-13, MV-WW-14 and MV-RWH-15 respectively). The campus open well and bore well were identified as potential structures for recharging hydro testing water.

The concerned authorities of Ashramshala gave permission for the said work but the final decision

maker, the client BMC denied the proposal on account of previous disputes with the community in the area, resulting in shelving of the proposal. The proposal projected 726 KL water recharge.

At times, social aspects supersede good water conservation proposals.

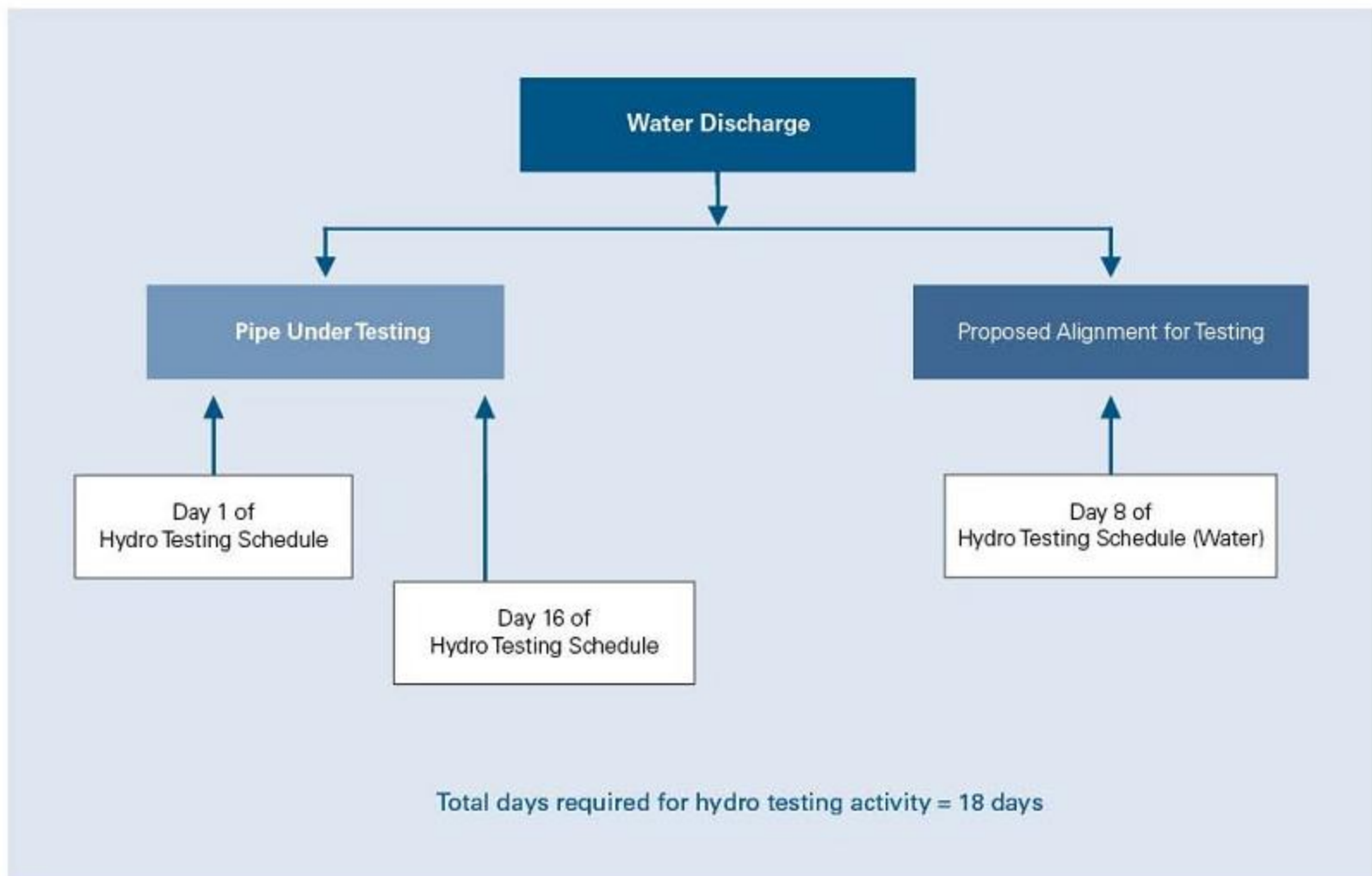
#### Reuse of Hydro Testing Water for two consecutive sections (MV-WW-16)

Initial planning involved the review of schedule of hydro testing of different stretches of pipeline. It helped for strategic planning of recycling of hydro testing water for next stretches of pipeline. The framework was made for proper implementation of the work. The strategic planning projected the water recycle of quantum of 63569 KL.

To their best ability, the site managed to adhere to the plan and implemented the water recycling procedure to save water of 1557.411 KL.

The site would have shown even better water saving if this had been planned from the early stages of commencement of the site. The knowledge gathered by the site in implementing the proposal would help during planning of the work at other HCC sites as well, such as the new pipeline project NC 25, in Gujarat.

Clearly, this demonstrates that an initial study of water utilization needs at a site helps in planning water saving measures.



## D) Water Conservation Reuse at HCC's Vizag Cavern Project, Andhra Pradesh

Tunnelling is the primary activity in the Vizag Cavern Project situated at Vishakhapatnam in Andhra Pradesh. Tunnelling requires a large quantity of water used for drilling machinery. Initially the water required was purchased by the site at a high cost, tremendous pressure on groundwater resources and high volume of wastewater (0.6 ML to 1 ML) was generated from the tunnel. The UN CEO Water Mandate intervention helped the site to install a wastewater treatment plant (WWTP) which treated the wastewater to reusable parameters and recycled it for appropriate tunnel activities (Proposal No. VCP- WW-28). Apart from wastewater treatment, the water mandate team also explored the rainwater harvesting potential of the site and proposed rooftop rainwater harvesting systems at site establishments (Proposals VCP-RWH-20,22,23,24,25,26 and 29). The water mandate team also proposed an embankment for the natural pond to enhance its capacity (Proposal No. - VCP-RWH-27). The proposal (VCP-WW-21) to conserve grey water, after treatment, from the labour camp was shelved by the site because the establishments were to be removed from the location.

### Rooftop Rainwater Harvesting for Site Establishments (Proposals VCP-RWH-20, 22, 23, 24, 25, 26 and 29).

The site area receives moderately average rainfall of 1250 mm per season. The water conservation potential through rooftop rainwater harvesting of site establishments was identified. The proposals were made for buildings such as the project office, client's office, store building, workshop, workers' camp, etc. Water conservation through recharging the ground by obstructing the runoff at shaft B location was also proposed. All the proposals except the RTRWH at workers' camp were accepted and implemented by the site. The camp proposal was shelved as the camp was about to be shifted from the site. The water conservation projected through these proposals was 15804 KL/year.

Rooftop Rainwater Harvesting at Vizag Project site



Rooftop Rainwater Harvesting (RTRWH) proved to be effective as all the water collected in soak pits percolated into the ground. Though the impact is not measurable, the percolated water helped to conserve water in the same catchments.

This intervention is now used at all the sites where the ground supports percolation. Rooftop Rainwater Harvesting has proved to be the easiest and an effective water conservation intervention at several sites.

### Increasing the capacity of the Natural Pond by Embankment Construction (VCP-RWH-27)



Embankment created near natural pond at Vizag Project site

The proposal of enhancement of the natural pond was accepted by the site and executed. The natural pond having roughly 2 Ha as catchment area and 900 sq.m as submergence was explored for water conservation by constructing an embankment at its spillway. The percolation of 107 KL/day gave a total projected percolation of 160000 KL/year. The impact of the intervention is not measurable but nevertheless water accumulation methods always help in water conservation through percolation. This concept of pond creation was also used at the Polavaram site.

Pond water accumulation (natural or artificially created) proves as a good water conservation intervention. The Vizag site put forward the impoundment proposal to the client EIL and obtained their agreement to the proposal in the interest of maintaining the water table in the area.

### Recycling of Wastewater for Tunnel Construction Activities by introducing WWTP (VCP-WW-28)

Tunnelling activity is a major part of the project work, which demanded a high quantum of water for activities like:

- Bore hole pressurization



- Drilling
- Dust suppression during mucking
- Curing
- Rock bolt grouting

The consumption of water recorded by the installed flow metres ranged from 1200 KL/day to 1400 KL/day. Based on the recorded outflow from the tunnel, the Wastewater Treatment Plant (WWTP) was designed, with rigorous treatability assessment, to deliver outflow of 50 KL/hr. The intervention helped the site to save a considerable quantity of fresh water. The fresh water saved by the site is 217520 KL in 11 months. The site had installed the flow metres from the initial stage, to measure the water

flow into and out of the tunnel. The log record of the readings maintained at site gave realistic data on the water saved.

The impact of installation of WWTP proved highly beneficial to the site.

#### This intervention

- Reduced the dependability of site on external sources
- Saved cost in procurement of water
- Saving of fresh water

Though the WWTP plant required initial capital investment, its use proved to be beneficial.

Wastewater Treatment Plant at Vizag Project site



## **E) Use of Wastewater for Hygiene at Maroshi Ruparel Tunnel Project, Mumbai**

Maroshi Ruparel Project is an underground water supply tunnel located in the city of Mumbai.

Percolation of saline water into the tunnel being a recurring problem, dewatering the tunnel is one of the major construction activities.

The high salinity of the dewatered wastewater limits the reuse of wastewater.

As per the contract conditions, the client supplied adequate water to the project free of cost.

This fresh water was initially used for domestic uses at site including washrooms. The site with the help of the Water Mandate team proposed to use the saline water for flushing in washrooms at the workers' camps and project offices (Proposal VMP-WW-35).

The water mandate team also identified a private establishment next to the project office (Proposal VMP-WW-36) and the community toilets in the vicinity to try and reuse the saline water at these places. (Proposals VMP-WW-37, 38, 39).

### **Implementation of Proposal (VMP-WW-35) at Maroshi-Ruparel Tunnel site**

The proposal of wastewater reuse at the site (Proposal No.-VMP-WW-35) was accepted and implemented.

The site established a new plumbing system to supply the treated wastewater to the camp washrooms with 9 WCs, to the project office washrooms with 2 WCs and 2 urinals and to the client's office with 1 WC and 2 urinals. The projected fresh water saving was 547.5 KL/year considering 150 daily users.

The intervention has been effective in water saving. Though there is no direct measurement of water used at washrooms, the flow metre readings at the office building have shown considerable reduction in water consumption after the installation of wastewater reuse (as shown by the initial flow metre recordings

of the water used at the office building including the washrooms). The success of the proposal gave the site confidence to establish a similar wastewater reuse arrangement at the Maroshi site.

The intervention proved that wastewater, with suitable precautions, can be utilized for hygiene, saving a substantial quantity of fresh water.

### **Implementation of Proposal (VMP-WW-36) at Maroshi-Ruparel Tunnel site**

The proposal demanded the participation of a private organization. It projected the reuse of treated wastewater of 21.9 KL/yr from 4 WCs used by 9 persons. However, the proposal was shelved because of plumbing constraints, easy availability of municipal water and inability of staff to take independent decisions.

The attempt to involve a public organization helped us understand that with abundant availability of municipal water at cheap rates, there is a disinclination to change the existing plumbing system posing constraints in water reuse.

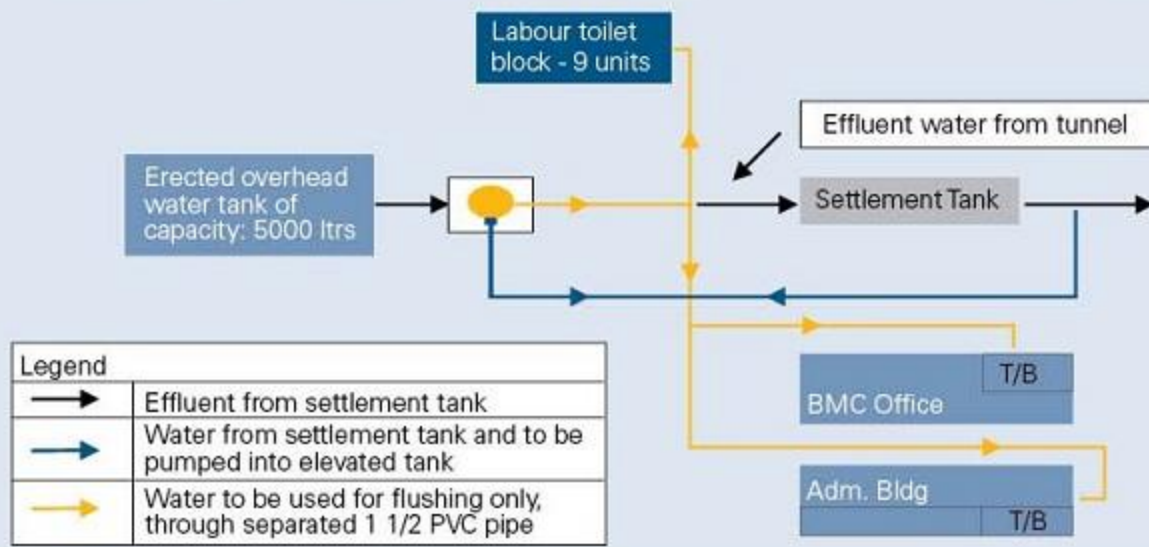
### **Implementation of Proposals (VMP-WW-37, 38, 39) at Maroshi-Ruparel Tunnel site**

The water mandate team identified the community washrooms in the vicinity of the site. The proposals projected 5110 KL/yr of water reuse for 1300 end users/day at three different locations. These proposals of public-private partnership did not materialize and were shelved owing to constraints like the absence of dedicated plumbing in the washrooms, contractors maintaining the washrooms and abundant water availability.

The initiative at community toilets helped us to realize that scarcity of the resource (water) is essential for acceptance of a new concept at the community level.

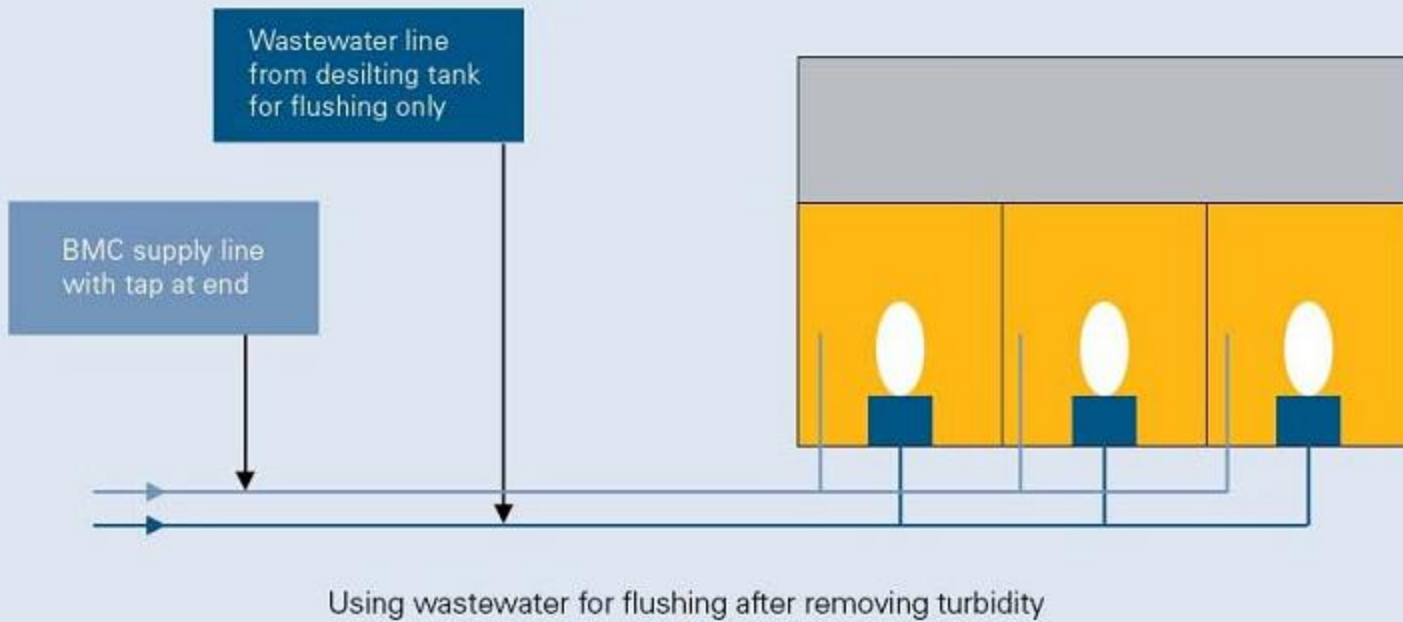


Schematic: Layout of effluent water use for flushing in toilet blocks at the Vakola Tunnel site.



Schematic: Use of wastewater for hygiene

Typical Toilet Block Layout



## Around Fence

### Artificially Excavated Pond at Polavaram Project site (PRC-RWH-80), Andhra Pradesh

A culvert below canal was constructed as a part of the project to connect the land areas on either side of the canal. The site, with their own initiative, created a pond of capacity approximately 7200 KL on the downstream side of the culvert to accumulate water. The land on the upstream side worked as catchments for the pond. The impounding of water was enabled all the year round through prolonged recharging by surface stream. With the low percolation rate, the projected water conservation was 48240 KL/year.

The water accumulated in the pond was used for dust suppression and curing of concrete during the execution of the canal stretch at that location, reducing the pressure on ground water resource. The pond also benefited the community around as they used the water for farming, fish breeding, etc. The impact was not measurable but contributed in increasing the groundwater table through percolation; the farmers used surface water for farming reducing their groundwater use at that location, reducing the pressure on groundwater resource.

The accumulation of water helped to conserve the groundwater.

Artificially excavated pond at Polavaram Project site



## Beyond Fence

### A) Utilizing the Seepage Water for Irrigation at Ghodazari Branch Canal site, Maharashtra

Ghodazari Branch Canal Project is being executed by HCC for the client Vidarbha Irrigation Development Corporation. It is located near village Nagbhid, 140 Km from Nagpur in the Vidarbha region of Maharashtra. The topography of the Vidarbha region shows large basaltic formations by Deccan lava. Geographically, much of this central Indian region is in the rain shadow area and faces water scarcity. Water available for irrigation mainly depends on the rainfall and the ground wells.

The canal work is a part of irrigation infrastructure development work by Vidarbha Irrigation Development Corporation. The canal originates from the Gosikhurd Dam built on the river Vainganga, the biggest river of Vidarbha, in Godavari basin. A cut & cover type canal, the work comprises excavation, laying of a concrete raft floor, and constructing vertical concrete walls with arching at the top to create a tunnel. After the construction of the canal, back filling of the soil is done to achieve the original ground level.

During construction, the concrete structure of the canal saw accumulation of seepage water percolating from the soil. The site arranged for water pumps to extract the seepage water from the canal, and a pipeline to carry the seepage water up to the nearby farms. This extracted water was used by the farmers in the vicinity for irrigation. Owing to the water availability, the area adjacent to the canal demonstrated a crop harvest on land which was otherwise not cultivable.

The local village governing body acknowledged the efforts of the site with an appreciation letter.



Appreciation Letter by Grampanchayat, Nagbhid

### B) Relief Work at Leh, Jammu & Kashmir

On 6<sup>th</sup> August 2010, cloudbursts and flash floods struck Leh in the state of Jammu & Kashmir. HCC, which has two large engineering project sites in the Ladakh and Kargil regions, deployed trained engineers for relief and restoration work at the affected villages close to its project sites. These are at Saspoche, Bazgo and Nimoo, located at a distance of 30-45 kms from the project sites.



Both HCC teams from Nimoo & Chutak sites under the guidance of CSR Mumbai worked hard to support disaster hit Leh.

The HCC team was the first one to reach Saspoche village for rescue work.

HCC supported the village cleaning, distribution of food material and health check-ups and distribution of medicines to the villagers. The relief teams were led by Engineering in Emergencies (EE) trained engineers, who are selected engineers from various HCC project sites, extensively trained to work in disaster relief for Water, Sanitation, Shelter and Hygiene Promotion. HCC partnered with various players in Humanitarian Sectors like NDMA, OXFAM, SEEDS, Save the Children, WHO, REDR, etc.



The disaster also ravaged the school in which the climax of Aamir Khan's blockbuster movie "3 Idiots" has been filmed. The Druk White Lotus School is being run by the London based Drupka Trust. The school is located at Shey, about 15 Km from here on the Leh-Manali highway. Heavy earth moving equipment and team of more than 75 people including a trained disaster relief engineer, equipment such as JCB and tippers have been deployed to clear mud and sludge left behind by the cloudburst. Aamir Khan personally visited the school and appreciated HCC's work which helped the school to get back to normal situation. Along with this, HCC team also repaired the bridge at Hemis-choo which is in between Nurla and Alchi, and cleaned Rizhong Monastery. The road from NH-1D to the Rizhong was washed away at three places and the flooded mud stuck away the road at several places for around 6 Km. HCC immediately deployed Loader for restoration of above road. Cleaning of Rizhong Monastery at ULE TOPO with 50 persons for clearing the mud accumulated at their school. HCC offered 200 ltr of diesel to their monastery for their JCB to run.

#### Water Channel for Drinking Water

A team of 15 workers went to Khaling village near Nimoo site to re-route a NALA for drinking water. Another team of HCC EE trained engineers built toilets and water supply system along with OXFAM. In addition to all the relief work, Chutak Hydroelectric Project, Kargil, sent relief material and a rescue team for the rehabilitation work to be carried out at Leh, which included 500 packets of food material, 500 blankets and a rescue team of 25 members (Supervisor, Cook and Labourers).



#### C) Community Water Consciousness Proposals at Kihim Village, Maharashtra

Kihim is a coastal village in Raigarh district of Maharashtra, i.e., in the Konkan coastal zone with a scenic beach, and is primarily a tourist destination. Kihim has an approximate population of just 4700 people comprising 900 households.

The available water sources in the village are bore wells, open wells and Municipal water. There are approximately 100 private bore wells, 8 public bore wells (owned by Grampanchayat), 350 private open wells and 11 public open wells. The main source of potable water in the area is Municipal Tap water from Maharashtra Jeevan Pradhikaran Board through Maharashtra Industrial Development Corporation Khopoli Water Supply.

The on-going extraction of fresh water from the bore wells and open wells has reached alarming levels and is leading to increase in rate of flow of saline water from the coastline into the village shallow aquifers.

HCC has been implementing environment enhancement projects at Kihim, including solid waste management and employment generation. HCC also took the initiative to address the problem of the dwindling fresh groundwater resource and proposed 16 Rainwater Harvesting solutions for groundwater recharge and real time storage providing the engineering process in detail. 14 out of the 16 proposals were practically feasible and executed on the ground. Permission was obtained from the Grampanchayat for the execution of the proposals which were implemented with HCC's support. HCC also conducted capacity building workshops for the local community on building infrastructure and for operations & maintenance of Rainwater Harvesting Structures. Further, HCC is monitoring the performance of RWH systems and quality of water being recharged in the ground.

Along the coastal region, the groundwater helps prevent the intrusion of saline water from the sea by maintaining hydrostatic balance. Drilling of more and more bore wells for catering to water needs of the area is leading to depletion of the groundwater level and disturbing the hydrostatic balance. Thus the only eco-friendly solution to maintain this balance is by rainwater harvesting. The area currently has many abandoned bore wells, some of them having no water since drilling, and some not in use owing to lack of water extraction accessories. Some of the open wells in the area contain sludge resulting in less water carrying capacity. There are lots of creeks where water gets logged during high tide in the rainy season.

Water Consciousness Efforts were made by the HCC UN Water Mandate team. To promote the RWH system, an awareness session was held on water conservation for school teachers and students at Wadke High School, Kihim, on 'World Environment Day - 5<sup>th</sup> June, 2010'. A preliminary survey was conducted with the assistance of a hydro geologist and survey data collected by door-to-door communication with the local people. Another awareness session was conducted for members of the Grampanchayat and the head of the Kihim Hotel Association. The design support for the RWH system was also given by the HCC team.

A primary survey was done by community, and data was gathered regarding sources of water, seasonal availability of water quantitywise & qualitywise, number of bore wells available and their performance in different seasons. On the basis of the primary survey data, a hydro geological survey was conducted along with a hydro geologist.

Technical proposals were subsequently made describing in detail the engineering processes involved. There were four types of proposals, namely 3 Pilot Proposals (Proposal Nos. 101, 102 & 103), 3 Public Proposals (Proposal Nos. 104, 105 & 106), 4 Private / advisory proposals (Proposal Nos. 107, 108, 109 & 110) and 7 Community Proposals (Proposal Nos. 111, 112, 113, 114, 115, 116 & 117). Execution was carried out according to the proposals. Total expenses for the execution of all the proposals are ₹213244.75, of which ₹205947.7 were paid by HCC and for community related proposals (10% contribution) ₹7297.05 was paid by community.

Once the Grampanchayat issued a letter of permission for execution of Pilot & Public proposals, the HCC UN Water Mandate team supervised and monitored the execution of all the proposals.

#### Pilot Proposals:

The pilot proposals specifically pertained to the abandoned bore wells. As a result, from 1<sup>st</sup> June, 2010 till 31<sup>st</sup> August, 2010, all the bore wells are serving as recharge wells, irrespective of the fact that rainfall recorded in this area was 229 cm. Thus it was proved that abandoned bore wells can be used as recharge wells. By using abandoned bore wells as recharge wells, the capital cost incurred on creating these bore wells was put to good use instead of being left as wasteful expenditure. At the end of the monsoon, HCC will train school students/staff/local authority to remove the filter cloth, keep it safe, and cap the borehole safely. As the well's absorption is fairly good, HCC plans to explore further application of the design to augment the locations available for collection of water for recharging during the next monsoon, such as the school and temple roofs.



Working of Feeder for RWH Pilots

RWH Pilot Proposal No.102 – at Z. P School in Kihim, Maharashtra





RWH Public Proposal No.105 – at S. T. Stand in Kihim, Maharashtra

#### Public Proposals:

The public proposals included abandoned, working bore wells & open wells. In Proposal No.104, the bore well was not functioning because of the absence of a water lifting mechanism. To begin with, and before recharging, the bore well was flushed while under the same Proposal 104, the open well was cleared of sludge before recharging. Since these proposals relate to public places, they also aid in promoting the RWH system by arousing the curiosity and interest of members of the general public. Here too, the abandoned bore wells are showing good recharging capacity. After the monsoon, HCC's objective is to train students/ staff/ local authority to take care of the maintenance of these borewells and cap the borehole safely.

#### Private/Advisory Proposals:

The RWH proposal was properly put forward to the owner Mr. Mhatre (109). The RWH solutions were not suitable for Al Manzil (110) as the property is normally vacant during monsoon, and there is minimal demand for stored water.

The drainage pattern in Kihim is sensitive to tidal variations. An occurrence of heavy rainfall coinciding with the high tide causes flooding of creek channels. The flood risk from backflow into fields was reduced by providing a solution to the owner of the property. The two solutions provided are: a) conforming to

the natural drain; create an engineered channel with clearly designed invert levels. This channel will provide a bypass route to flood water in the event of heavy rainfall, b) create a RWH storage tank above the ground, in order to carry out real time use of rainwater, as well as to reduce the stormwater contribution from the property.

#### Community Proposals:



RWH Community Proposal No.115 - at Kate's house in Kihim, Maharashtra

These are some good examples of building an understanding among the local community of the importance of implementing RWH, to help save treated water for household activities and to put rainwater to real time use and minimize wastage of such water.



A new method of plumbing was devised to direct the overflow of the collection tank to the open well. This will save the electrical energy required to pump out water from the bore well. In these proposals, the community contributes financially (10% contribution) and provides help during execution of the proposals and also do not charge labour cost for their houses (Proposal No. 117).

All the results are based on community observations, and log records are maintained by villagers.

क्र.सं.	दिनांक	स्थान	विवरण	पंपिंग	वैकल्पिक	टिप्पणी
1	10/07/10	...	...	...	...	...
2	11/07/10	...	...	...	...	...
3	12/07/10	...	...	...	...	...
4	13/07/10	...	...	...	...	...
5	14/07/10	...	...	...	...	...
6	15/07/10	...	...	...	...	...
7	16/07/10	...	...	...	...	...
8	17/07/10	...	...	...	...	...
9	18/07/10	...	...	...	...	...
10	19/07/10	...	...	...	...	...
11	20/07/10	...	...	...	...	...
12	21/07/10	...	...	...	...	...
13	22/07/10	...	...	...	...	...
14	23/07/10	...	...	...	...	...
15	24/07/10	...	...	...	...	...
16	25/07/10	...	...	...	...	...
17	26/07/10	...	...	...	...	...
18	27/07/10	...	...	...	...	...
19	28/07/10	...	...	...	...	...
20	29/07/10	...	...	...	...	...
21	30/07/10	...	...	...	...	...
22	31/07/10	...	...	...	...	...
23	01/08/10	...	...	...	...	...
24	02/08/10	...	...	...	...	...
25	03/08/10	...	...	...	...	...
26	04/08/10	...	...	...	...	...
27	05/08/10	...	...	...	...	...
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34	12/08/10	...	...	...	...	...
35	13/08/10	...	...	...	...	...
36	14/08/10	...	...	...	...	...
37	15/08/10	...	...	...	...	...
38	16/08/10	...	...	...	...	...
39	17/08/10	...	...	...	...	...
40	18/08/10	...	...	...	...	...
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43	21/08/10	...	...	...	...	...
44	22/08/10	...	...	...	...	...
45	23/08/10	...	...	...	...	...
46	24/08/10	...	...	...	...	...
47	25/08/10	...	...	...	...	...
48	26/08/10	...	...	...	...	...
49	27/08/10	...	...	...	...	...
50	28/08/10	...	...	...	...	...
51	29/08/10	...	...	...	...	...
52	30/08/10	...	...	...	...	...
53	31/08/10	...	...	...	...	...

RWH community observations – Register maintain at Ujjivana's office in Kihim, Maharashtra

Below are the figures for the months of July & August 2010

- Quantity of water recharge through bore wells is 75.77 M<sup>3</sup>
- Quantity of water recharge through open well is 136.08 M<sup>3</sup>
- Quantity of treated municipal tap water saved by using rainwater for household activities is 175.80 M<sup>3</sup>

After the implementation of this initiative, these proposals proved to be significant and long term water conservation solutions for Kihim. It was shown that rainwater harvesting (RWH) can be successfully implemented and public awareness was also raised regarding RWH.

Abandoned wells can be used for recharging. Water is made available for (through community proposals) household use saving the time and effort of the women in the village. The execution helped the plumbers to understand the functional purpose of each component of the design. It also encouraged masons to show their skills, for example, making a round base for the collection tank.

Through these proposals, capacity building of the women from the community is achieved regarding quality & quantity of water. These proposals are also helpful in checking the behaviour of the groundwater in the coastal region. The initiative has also helped in developing a procedure for the implementation of RWH work for other villages.

#### D) Water Conservation at HCC's 247 Park

247 Park - A 1.8 million sq.ft business destination located in Vikhroli, Mumbai, is a LEED certified green building. It is a zero discharge complex with installed rainwater harvesting systems and centralized sewage treatment plant.

##### Rainwater Harvesting

Implementing the stormwater management plan has decreased the site imperviousness by around 98%. The design of the rainwater collection system is such that the post-construction rainwater runoff is lower than pre-construction runoff by incorporating rainwater harvesting pits at strategic locations within the site.

For 3 months of monsoon (June 2010-August 2010) the estimated quantity of groundwater recharge was 31000 M<sup>3</sup>.

##### Centralized Sewage Treatment Plant

Treatment of 100% wastewater generated with occupancy from March 2010 to August 2010 led to fresh water saving of 6474 M<sup>3</sup>. The working of STP minimized the burden on water supply infrastructure and lowered the energy use.

The treatment unit features Membrane Bio Reactor (MBR) technology for the treatment of sewage.

##### Footnotes:

- i For 25 HCC Project Sites from April 2009 - March 2010
- ii For period 1<sup>st</sup> September, 2009 - 31<sup>st</sup> August, 2010
- iii As on August, 31<sup>st</sup>, 2010





## The HCC Group of Companies

HCC Infrastructure Ltd is a leading developer serving India's infrastructure needs in the areas of Transportation, Energy and Urban Utilities. Since its inception two years ago, HCC Infrastructure

has grown its portfolio to over ₹5,500 crore. Its current assets under management include six NHAI concessions, of which two are operational.

Nirmal BOT, Andhra Pradesh





Lavasa Hill City

Lavasa is a new planned hill city, 1/5th the size of Municipal Corporation of Greater Mumbai, located in the Mumbai-Pune economic corridor. It is promoted by HCC and HREL. The Master Plan for the city was designed in conjunction with HOK International Ltd., USA and has won 4 international awards. It is based on the principles of New Urbanism which organizes all components of essential city life within walking distance of each other. The city is planned for an estimated permanent population of around 3 lakh residents and 20 lakh tourists a year. Concepts like e-Governance, Geographical Information

System (GIS) and Biomimicry as a science have been adopted in town planning and techniques like Hydroseeding, applied for protection and enhancement of the environment. Lavasa has tied-up with industry leaders in various businesses such as hospitality, health care, education, tourism, etc. It is envisioned to be a more liveable city of the future where residents can live, work, learn and play in harmony with Nature.

Lavasa is one model of new city development. It can also be replicated to build other cities.

HCC Real Estate Ltd (HREL) has developed 247Park, a state-of-the-art business destination at the heart of the upcoming IT corridor at Vikhroli (West) in Mumbai. The 1.8 million square feet building, 247Park is India's largest standalone LEED Gold certified commercial

building and is designed to lower energy costs by 23% while offering a clean and green work environment. HREL has pioneered new standards for environmental conservation in construction in India, setting exemplary standards for efficiency in energy resources.

247Park, Mumbai



Karl Steiner AG (KSAG), Switzerland, is the second largest total services contractor in the Swiss real estate market. Since its inception, almost 100 years ago, it has specialized in turnkey development of new buildings and refurbishments, and offers services in all facets of real estate construction. KSAG's rich

expertise in Total Services Contracting will allow HCC to undertake the development and construction of world-class, sustainable and green residential and commercial spaces on a turnkey basis; and access cutting-edge European technologies that will augment EPC offerings in Indian and European markets.

Business Centre, Andreasark





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