DOWNLOAD PDF PLANNING AND MANAGING RELIABLE URBAN WATER SYSTEMS

Chapter 1 : Urban Water Engineering and Management | IHE Delft Institute for Water Education

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This report investigates the cost-effectiveness and reliability of two water supply systems, ground water and hand pumps. In a second edition about half the entries have been updated to take account of new test data on the pumps concerned. The impacts of demand responsive approach DRA developed and advocated by the World Bank and Water and Sanitation Programme WSP are critically analysed and a set of principles proposed that are applied these to a project cycle with detailed design processes. A Guide to the Development of On-site Sanitation: Link The book contains detailed practical and technical advice for the selection, design, construction, and maintenance of on-site facilities for the removal of human excreta. The author concentrates on technical aspects of design, construction, operation and maintenance options for low-income urban settlements building their own latrines. The need for a thorough analysis of cultural as well as design features is emphasised. Practical Development of Strategic Sanitation Concepts. Strategic incremental approaches to sanitation are emphasised, for example through planned stage wise system upgrades rather than an all encompassing, one step strategic sanitation approach. Conditions for a complete strategic sanitation approach happen rarely and that policy should focus on the process, individual stakeholders capacities and necessary assistance required. Important operational findings support that appropriate on-site sanitation strategies need not be viewed as an interim stage of sanitation service. The research has far reaching policy significance such as the mismatch of user and professional perceptions about the appropriateness of on-plot sanitation systems for low-income urban areas or the import of social and cultural context. The authors emphasise the need to integrate participatory approaches at the local level with strategic improvements to city level infrastructure. Short, focused summaries with thumbnail sketch of the main elements of sanitation are available on their web site. Recommendations - Guidelines for Drinking-water Quality. Addendum to Volume 1: Link This report summary aims at creating community-based environmental health indicators that can help identify need and facilitate dialogue between urban poor, utility providers and environmental service planners. The research team however realizes that heterogeneous communities distinguished by wealth, religion, gender etc can rarely reach consensus on a list of indicators of health. This approach however has positive effects only if major stakeholders within both municipalities and communities are involved from first stage or the conditions of a donor-funded project ensure an influence on decision-making. Benchmarking Water and Sanitation Utilities pdf download available This startup toolkit provides comparitive cost and performance data in the water sector to encourage efficient, financially viable utilities responsive to the poor and accelerating urban growth. Key stakeholders are provided with important information built upon core indicators that can further be developed into customized measurement and monitoring systems. Partners are encouraged to share data with peers across sectors, regions and countries to create inter utility performance comparisons. These comparisons can then counter inefficiencies that may occur due to the limited scope of direct competition. Time for a Change. Walters, and Anthony Yazer. World Bank Discussion Papers No. The World Bank, Washington, D. Link The purpose of this report is to contribute to the re-examination of the issues and problems of rural water supply. Link This report summary aims at developing a design manual and a Windows-based design program to simplify sewerage design for sanitation engineers in developing countries. The software is easily downloaded from the following website and is available in Spanish and Portuguese. The technology can be successfully and appropriately used in middle and high-income neighbourhoods as well. Conceptually it is the same as conventional sewerage, but with efforts to reduce conservative design features and to make context responsive design standards. Horacio Caminos and Reinhard Goethert. The book highlights the importance of the land subdivision pattern in the development of standard infrastructure. It offers guidelines for a minimum and standard level of service, and illustrates layout design through various projects. A photo-essay is included to assist the layman in understanding urbanization, including the range of infrastructure found in developing situations. Link This report summary describes a project to develop awareness of the need for a strategic information-based approach to sanitation planning. The project promotes greater use of strategic approaches using a three-pronged strategy of disseminating written material, organising workshops, and building upon local training institutions to develop training courses. The poor shall be benefited most if secondary stakeholders such as municipal engineers, NGOs, consultants and training institutions adopt strategic approaches to sanitation planning. See Training Institutions for details of courses available.

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Chapter 2 : NPTEL :: Civil Engineering - Water Resources Systems Planning and Management

*Planning and Managing Reliable Urban Water Systems [Robert J. Harberg] on www.nxgvision.com *FREE* shipping on qualifying offers. This handbook for city planners, consultants, engineers, and public administrators explains what is needed to ensure that a water system will deliver the quality and quantity of water consumers demand.*

Under natural conditions the water inputs at any point in the system are precipitation and overland flows; while the outputs are via surface flows, evapo-transpiration and groundwater recharge. The large volumes of piped water introduced with the change to an urban setting and the introduction of vast impervious areas strongly impact the water balance, increasing in-flows and dramatically altering the out-flow components. One of the objectives of Agenda 21 is to develop environmentally sound management of water resources for urban use. Human dignity, quality of life, environmental security, an open stakeholder process, and many others. The three steps are: Prevention, Treatment for reuse, and Planned discharge with stimulation of self-purification capacity. The IUWM process included an extensive stakeholder engagement process, whereby the needs of all parties were included into the final management plan. A partnership was created between New York City, the agricultural community, and the federal government. The case has become a model for successful IUWM. It gets its name relative to black water which is heavily contaminated with human waste. Different resources suggest what equipment produce grey or black water. However, it is most commonly accepted that bathtubs, showers, washbasins, washing machines, and laundry tubs produce grey water, whereas toilets, sinks, and dishwashers are classified as black water sources. In Santa Barbara became the first district in the United States to legalize the recycling and reuse of grey water. Since then, grey water has become a part of integrated urban water management. It addresses the practice of managing wastewater at the residential scale. Additionally, most domestic appliances automatically collect grey water in order for it to be disposed. There are three types of grey water systems each of which has different requirements, codes, and sizing specifications. However, they share standards to meet health and safety regulations: A complex grey water system provides for a development with a substantial discharge greater than gallons per day. It requires a written construction permit submitted to the enforcing agency. A simple grey water system is sized to serve a one or two family home with a medium level water discharge maximum gallons per day. It too, requires a written construction permit submitted to the Enforcing Agency. A clothes washer grey water system is sized to recycle the grey water of a one or two family home using the reclaimed water of a washing machine produces 15 gallons per person per day. This particular system is the most common and least restricted system. In most states, this system does not require construction permits. This system is often characterized as Laundry to Landscape L2L. The system relies on valves, draining to a mulch basin, or the area of irrigation for certain landscape features a mulch basin for a tree requires The drip system must be calibrated to avoid uneven distribution of grey water or overloading.

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Chapter 3 : Urban water management

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Upon completion, the participant should be able to: Explain the position and strategy of a water organisation in relation to its institutional environment. Summarize the scope , scale, structure and key work processes of organisations Analyze the management and decision-making processes in water organisations, including the management of change. Plan the use of performance analysis and benchmarking in the regulation and management of water organisations. Assess the processes of human resources, health and safety, management for integrity and sustainability, asset management and customer management. To expose the participants, during a two week fieldtrip to a European country, to different international practises in the design, operation and management of water supply, wastewater, solid waste and urban civil infrastructure networks. The fieldwork, carried out typically within the Netherlands but on location, is a one week work to make the students familiar with performing research on location, how to process real data, and to apply the newly acquired knowledge to a practical situation. The deadline to submit your admission letter to the Worldbank is 12 April , so make sure you have send your application for admission to IHE Delft before 21 March The Orange Knowledge Programme aims to advance the development of the capacity, knowledge and quality of both individuals and institutions in higher and vocational education. A good command of the English language, if this is not the first language. A strong motivation to successfully complete the programme. Several years of professional experience in an area of work related to the specialisation is an asset. For IHE Delft please complete the online application form. Alternatively, you can also submit your application online from the same website. Please mention clearly which programme you are applying for. Take into account that, in case you wish to apply for financial assistance, the fellowship application deadline is usually much earlier. For admission to the programme please complete the online application, the link to the application section of our website is available at the top of this page. You need to submit the following documents: Certified copies of academic transcripts. Authenticated or certified copies are copies with an official stamp to verify that the copies are true copies of original documents. This official stamp may be from one of the following: One recommendation letter has to come from the current employer if available and another one from the university the student graduated from. Letters have to have an official letterhead and need to be signed. Please note all documents are required to be in English, or officially translated into English. One cannot apply for more than one programme per academic year, unless there is a period of at least 3 months between the starting dates of the programmes of interest. If the other programme is also an Erasmus Mundus programme, the applicant can submit up to 3 applications. More information Further questions about the application procedure can be addressed to:

Chapter 4 : Water and Sanitation Tools

Overview[edit] Visualisation of the distribution by volume of water on Earth. The entire block comprises 1 million tiny cubes. Of the water resources on Earth only three percent of it is fresh and two-thirds of the freshwater is locked up in ice caps and glaciers. Of the remaining one percent, a fifth is in remote, inaccessible areas and much seasonal rainfall in monsoonal deluges and floods cannot easily be used. As time advances, water is becoming scarcer and having access to clean, safe, drinking water is limited among countries. At present only about 0. Due to the small percentage of water remaining, optimizing the fresh water we have left from natural resources has been a continuous difficulty in several locations worldwide. Much effort in water resource management is directed at optimizing the use of water and in minimizing the environmental impact of water use on the natural environment. The observation of water as an integral part of the ecosystem is based on integrated water resource management, where the quantity and quality of the ecosystem help to determine the nature of the natural resources. As a limited resource, water supply sometimes supposes a challenge. This project faced a difficult task for developing areas: The DESAFIO engineers worked on a water treatment system run with solar power and filters which provides safe water to a very poor community in the state of Minas Gerais. For water as a resource, this is particularly difficult since sources of water can cross many national boundaries and the uses of water include many that are difficult to assign financial value to and may also be difficult to manage in conventional terms. Examples include rare species or ecosystems or the very long term value of ancient groundwater reserves. An assessment of water resource management in agriculture was conducted in by the International Water Management Institute in Sri Lanka to see if the world had sufficient water to provide food for its growing population or not. Regarding food production, the World Bank targets agricultural food production and water resource management as an increasingly global issue that is fostering an important and growing debate. To avoid a global water crisis, farmers will have to strive to increase productivity to meet growing demands for food, while industry and cities find ways to use water more efficiently. This rapid urbanization happens worldwide but mostly in new rising economies and developing countries. Cities in Africa and Asia are growing fastest with 28 out of 39 megacities a city or urban area with more than 10 million inhabitants worldwide in these developing nations. With developing economies water scarcity is a very common and very prevalent issue. As cities offer the best opportunities for selling produce, farmers often have no alternative to using polluted water to irrigate their crops. Wastewater from cities can contain a mixture of pollutants. There is usually wastewater from kitchens and toilets along with rainwater runoff. This means that the water usually contains excessive levels of nutrients and salts, as well as a wide range of pathogens. Heavy metals may also be present, along with traces of antibiotics and endocrine disruptors , such as oestrogens. Developing world countries tend to have the lowest levels of wastewater treatment. Often, the water that farmers use for irrigating crops is contaminated with pathogens from sewage. Common illnesses include diarrhoea , which kills 1. Many cholera outbreaks are also related to the reuse of poorly treated wastewater. Actions that reduce or remove contamination, therefore, have the potential to save a large number of lives and improve livelihoods. This involves analysing the food production process from growing crops to selling them in markets and eating them, then considering where it might be possible to create a barrier against contamination. The UDSS is then able to analyse and show homeowners which of their appliances are using the most water, and which behaviour or habits of the households are not encouraged in order to reduce the water usage, rather than simply giving a total usage figure for the whole property, which will allow people to manage their consumption more economically. The UDSS is based on university research in the field of Management Science , at Loughborough University School of Business and Economics, particularly Decision Support System in household water benchmarking, led by Dr Lili Yang , Reader [15]

Future of water resources[edit] One of the biggest concerns for our water-based resources in the future is the sustainability of the current and even future water resource allocation. Finding a balance between what is needed by humans and what is needed in the environment is an important step in the sustainability of water resources. Attempts to create sustainable freshwater systems have been seen on a national level in countries such as Australia , and such commitment to the environment could set a model for the rest of the world. The field of water resources management will have to continue to adapt to the current and future issues facing the allocation of water. With the growing uncertainties of global climate change and the long term impacts of management actions,the decision-making will be even more difficult. It is likely that ongoing climate change will lead to situations that have not been encountered. As a result, alternative management strategies are sought for in order to avoid setbacks in the allocation of water resources.

Chapter 5 : Urban Flood Management and Disaster Risk Mitigation | IHE Delft Institute for Water Education

urban water systems 53 Â· A lack of expertise in integrated urban water management in planning Sustainable Water Management in the City of the Future SWITCH.

Dialogues of sustainable urbanisation: The city is dependent on water, because water plays an essential role for its development and functioning. The functions of water are diverse and cover not only domestic purposes and discharge of waste but also include ecological functions. These are linked to green space management, landscape design, crop cultivation and biodiversity. But also functions such as temperature buffering are becoming more important. Water thus forms a cross-sectional topic that integrates several areas such as climate protection, quality of life, resource and energy efficiency. These connections show the importance of water for an urban development. Technical intelligent solutions that serve this purpose are based on the separate collection of various wastewater streams, targeted and appropriate water treatment, the recirculation of water resources, and the recovery of nutrients and organic matter contained. Many of these technologies focus on domestic wastewater, which plays a central role in urban areas. Due to its modular design and the choice of the degree of centrality, such solutions can be combined and implemented at the level of the bathroom, the house, the block, the neighborhood or even the whole city. Alternative wastewater infrastructure at neighborhood level: Rainwater is used to supply local waters, for irrigation or is infiltrated. Toilet wastewater blackwater is going to a biogas or composting plant instead of entering the mixed water disposal and domestic wastewater without toilet water greywater is treated and can be reused for toilet flushing or other domestic purposes while undergoing heat recovery. The separate collection of greywater low contaminated wastewater produced during showering and hand washing or from the washing machine and in some cases from the kitchen sink allows an uncomplicated treatment and heat recovery. The recovered heat is used to heat drinking water and to support heating spaces in the house. The treated greywater can then be used for toilet flushing, for the washing machine, to irrigate green spaces or to supply a nearby water body. The blackwater wastewater from toilets is transported with minimal water content through vacuum or excess pressure. Its organic material can generate energy by the means of a biogas plant or substrate for soil by a composting facility. As for the rainwater management, green roofs or retention basins that are already frequently used evaporate or seep the majority of the rainwater locally. All these possibilities show the huge design potentials: Innovative technologies must be accepted by the users in everyday life to be successful. It seems that users are open to such designs in pilot projects that implement such innovative technologies, mostly exist at building or block level. A major issue for them was the unobstrusive operation. However, the respondents differed noticeably in their open-mindedness and their interests towards the water techniques. This is less of a restriction, but holds in contrary, as has been shown before, a tremendous creative potential. Urban planning should therefore take into account the role of water in all its different functions. Systemic and interlaced thinking that encompasses both natural resources water, air, soil, and landscapes and social dynamics is necessary to ensure integrated urban planning. It is important to consider environmental, social, and economic criteria. Thinking in terms of disciplines and the implementation of individual measures often lead to unwanted external effects. We believe that solutions can therefore be found that satisfy the different needs and overcome conflicts of interest. It should be the responsibility of cities to create such a vision and steer the transformative process as administrators of the public commons. Various sectors such as climate adaptation, demographic change, energy production , green spaces, and food production all impact urban planning processes. References Berliner Netzwerk E: Lima Ecological Infrastructure Strategy. Integrated urban planning and design tools for a water-scarce city. Ergebnisse einer qualitativen Bewohnerbefragung. There she deals with the possibilities of the transformation of conventional wastewater systems towards more sustainability. She studied Nutritional Sciences B. Moreover, she is active as a journalist. She studied agricultural sciences with the focal points agricultural engineering and ecology in Germany and Norway.

Chapter 6 : River System Engineering and Management - Department of Urban Management, Kyoto Unive

Maintaining reliable water is no simple task in today's urban areas. This handbook explains exactly what you need to ensure your water system will continue to deliver the quality and quantity of water your consumers demand.

Develop understanding of structural and non-structural flood resilience measures such as, conventional and innovative structures, early warning systems, etc. Learn how to produce different flood risk maps in a GIS environment and how to calculate different types of flood damages, and Develop understanding of how to use the models to assess the performance of existing systems and how to design the new ones within the context of different flood risks pluvial, fluvial, coastal and flash floods Propose and judge different adequate technical rehabilitation measures to mitigate urban flooding. The main objective of this course is to provide the most up-to-date information on the topic of urban flood modelling and disaster management and to enable participants to be more effective in applying modelling tools and techniques for urban flood management. Different modelling approaches are considered and they range from data driven to physically based, from conceptual to detailed 1D-2D modelling. These approaches are then embedded in the wider context of flood risk assessment and disaster management. This wider context considers everything from how the urban planning process should take place in areas with potential flood risks, to urban hydrology, climate change, flood hazards, environmental impacts, public health issues and the conceptual design of flood protection schemes. Course content Urban Development Planning and Asset Management The course starts with the wider picture and considers how flood risk is managed as part of the urban development planning and asset management process. Urban Hydrology and Climate Change This will give participants an understanding of how the rainfall-runoff process occurs and what would be the implications of different climate change scenarios. Flood risks due to the following types of urban floods will be considered: Fluvial Flooding resulting from rivers breaching or overtopping flood defences and inundating urban areas; Coastal Flooding resulting from tidal or storm surges in cities close to the coast or deltas; Pluvial Flooding caused by heavy rainfall exceeding the capacity of the drainage systems; Flash floods caused by rapid response of ephemeral streams to heavy rainfall, related, inter alia to steep slopes. Flood Inundation Modelling 1D, 1D-1D and 1D-2D flood inundation modelling approaches will receive particular attention during the lectures and hands-on exercises. Flood Risk Estimation and Management In this part of the course, the participants will be introduced into different ways of assessing and managing urban flood risks through a source-pathway-receptors framework. Special attention will be given to the selection of different structural and non-structural measures including Sustainable Drainage Systems SuDS. Modelling Uncertainty It is important to note that evolution of floods in urban areas is caused by several interrelated factors and as such modelling of their dynamics and impacts should not be considered as a precise activity. This part of the course will address different sources of modelling uncertainty and its influence on estimation of flood impacts. Theory and Practice of Disaster Management This part of the course will discuss both theoretical and practical aspects of proactive disaster management practice. It will connect all previously covered aspects for formulation of strategies for disaster prevention, mitigation, response and recovery. Particular attention will be given to the vulnerability analysis and model-based estimation of flood damages. Different probabilities of floods and depth-damage curves will be considered. Also, practical aspects with respect to design and implementation of real-life information systems will be discussed.

Chapter 7 : www.nxgvision.com: Customer reviews: Planning and Managing Reliable Urban Water System

Urban planning should therefore take into account the role of water in all its different functions. Systemic and interlaced thinking that encompasses both natural resources (water, air, soil, and landscapes) and social dynamics is necessary to ensure integrated urban planning.

Water service issues, including water quantity and quality, were left to the water utilities. Today, water planning is undergoing rapid change with the impact of population growth, climate change, infrastructure conditions and the continuing influence of the environmental movement. Droughts, floods, infrastructure failures, concerns about emerging contaminants and technological advances have caused a revolution in the water industry. Water engineers are beginning to recognize they cannot provide sustainable services without involving those in the development community â€" including planners, architects, and community activists. Leading edge planners are reaching across the aisle to water managers to help advise on their comprehensive plans, not only to meet environmental objectives, but also to add value and livability, rooted in the vision of the community. This new paradigm of incorporating water into all aspects of the built environment is called "One Water" and emphasizes integrated, regional water planning and partnerships between water resource managers and land use planners. As a result of this changing perspective, the American Planning Association created a Water Task Force in to offer recommendations to the Board of Directors. The present document is an effort to develop an integrated approach to policies for water based on the core themes of the Task Force Report. The report recognizes the importance of water as a central and essential organizing element in healthy environments along with the importance of planning to ensure that land-use, environmental and infrastructure planning for water will increase resilience to extreme events and climate change. However, the report also acknowledges that new mechanisms for interdisciplinary efforts are critical to effective water management and the protection of the water environment. Specifically, the report calls for: A planning practice that employs an integrated, systems-oriented, comprehensive approach to water management. Innovative land-use planning and urban designs to improve and protect water environments. New and improved professional practices to manage water more sustainably and equitably. Awareness of the potential for inequity in access to water supply, water pricing that is not sensitive to ability to pay and yet does not fully account for the full cost of water , and environmental justice issues where discharge of pollution to waterways occurs and where there is insufficient attention to flood mitigation. This policy guide is divided into five sections. The first addresses traditional water for human use potable and non-potable water supply, wastewater as they are evolving to meet the challenges of the future. The second is focused on stormwater management and flooding, while the third concentrates on ecological and natural resource issues for water. The fourth section looks at policies to ensure that all these aspects of water are integrated in terms of planning and implementation. The fifth section addresses specific policies for APA itself in order to promote an integrated water paradigm that supports both human and ecological uses of water. Water Quantity and Quality: Human Uses This paragraph addresses potable and non-potable water supply and wastewater services â€" that is, water quantity and quality for human uses. Traditionally, water planning was left to water resource managers and engineers. The result was the water infrastructure system and institutions we have today, which consists of networks of dams, reservoirs, underground pipes and treatment plants, and utilities that are based on fast conveyance engineering and treatment and not holistic planning. This traditional system has provided effective water services for the past century and a half, but without significant involvement of planners. Urban planners provided population figures based on projected development, but left the planning design of the system to the utilities. Non-potable water use is also a very important aspect of comprehensive water planning â€" it is critical to consider and plan for the water used by industry and agriculture, which may be taken directly from the water resource, as this is a significant portion of the overall water used by humans. Additionally, many crops require potable-level quality for irrigation, and future water planning should take this into account. Climate change, population growth, emerging contaminants and deteriorated infrastructure make this historic model of infrastructure implementation, as well as the institutional silos, obsolete. It is essential to consider the scarcity of water, the actual cost of water, and the role water plays in our way of life and economy in order to plan and provide for future water needs. Water utilities are moving towards an integrated paradigm that embraces multiple sources of water for supply including reuse of wastewater and stormwater and the recovery of nutrients and embedded energy. Architects and landscape architects are embracing the integration of water systems at the site level â€" "net zero water" â€" while planners are looking for more sustainable ways of providing water services for their communities. Water scarcity, particularly in the Western United States and other drought-stricken parts of the country, is also of crucial concern. See accompanying sidebar The protection of water quality ranks equally in importance since failure to protect scarce resources can render them unusable. The American Planning Association and its Chapters and Divisions support the following objectives to ensure the future adequacy and quality of our water resources: Water planning should engage all levels of government including Federal, state, regional, and local, tribal nations, as appropriate and be carried out in concert with private utilities, suppliers and environmental resource agencies, in order to ensure that development and future water needs are consistent with availability and supply, by: Funding for construction and maintenance of water storage, pumping, treatment, and delivery systems must be allocated and water infrastructure designed, built, and maintained, to protect and conserve and reuse water resources to support our long-term economic future and overall well-being. The requirements of the Clean Water Act, including provisions to enforce water quality criteria and standards and the prohibition of discharges into a body of water unless permitted by National Pollutant Discharge Elimination System NPDES point source permits or stormwater runoff programs. Strengthened enforcement of permit requirements and water quality standards. Legislation that would require land use and health regulations for source water protection in order to protect the yield and water quality of aquifers and surface water resources, including requirements to jointly manage connected surface and groundwater resources. Legislation that would establish standards and permits for the construction, operation, and abandonment of wells to protect groundwater resources from potential contamination, as well as restrictions on septic tank location and regular septic tank inspection to protect groundwater and surface water quality. Incentives for the use of design alternatives that include safe water reuse for potable and non-potable uses and energy and nutrient recovery that can be used either on a localized or regional scale. The use of innovative land use planning and urban design, during both development and redevelopment, that results in use patterns and development with a low-impact on water resources. Water quality impacts of land use plans should be fully quantified and balanced with point source and stormwater discharge limits. The creation of tools that can be used by planners to facilitate water neutral or "net zero water" development. Rating systems for water management that rewards sustainable water management practices. Financing and integrated capital investment that incentivizes innovative infrastructure and design, and investment in technology. Construction and maintenance of public rights-of-way should utilize best management practices during construction and incorporate the principles of green infrastructure to the extent practicable in order to improve the quality of urban runoff. Funding to rebuild aging infrastructure to maintain a state of good repair and that will avoid the introduction of contaminants into water supplies. Continued funding for Title V of WRRDA, the Water Infrastructure Finance and Innovation Act WIFIA , which establishes a new financing mechanism for water and wastewater infrastructure projects, and which provides low interest rate financing for the construction of water and wastewater infrastructure. Implementation of local regulations that recognize the potential incompatibilities of some land uses with hydraulic fracturing, and the potential for groundwater and surface water contamination from hydraulic fracturing. Future investments in water-related infrastructure that seek to redress imbalances in water resource availability and quality, improve infrastructure in lower income neighborhoods that would otherwise be overlooked by new private investments, address repetitive flooding, and implement pricing strategies that recognize the fundamental right to water for health and safety. Encourage planning for rural water and wastewater infrastructure and connection incentives to minimize the number of septic tanks and potential for contaminated wells. Identify and work to mitigate the negative impacts agricultural uses can have on water resources. Identify and develop innovating pricing strategies for water resources management to ensure equity and fairness while adopting measures to strongly encourage end-user conservation. Water in the West The dry, western part of the U. Water is a scarce commodity, fought over for more than a century and a half, and the subject of controversial and complex laws. Simply put, water rights dictate who has access to how much, where and when, and are very tough to change. In many parts of the west, historic water rights are held by rural landowners, often causing serious environmental harm and making it difficult to accommodate the needs of growing urban areas. There is a strong need to balance the water needs of rural and agricultural land uses with the need for water to support development in urban areas and ecosystem health, especially in a time when water may becoming even more scarce. Western states typically have established ranching and farming communities, which are part of the economy, but perhaps even more importantly are part of the culture and heritage of the West. At the same time, cities within the West have experienced considerable growth and economic success and have become the centers of commerce. Managing state water resources will require consideration of the location of water resources; areas of water use; means to conserve and store water; and systems for the delivery of water. The difference in way of life and perceived need can create disparate viewpoints in the need for water infrastructure and services, and for native fish habitat and other environmental and economic benefits. State water plans can be critical tools to set the stage for meeting and balancing statewide needs and gaining consensus by considering the varying needs and circumstances of different geographic and economic areas. Where large infrastructure projects such as reservoirs and delivery systems are warranted, it is important to recognize that support and voter approval, even for carefully planned and vetted facilities, will likely only be achieved through statewide outreach and education. A significant factor in Western water law is the right of "prior appropriation," or "first in time, first in right. This can lead to wasteful watering practices. In states where water law currently is based on a "use it or lose it" structure, it is important to support legislation that will preserve the private property right of the water owner while allowing other more beneficial water uses. One way to accomplish this is to allow the holder of senior water rights to assign them to another user in years where they are not needed without fear of losing them due to lack of use. This would eliminate potential wasteful practices that result in unnecessary use to avoid losing the water right. Perhaps an even bigger issue is the use of flood irrigation, which uses far more water than more intensive farming practices. Proposed Policies There are many tradeoffs involved in all of these situations, but the reality of a growing population combined with the probability of increasing drought conditions throughout the west will make new policies and legal arrangements imperative. In order to help resolve some of these complex issues and create a more sustainable future the American Planning Association and its chapters and divisions support the following actions: Creation of a multi-state body to study the legal and regulatory impediments to changing water laws and allocation procedures that impede the efficient distribution of water, and possible approaches to enacting changes to those laws and regulations. Stormwater and Flooding Stormwater and flood management are serious local concerns, both because of federal regulations to control pollution caused by urban runoff and also because of the damage due to increasingly severe weather events. Loss of life is also a concern. Historically stormwater systems are designed for fast conveyance of rainfall runoff to nearby rivers and streams. Given the enormous addition of impervious surfaces to the suburban and urban landscapes over the past years, this has significantly changed the natural shape, morphology, and environmental character of streams and rivers. In addition, in most of the country stormwater programs do not have a dedicated revenue stream, as water supply and wastewater services do. Flood control for minor systems has typically been the responsibility of the local streets department, while special districts and the Army Corps of Engineers have managed the major systems. Stormwater The American Planning Association and its Chapters and Divisions support the following objectives for Stormwater management: Stormwater should reach streams and rivers in ways that mimic natural runoff patterns to the maximum degree possible. Policy and infrastructure design should shift away from the fast conveyance of rainfall runoff and achieve more natural stormwater control through the integration, implementation and maintenance of Low Impact Development and Green Infrastructure approaches. Stormwater drainage systems, which for the most part are largely unfunded due to the lack of service fee structures, need to be re-conceived as a formalized service provided to communities. Federal and state Clean Water Act implementing regulations that recognize the importance of, and preferentially favor, environmentally sustainable stormwater management designs for stormwater systems in achieving water quality goals for streams, rivers, and oceans. The development and application of innovative land use planning and urban design that considers the potential impact from overland flow, as well as point source and stormwater discharges, so that the result is net low-impact development from a stormwater management perspective. Watershed-wide plans that cross jurisdictional lines, and interagency cooperation in data sharing at all levels of the private and public sectors. Strengthen mechanisms to encourage upstream land use authorities to consult with downstream communities within a watershed. Establishment of a national catalogue of green infrastructure best practices and successful case studies of mitigation and adaptation. Green infrastructure and planning for multiple objectives as a cost-effective method for mitigating the effects of natural hazards while also supporting other benefits to the community. A demonstrated, integrated, systems-oriented approach to stormwater management using water quality improvement features, such as bioswales, natural or rehabilitated catchment areas, unlined stormwater detention ponds, and other low impact and green infrastructure approaches that improve water quality and promote livability. Increased federal and state research into green infrastructure techniques and natural systems engineering and restoration as appropriate to specific regions and the hazards they face. Development of performance standards for stormwater management during development review that shift priorities from conventional fast-conveyance designs to more environmentally sustainable low impact designs. Identification and creation of new funding to rebuild oft-underfunded stormwater drainage systems, and to provide retrofit and modification of such systems to achieve more natural, slow-conveyance, high storage designs. New federal and state legislation, or strengthened existing regulations, that specifically provide for the creation of Stormwater Utilities that follow prescribed standards of practice and operation, to allow the sustainable and effective operation and management of stormwater drainage systems. Development by local communities of dedicated revenue streams designed specifically for stormwater management and infrastructure improvements. New training programs that allow the development of a workforce specifically trained and equipped for construction and maintenance of low impact and green infrastructure designs, which require more regular maintenance than highly engineered pipe systems due to their natural environmental features. Flooding The objectives and policies in this section are derived from the Hazards Mitigation Policy Guide, which provides more specific guidance for water-related hazards, among others.

Chapter 8 : APA Policy Guide on Water

Urban management systems should include the ability to plan and model whole systems that optimize transportation and the built environment, resources including energy and water, and natural systems.

Chapter 9 : Water resource management - Wikipedia

Role of Water in Urban Planning and Management By William J. Schneider, David A. Rickert, and Andrew M. Spieker WATER IN THE URBAN ENVIRONMENT G E 0 L 0 G I CAL 5 U R V E Y C I R C U LA R H.