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**MANAGEMENT OF DRAINAGE AND WASTEWATER
TREATMENT PLANNING IN GRADE-III CITY IN THE
CENTRAL COASTAL REGION OF VIETNAM**

SPECIALTY: URBAN MANAGEMENT

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SUMMARY OF THE THESIS

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A. INTRODUCTION

The urgency of the thesis

The drainage and wastewater treatment system (DWTS) is of particular importance to the formation of a modern, comfortable and sustainable city. In order to contribute to creating a DWTS which is well operated, suitable to the local conditions, ensuring flood prevention and environmental protection, construction investment and operation management are very important. However, the DWTS well constructed and managed according to the approved planning is a key factor. This is the content of management of DWTS planning.

Grade-III city in the Central coastal region of Vietnam (the CCRoV) are either provincial centers or sub-regional centers, with technical infrastructure systems according to regulations, which must be relatively synchronized. However, in reality, the infrastructure system including DWTS is still patchy and inconsistent. Grade III in the CCRoV already have approved urban plans, including DWTS planning with the content of identifying a design plan for the drainage system, with little attention to construction investment as well as flexibility in implementation according to investment phases, socio-economic fluctuations, and natural conditions, especially in the context of climate change (CC). Planning management is still inconsistent due to various reasons such as lack of qualified human resources, lack of strong and sufficient mechanisms, lack of financial resources for management ... So DWTS planning have not contributed much in contributing to the formation of a good DWTS of the Grade-III cities in the CCRoV.

The concept of sustainable development has become the future of the city, including the concepts of sustainable drainage system (SuDS) and green infrastructure. Strengthening and promoting the role of the community is also being mentioned as a key factor to solve conflicts when implementing urban planning, besides the impacts of CC are becoming more serious, especially water related issues. Along with

that the Grade-III cities in the CCRoV has an appropriate scale for the development of the concept of green city, sustainable city, and have high risk of the impacts of CC and sea level rise. The planning, construction and management of the DWTS will greatly contribute to the establishment of the sustainable development city and create better living conditions for urban residents now and in the future.

Therefore, research on management of DWTS of the Grade-III cities in the CCRoV is needed.

Purposes

Study, supplement and finalize regulations on the process and contents of the DWTS planning in order to improve the ability of using urban planning to serve the management of DWTS to suit the reality and sustainable development requirements.

Object and scope of the study

Research object: Urban planning and management of the DWTS according to the approved urban planning.

Research scope:

- Place: Grade-III city of the CCRoV
- Period: orientation to 2025, vision to 2050

Research Methods

The thesis uses 6 research methods including: methods of investigation, survey, data collection (chapter 1,2,3); methods of synthesis, analysis and evaluation (chapter 1,2,3); expert method (chapter 1,2,3); inheritance method and reference to related documents (chapter 1,2); diagramming method (chapter 1,2,3); Applied empirical methods (chapter 3).

Scientific and practical significance of the thesis

- Contribute to perfecting the content of legal documents about DWTS planning management; Innovating and improving the capacity of management of DWTS.

- DWTS planning management accordance with the characteristics of the CCRoV and application to Cam Ranh City - Khanh Hoa province.

New contributions of the thesis

- Summarizing and assessing the situation of management of DWTS plannings in grade-III city in the CCRoV (08 cities) on the structure of state management agencies, word of planning, application of GIS technology in planning and planning management, the participation of the community and stakeholders.

- Proposing contents to be adjusted, supplemented the work of planning on DWTS in the master planning for grade-III city in the CCRoV:

1. Solutions to integrate and institutionalize the contents of DWTS planning into master planning for grade-III city.
2. Solutions to integrate SuDs and adaptation to CC in the content of DWTS planning.
3. Solutions to application of GIS technology to planning and management planning of DWTS.

- Proposing supplementing and perfecting the organizational structure, mechanisms and policies on the management of DWTS planning for grade-III city in the CCRoV:

1. Solutions to adjusting and perfecting the organizational structure, functions, tasks of state management agencies of DWTS.
2. The contents need to be adjusted, supplemented on mechanisms and policies on the management of DWTS.
3. Solutions to enhance the role of community and stakeholders in DWTS.

Definition or terminology

The thesis refers to some basic concepts of urban planning and urban management, infrastructure systems, DWTS ... related to the research content.

The structure of the thesis

The thesis has 138 pages, except the introduction, conclusion and recommendations, the main content of the thesis consists of 3 chapters:

- Chapter 1. Overview of management of DWTS planning in grade-III city in the CCRoV.
- Chapter 2. Scientific basis for management of DWTS planning in grade-III city in the CCRoV.
- Chapter 3. Suggestions about management of DWTS planning in grade-III city in the CCRoV, applying research results to Cam Ranh City, Khanh Hoa Province and discussing research results

B. CONTENT

CHAPTER 1. OVERVIEW OF MANAGEMENT OF DWTS PLANNING IN GRADE-III CITY IN THE CCRoV

1.1. Overview of DWTS in the grade-III city of the CCRoV

1.1.1. Overview of grade-III cities in Vietnam

In the period from the end of the 20th century to the beginning of the 21st century, the grade-III cities increased sharply due to the investment and upgrading of grade-IV cities into grade-III cities. However, this trend has declined in recent years due to the balance between upgrading of grade IV cities to grade III and upgrading of grade III cities to grade II cities.

The grade-III city are evenly distributed in economic regions: 11 in the Northern midland and mountainous region, 06 in the Red river delta region, 09 in the Central coast region, 03 in the Highlands region, 07 in the Southeast region and 09 in the Mekong delta region.

The organizational structure of grade III city is similar, the city-level management agency is the urban management board and provincial management agency is Department of Construction. (Except for Son Tay town, which belongs to Hanoi city, the Department of Planning and Architecture is involved).

1.1.2. Current situation of DWTS in the grade-III city of the CCRoV

The grade-III city of the CCRoV consists of 08 cities in 7 provinces with a population of 75,000 - 180,000, mostly coastal cities. With 04 cities, including 01 city is the provincial capital and 04 towns.

The cities mainly use the common drainage system. The drainage system is still patchy, inadequate and degraded, leading to inundation

and pollution. Distributed drainage systems to serve small communities have increased significantly in recent years, but the operation and maintenance of poor maintenance is not good due to limitations in system maintenance and management skills. The impact of CC on grade-III city of the CCRoV increases the risk of flooding and urban pollution.

1.2. Current situation of drainage and wastewater treatment planning management in the grade-III city of the Central coastal region of Vietnam

1.2.1. Organizational structure of drainage and wastewater treatment planning management

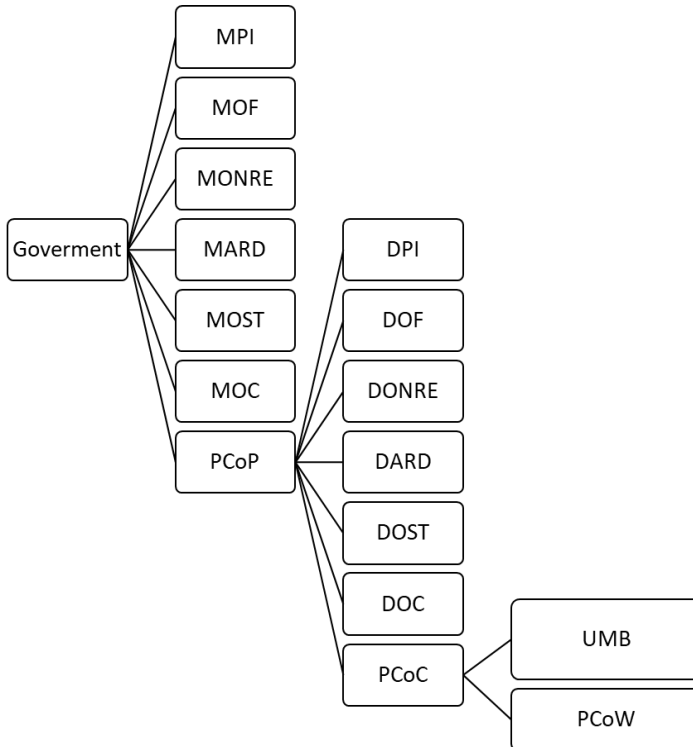


Figure 1.1. Scheme of Organizational structure of DWTS planning management in the grade-III city of the CCRoV

Organizing the management of DWTS planning management in the grade-III city of the CCRoV is classified into three levels: national, provincial and urban. In particular, the management focused on the Ministry of Construction, Department of Construction and Urban Management Board.

1.2.2. The DWTS planning

Grade-III cities of CCRoV have been set up master planning, along with management regulations under the planning scheme. However, the grade-III cities of CCRoV have not been prepared a DWTS planning and 02/09 cities have already had an approved DWTS project and are implementing.

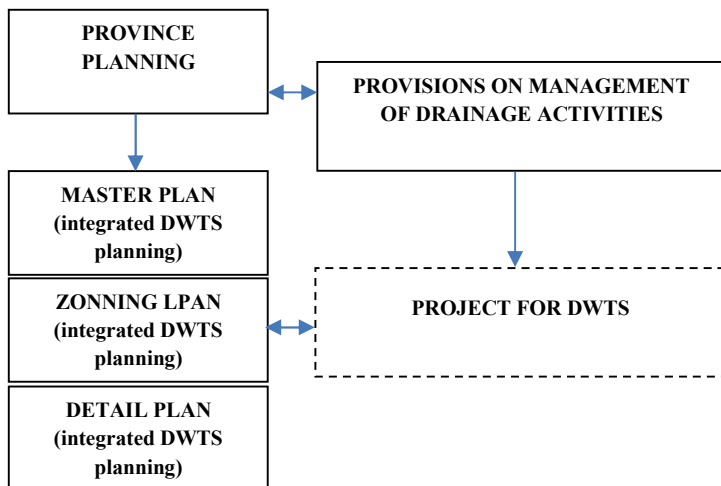


Figure 1.2. DWTS planning in grade-III city in the system of urban planning according to law system

In fact, urban planning is not enough to ensure the requirements for immediate implementation of construction investment projects, so it is necessary to have a DTWS planning to mediate between two steps of master planning and the project. However, the grade-III cities have little or no funding to do so and it also takes a long time to reach the stage of setting up construction investment projects (about 40 months).

1.2.3. Policy, mechanisms about DWTS planning management

Construction Law, Urban Planning Law and other relevant documents governing contents of planning and project planning; management and construction of the DWTS; The Environment Law and the Law on Water Resources and related documents stipulate the requirements on water quality and the protection and use of water sources ... for the DWTS.

Development orientations for drainage in city and industrial zone of Vietnam offer views, visions, objectives, solutions and regulations on organization of implementation in the field of DWTS as well as wastewater from industrial zone.

The system of technical regulations for the DWTS is used to manage the DWTS planning management and management of DWTS.

1.2.4. Application of GIS technology in DWTS planning management

The level of GIS application in the CCRoV is currently at a low level, not yet becoming a foundation for fields. Currently, the DWTS planning still uses traditional technologies that have not yet applied GIS technologies.

Some city with foreign capital (ODA), has GIS applications in master planning (Dong Ha city, Quang Tri province ...) but no final results.

1.2.5. Community and stakeholder involvement in DWTS planning management

Community participation in management is referenced in the Urban Planning Law and the Construction Law. However, the community opinion is just a general activity, soliciting opinions of the community.

The content of community participation in the DWTS planning is stipulated in the framework of community participation in urban planning, without specific regulations.

Stakeholders, especially DWTS investing, constructing and providing services companies, are rarely consulted when

implementing the planning, so the effectiveness of investment in DWTS under planning are low.

1.3. Overview of scientific research related to the thesis

The thesis focuses on analyzing 03 research projects, 05 doctoral theses, 05 domestic projects, 02 international research projects. The research mainly focused on new drainage management models (SuDS, decentralized, CC response, etc.), regional drainage management without mentioning the city planning(process, content ...), the issue of integrating them into master planning, using scientific and technical advances in the management of DWTS and reviewing and assessing the appropriateness of the current legal document system ...

1.4. Issues needing research of the thesis.

- Adjust, supplement and complete the planning process of the DWTS planning in master planing
- Integrating solutions for SuDS, CC response in the content of master planning.
- Application of GIS technology to planning management.
- Adding and completing the organizational structure of DWTS planning management.
- Supplementing and adjusting policies and mechanisms management on DWTS planning
- Enhancing the role of community and stakeholders participation in the DWTS planning.

CHAPTER 2. SCIENTIFIC BASIC FOR MANAGERMENT OF DRAINAGE AND WASTEWATER TREATMENT PLANNING IN GRADE-III CITY ON THE CENTRAL COASTAL REGION OF VIETNAM

2.1. Legal basic about management of DWTS planning

2.1.1. Regulations on management of DWTS planning

Urban planning must be integrated with the content of the DWTS planning, the master planning is the basis for implementing investment projects to build the DWTS. Localities also have to formulate

regulations on drainage management and drainage investment development plans (Decree 80/2014 / ND-CP).

The state agreed on the management of DWTS, land management for the DWTS, the management of the quality of the wastewater and receiving sources as well as the requirements of integrating climate change adaptation (Law on Planning; Law on Land, Water Resources Law, Environmental Protection Law ...)

2.1.2. Strategy, orientation on management of DWTS planning

Orientation of DWTS of Urban Areas and Industrial Zones in Vietnam to 2025: the grade-III city must have a DWTS with service coverage of over 80%; Completely overcome the situation of flooding, in addition, a part of rain water and wastewater after treatment must be reused; DWTS projects must be quickly completed with the basis of approved DWTS planning.

Strategies on sustainable development, green growth and CC response also raised the following requirements: Integrating the contents of sustainable development, green growth and responding to CC when implementing the plan; Strengthening the roles and responsibilities of the community and other stakeholders is also focused, including from consulting, criticism, policy recommendations and planning and planning.

2.2. Theoretical basis about management of DWTS planning

2.2.1. Models of organizational structure

Organization structure in the thesis's proposals as follows:

- Online organization structure is suitable for small-scale units and the management is not too complicated.
- Organization structure according to the appropriate functions at the national level units

2.2.2. Factors affecting the management of the DWTS planning in grade-III city in CCRoV

As the cities with a central role in the province, it is necessary to become a model of urban development management including the management of the DWTS.

Plain terrain, less fragmented, favorable for the development of DWTS with the application of green infrastructure, SuDS.

Located along the coast with low ground level, CCRoV is located in the area strongly affected by CC.

The budget is low, so it needs to go towards simple processes, the ability to socialize, mobilize community resources and be flexible enough to adjust quickly.

2.2.3. Principles about SuDS of the DWTS planning management

SuDS solutions have been evaluated as being applicable as soon as possible, especially in medium-sized cities and in the development stage as grade-III cities in Vietnam.

Integrating is the most effective way to bring SuDS solutions to life soon.

2.2.4. Principle of integrating CC response solutions of the DWTS planning management

It is necessary to integrate the content of CC response in urban planning management.

Integrating CC response in urban planning must ensure integration, holistic, comprehensive and take into account the priority for each solution.

2.2.5. GIS on the DWTS planning management

GIS is a useful technology that integrates spatial data with other types of data to turn them into useful information to help important urban governments choose locations and manage facilities. infrastructure, providing urban services in a reasonable manner.

Assisting urban authorities and related agencies to improve the efficiency of planning management and construction of urban

2.2.6. Participation of community and stakeholders on the DWTS planning management

The initiative and active participation of the community in construction and management instead of being considered passive consumers.

Dissemination of adequate information supports consensus building, while also helping to avoid unnecessary political measures as well as speculative investment activities.

2.3. Experience in management of DWTS planning

2.3.1. Domestic experience

Results of the management of DWTS planning in Vietnam can be summarized in some main contents related to the planning as:

- Integrated management of water resources
- Institutional stability of the sector
- The role of organizations operating in the service sector on natural resources and sanitation and community participation

2.3.2. International experience

- Thailand: Investment, law enforcement and cooperation; Drainage fee; Private sector involvement.
- Sri Lanka: Capacity building of managerial staff; Customer service guarantee; Focusing on wastewater management.
- India: Reuse wastewater; The independence and autonomy of the drainage service management unit; Have a long-term vision; Towards the needs of service users; Application of technology in management.
- Malaysia: Establishing an appropriate legal and institutional framework; PPP model.
- Philippines: Wastewater management business opportunity; Privatization.
- Japan: Reasonable financial allocation; Responsibilities of grassroots authorities.

CHAPTER 3. PROPOSED SOLUTIONS FOR MANAGEMENT OF DRAINAGE AND WASTEWATER PLANNING IN GRADE-III CITY ON THE CENTRAL COASTAL REGION OF VIETNAM

3.1. Perspective about management of DWTS planning

- Comply with the basic legal corridor on the management of DWTS but has proposed revisions in order to be uniform, simple but still effective and save costs and time.

- Organizing state management agencies in the direction of streamlining, highly specialized, avoiding overlapping, and taking responsibility with powers of each unit and cadre and state management officials.
- Enhancing the participation of the community and stakeholders in management planning.
- Towards the integration of sustainable development, green infrastructure, CC response and sea level rise in planning.
- Prioritizing the use of advanced scientific technology in the management and archival of planning dossiers in order to increase efficiency and accessibility after approval.

3.2. Proposing technical management solutions about management of DWTS planning

3.2.1. Solutions on DWTS planning process

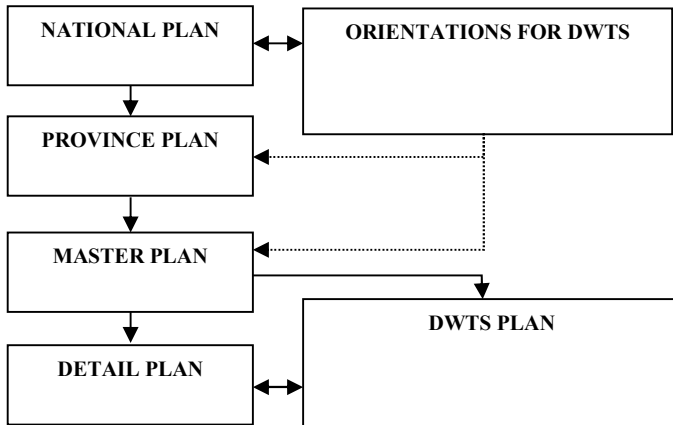


Figure 3.1. Diagram of DWTS planning for grade-III cities of CCRoV

The DWTS planning is integrated into the master planning to concretize the national DWTS orientations at the urban level and the orientations for the development of the DWTS have been integrated into the provincial plan. After master planning of the grade-III city, when implementing the DWTS project, it is necessary to concurrently elaborate a detailed planning of the DWTS. Thus, there will be no

need for intermediaries between master planning and construction investment projects of DWTS.

According to the proposed process, more specific steps for the DWTS planning section in master planning will include: overall research (at 1: 10,000 scale), detailed studies (at appropriate rates ...) and develop management regulations according to planning

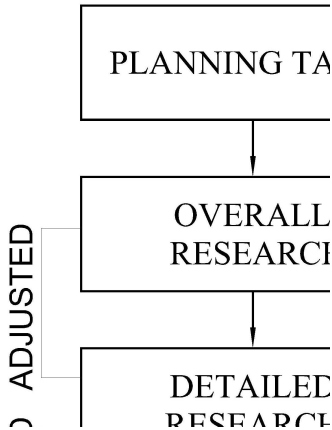


Figure 3.2. Diagrams process and requirements of DWTS planning in the grade-III city of the CCRoV

The overall study and detailed studies identify a series of input parameters for the investment project on construction of urban drainage and sewerage systems, but to make management easier classify these parameters to determine which parameters are mandatory control, which ones are recommended and which ones are only suggestions, thereby gathering them into public requirements. The management of the implementation according to the plan in the final step is to develop management regulations according to the planning scheme.

The management of DWTS is not only encapsulated within the urban area but also needs to be considered in the overall region, so it is necessary to develop a regulation on the management of DWTS to

enhance the legality of the planned management and create a unity in the management of DWTS activities.

Figure 3.3. The relationship between the regulations on the management of DWTS and the planning

3.2.2. Solutions for integrating SuDS and CC response in DWTS planning

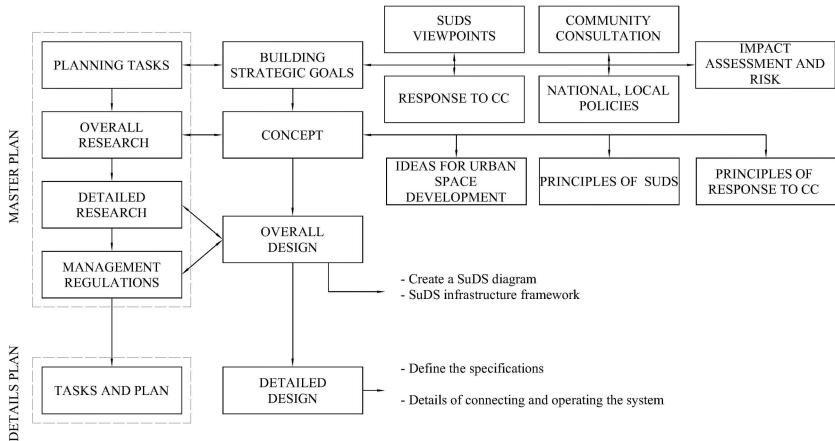


Figure 3.4. Diagram of integration of SuDS solutions and CC response in planning

The main approach is to use and optimize the natural drainage system; reduce speed of flow; prioritize surface flows; preserve, protect and build water storage spaces to prevent flooding, regulate

microclimate in combination with other civil purposes; have a backup solution for unforeseen fluctuations due to CC impacts ...

The process of designing sustainable DWTS and CC response is carried out in 04 stages, including: Developing strategic objectives on DWTS; Conceptual design of DWTS; Overall design of the DWTS and the detailed design of the works of the DWTS.

3.2.3. Solution of applying GIS technology in management of DWTS

Developing database for GIS operating on network with user control. The information center under the DOC is the focal point that manages the entire shared database system and is responsible for developing standards, technical processes, regulations for decentralizing the management and sharing of specialized data layers, Department of Architectural Planning under DOC and urban management offices in urban areas are responsible for summarizing information, data and updating the system according to the decentralization.

The database on DWTS is an integral of urban planning database system. To ensure information security, based on the level of resource exploitation of the users, they will decentralize access to the system with the corresponding exploitation level.

3.3. Proposing the solution of management of DWTS planning

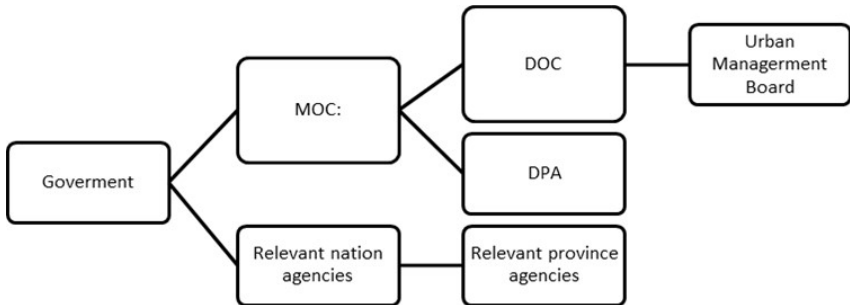
3.3.1. Proposing to supplement and complete the organizational structure of management agencies on the planning of DWTS

The organization of the management of DWTS at national level focuses on one focal point is the Department of Architectural Planning (Ministry of Construction).

At the provincial level, for the DOC, it is proposed to merge the specialized management function of the Technical Infrastructure Division into the Planning Department, to add specialized personnel to the Planning Department for the Planning Department

At the urban level, for the urban management board, specialized teams will be established in charge of various management areas: Housing and public works management group; Management group of

technical infrastructure works and Construction management team of construction activities, construction materials.



Hình 3.5. Diagram of organize management on master plan on DWTS in grade-III city in CCRoV

3.3.2. *Proposing to adjust, supplement and issue new mechanisms and policies on the management of DWTS planning*

Urban Planning Law No. 30/2009 / QH12: clarifies the DWTS planning, which is mandatory content integrated into master planning.

Construction Law No. 50/2014 / QH13: Agreeing on the content of responsibility for consultation of urban planning and other construction planning is implemented by the planning organization. Supplement regulations on providing information on the internet based on GIS system of basic information on construction planning.

Adding priority views based on natural characteristics to organize drainage, requirements on integrating SuDS and CCresponse into the orientation for development of urban and industrial drainage in Vietnamese Standards QCVN 01: 2019; QCVN 07-2: 2016 / BXD.

3.3.3. *The participation of the community and stakeholders in the management of DWTS planning*

Targets at service users and to meet the needs of socialization in management, investment, construction and operation include consultation in the planning process and publication of DWTS planning to stakeholders.

The participation of the community and stakeholders must be carried out throughout the entire process.

3.4. Application of research results on the management of DWTS planning

3.4.1. An overview of application location

Cam Ranh City is a district-level administrative unit of Khanh Hoa province with an area of about 32,501.08 hectares, with a population of 125,311 people.

Cam Ranh City has the common characteristics of the III-grade cities in CCRoV such as: There is a rapid rate of urbanization, but the value of GDP per capita is still not high compared to the national average; Labor with professional and technical qualifications accounts for a low proportion of the total labor source; The DWTS has been established for a long time and through many different stages, it has been seriously degraded. Located along the coast with low ground elevations, vulnerable to climate change and sea level rise, the river structure has a short length.

3.4.1. Applying the thesis's proposals to adjust the planning of DWTS of Cam Ranh City

Based on the urban development orientation, propose the main ideas for the Cam Ranh city is as follows:

- In the existing urban areas and suburban areas affected by the urbanization process, making the most of the natural drainage system combined with artificial systems.
- In areas where new high-density urban areas are planned for development, priority shall be given to natural drainage systems.
- Suburban residential areas and dispersed tourist spots use on-site wastewater treatment system in association with natural factors.
- Industrial development areas organize centralized wastewater collection and treatment taking into account preliminary treatment at each factory, enterprise and stable treatment of wastewater before being discharged into receiving sources.

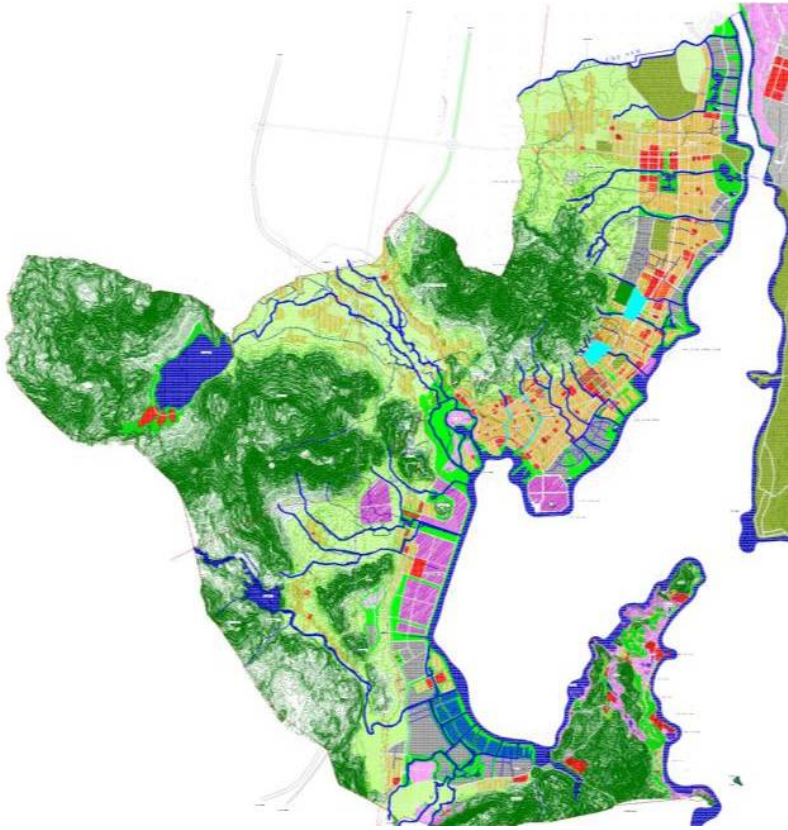


Figure 3.6. Orientation of the DWTs planning of Cam Ranh city according to the author's proposal

Zone 1, the natural flows are still and there is a lot of land fund for the arrangement of key works. Orientation for drainage planning in association with main drainage axes based on existing rivers, streams, seasonal flows, upstream areas organized into semi-submerged natural areas combined with agricultural production areas. In order to reduce the flow rate, absorb water, partially absorb the flow and temporarily store water, the middle and downstream areas organize the natural surface flow with buffer zone combined with green areas. open space if enough land can form the regulation lake

Zone 2 is a new central area of Cam Ranh city, urban space is forming, natural flows are still however not managed and there are signs of encroachment, there is still enough land fund for the arrangement of key projects on water drainage and waste water treatment. Orientation of drainage planning associated with main drainage axes based on existing seasonal flows, upstream areas organized into semi-natural flooded areas to reduce flow rate, absorbency, partially absorb the flow, the middle and downstream areas organize the natural surface flow, areas with enough land can be organized into semi-submerged park areas for temporary storage of surface water.

Zone 3 is the old central area of Cam Ranh city with stable urban space from before natural flows have been renovated, drained or reduced flow with no expanded area except for areas. mountain side. Make the most of the land fund to form open spaces for green water surface to support water drainage. Towards the re-formation of open drainage drainage axes.

Zone 4 is the downstream area of Tra Hoa, Tra Duc and Hanh streams with 03 gates to the sea (Ba Ngoi) with regulating reservoirs upstream of Suoi Hanh and Tra Duc lakes serving the main drainage, maintaining and expanding natural flows, low-lying areas storing water, organizing on-site wastewater treatment, construction areas must give priority to ensuring flow. of water, ready for flooding for a limited time.

Zone 5 is the downstream of many small streams originating from Ta Luong, Trai Lang and Doc Sen mountains. The industrial sector concentrates on collecting and treating wastewater separately, the civil areas treat the wastewater locally in combination with the on-site wastewater treatment. Maintain the main drainage basins based on the existing rivers, streams and drainage axes in the upstream area in combination with the semi-submerged areas, giving priority to the formation of regulating lakes in the area adjacent to the center of the area. Agricultural production and construction areas focus on water

storage and flow regulation. The centralized construction area will form drainage axes associated with green buffer zones combined with parks and public spaces.

Zone 6 is the area downstream of Can river and Dau stream with existing or upstream regulating lakes such as Song Can lake and Song Trau lake (located in Ninh Thuan province) with a large basin. Orientations for maintenance and expansion of natural flows, low-lying areas of water storage, on-site wastewater treatment, construction areas must give priority to ensuring the flow of water combining the areas. basin storing water with aquaculture area, seafood.

3.4.2. Applying the thesis's proposals to management of DWTS planning of Cam Ranh City

At the provincial level, at DOC, it is proposed to merge the specialized management function of the Division of Infrastructure into the Department of Planning. Staff of Planning Department: 10 people (adding 04 people, including 03 people in charge of infrastructure and 01 people in charge of GIS).

At the urban level, the organization of the Management Board of Cam Ranh City is divided into specialized groups in charge of various management fields: Housing and public works management group; Management group of technical infrastructure works and Construction management team of construction activities, construction materials. Proposal the number of staff of the Management Board is 12 (adding 03 people in charge of infrastructure).

3.5. Discussion some research issues

3.5.1. Discussing the proposal of renovating the process and content of the DWTS planning management in grade-III city in CCRoV

Renewing of the DWTS planning in Vietnam must be associated with the renewing of the master planning. The content of the DWTS planning in urban planning projects is highly manageable and has a long-term vision so it must ensure the flexibility to adapt to the

unforeseen developments of the socio-economic situation. as well as the impacts of CC and sea level rise.

The integration of green growth directions, sustainable development and CC response is necessary not only for the master plan on natural resources and environment but also for all other contents of urban planning. This is one of the important components to ensure the flexibility of planning solutions in addition to increasing the participation of the community and stakeholders in planning management.

3.5.2. Discussing the mechanism, policy and organization of DWTS planning management in grade-III cities in CCRoV

Because human resources for management will not be as convenient as in big cities, or at the provincial and nation levels, the personnel structure must be compact, versatile but still have to ensure professional quality. subjects. At the same time, in order to enhance two-way information exchange and ease of updating, the use of online database systems and GIS technology in database construction and information provision is very important, requiring specialized units. responsibility for implementing this content.

3.5.3. Discuss the possibility of expanding the research results of the thesis to grade-III cities in Vietnam

The proposals on renovating the process of planning and planning management for grade-III cities in the CCRoV can be applied to grade-III cities in Vietnam selectively, especially the regulations on integrating green infrastructure solutions, sustainable development and CC response into the DWTS planning. In addition, the proposal on increasing the participation of the community and stakeholders in the management of the DWTS is particularly suitable for small and medium-sized cities, as well as rural population quarters and clusters. village concentration.

C. CONCLUSIONS AND RECOMMENDATIONS

Conclusions

The thesis has studied the situation of DWTS planning management in the grade-III city in the CCRoV. Identified the existing problems that need to be solved and propose solutions in the management of DWTS of grade-III city in the CCRoV on scientific and practical bases. Detail:

1/ Adjusting, supplementing and perfecting the process of planning on DWTS, including the integration and institutionalization of DWTS planning in urban master planning, integrating solutions for SuDS, response to CC in the content of DWTS planning and application of GIS technology in the DWTS planning and management of DWTS planning.

2 / Add and complete the organizational structure for management of DWTS planning in order to enhance the capacity of the staff but still ensure a compact management structure. Proposing the adjustment and supplementation of mechanisms and policies on raising the role and encouraging the participation of the community and stakeholders in the management of DWTS planning.

The thesis has applied the proposed contents in specific cases of Cam Ranh city, Khanh Hoa province to confirm the effectiveness of the proposals and presented thesis to clarify the research content.

Recommendations

1/ Adjusting, supplementing some contents of the Urban Planning Law; Construction Law and the system of related documents

2/ Adjusting, supplementing some contents of Decree 80/2015/NĐ-CP and relevant documents

3/ Proposing adjusting, supplementing, completing tasks, functions and organizational structure of the DWTS planning management agencies.

4/ Continuing research towards a synchronized settlement of DWTS planning management for the grade-III cities in Vietnam.

THE PUBLISHED SCIENTIFIC PUBLICATIONS RELATED TO THE THESIS

1. Vu Tuan Vinh (2016), *Issues in the management of drainage and wastewater treatment planning of grade-III city in Vietnam*, Journal of Construction Planning (ISSN 1859-3054), no 76, page 94 – 97.

2. Vu Tuan Vinh (2016), *Proposals on renovation of urban infrastructure planning*, Journal of Construction Planning (ISSN 1859-3054), no 82, page 56 – 59.

3. Vu Tuan Vinh (2017), *Planning and managing of urban elevation along the direction of sustainable drainage*, Journal of Construction Planning (ISSN 1859-3054), no 88, page 31 – 35.

4. Vu Tuan Vinh (2019), *Requirements on infrastructure in urban and rural planning*, Journal of Construction Planning (ISSN 1859-3054), no 97-98, page 62 - 67.

5. Vu Tuan Vinh (2019), *Proposals on management of drainage and wastewater treatment planning for grade-III city in the Central coast region*, Journal of Construction Planning (ISSN 1859-3054), no 101-102, page 82 - 86.