

## Executive management and construction cost of collection and disposal of Surface water projects using Visual Basic programming language Geographic Information System

, Kheradmand Yazdan<sup>1</sup>, Gholizadeh Zahra<sup>2</sup>, Barati Rshvanlv Reza<sup>3</sup> and Gholiadeh Amin<sup>4</sup>

<sup>1</sup> Department of Civil Engineering, Shirvan Branch, Islamic Azad University, Shirvan, Iran

<sup>2</sup> Graduated student of GIS, Science and Research Branch, Islamic Azad University, Tehran, Iran

<sup>3</sup> Department of Environmental Health, Tarbiat Modares University, Tehran, Iran

<sup>4</sup> Department of Civil Engineering, Boshehr Branch, Islamic Azad University, Boshehr, Iran

Email: [gholamzadehdoab@yahoo.com](mailto:gholamzadehdoab@yahoo.com) (Corresponding Author)

**Abstract:** Today, new approaches to management of surface water management practices in the collection and disposal location is appropriate. It also aims to study how to implement and cost management of construction projects to collect and dispose of surface water has been commensurate with the location. does not assign a stage. Arc GIS 9.3 software system has been implemented. The study sample is selected city of Sabzevar. The construction cost management initiatives in order to collect and dispose of surface water from the Visual Basic programming language to develop system software Arc GIS 9.3 is used. The efficiency of the system with the extended spatial information about its role in the implementation of management plans for surface water collection and disposal were examined. The results of this system is efficiency. It is worth noting that display information on the operation costs by choosing design features a map of the location system is proposed in this study. The most significant achievements of this system is surface water flow in flood modeling for the optimal management of the system is synchronized.

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**Keywords:** Geographic Information System, development systems software Arc GIS 9.3, the collection and disposal of surface water, Visual Basic programming language

### 1-Introduction:

Nowadays, the understanding and control of water resource utilization policies, more than ever has been proposed [3] and because of the lack of environmental Pyamdh proper control of water resources, human, financial and criminal threats are floods be. issue identification and exploitation of water resources policy tightens. that in order to achieve this recognition, the research on water resources management requires the skills. This study using new techniques, for the passage of water resource management challenges facing the country, with the development and implementation of new approaches is necessary because water plays an important role in the sustainable development process, particularly for countries with strong growth in demand The lower level facing resource. More important, this approach has been chosen [1]. So that the resulting environmental consequences, social, economic, in the absence of proper control of water resources, it tightens. Therefore, given the extensive discussion of issues and management of water resources research and scientific findings that steps have been many (knapp and Olson, 1995; McKinney et al., 1999; Postel et al., 1996; Allen, 1998), this construction costs of collection and disposal of

surface water has led projects. Therefore, this study collected cost management of construction projects and the disposal of surface water has been commensurate with the location. Total credits in order to design a collection and disposal of surface water due to institutional constraints and public policy of the Iranian nation will not assign a stage. Therefore, the study design has several priority categories for each of these categories and discuss them with the information system where all information has been entered in a three-month period of preparation and . It is worth noting that systems using Arc GIS 9.3 software system has been implemented. Study of a selected region of Khorasan functions. A. The surface water collection and disposal cost management of construction projects from Visual Basic programming language to develop software Arc GIS 9.3 is used. The efficiency of the system with the extended spatial information about its role in the management of surface water collection and disposal schemes were examined. Based on the available budget, the work can be done from Miran, reporting costs, showing separately the costs of operations (the budget and the estimated amount of work required, the percentage of progress in each operation, changes in tariffs and feature updates,

reporting of costs, priorities and relevant information on the following priorities selected on the map, view a breakdown of costs to the operations performed, display based on the tariff question, Vtrsym operations in Vbravrd costs by selecting the desired position designed side operations) the results of this study is productivity. It is worth noting that display information on the operation costs by choosing design features a map of the location system is proposed in this study. The most significant achievements of this system is surface water flow in flood modeling for the optimal management of the system is synchronized.

## 2-Purpose:

The purpose of this study based on automated monitoring, accurate, timely, and appropriate place for executive management and construction projects is the collection and disposal of surface water. The fine analysis of the relevant projects of relatively inefficient utilization of existing assets and investments and also delay in operation Azamkanat and lack of prioritization in the budget and project plans and lack of coordination between the relevant facilities. Manages to be encountered.

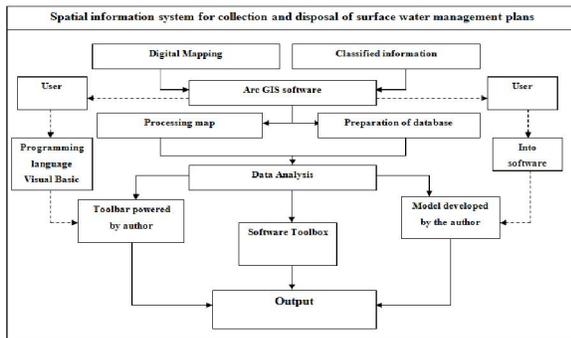


Figure 1 - System Design

## 3-1- Data collection :

The goal of this stage, the complete structure for spatial data in Arc GIS is a spatial information system software. To this end a detailed review of existing data, the required information has been prepared. This data includes a list of basic data and technical information is available from the map. The steps provide basic information and technical data and technical information on how to implement basic data will be dealt with.

### 3-1-1 - Preparation of data base design:

Basic map of the environment for GIS, should one side of a point, line or surface preparation and be saved. Due to the nature of 1:2000 cartography maps, some of the complications, the need for change

and structural transformation were defined for the type of preparation.

Also GISReady layers created in connection with, this step is done in two ways: automatic and manual. And some rules for building topology and fix errors in data preparation has been done, these rules are available for different combinations of layers, have been separately defined and implemented. Which is composed of the following

- Must Not Overlap
- Not Have Gaps
- Must Not Overlap With
- Boundary Must Be Covered By
- Must Not Intersect
- Must Not Have Dangles
- Must Not Have Pseudo
- Must Not Self-Overlap
- Must Not Self-Intersect

### 3-1-2 - extract specific data from existing maps and technical projects and their implementation on the base map:

In order to extract specific data from existing maps and technical projects and their implementation on the base maps, technical drawings were prepared. If all of the maps contained technical information and projects related to the project surface water collected in Dwg format and in three different scales of 1:7500, 1:10000 and 1:50000 were prepared. with (scale 1:2000) have been implemented. Information extracted from existing maps of harvest information from maps to maps, technical reports, executive consists of: Mnhvl, site plan, the city, the detailed design of the conductor, the legal limits detailed plan, a member of the conductor, the conductor performance, the main drainage basins in the final classification, operational priorities, structure, slope, slope grading streets, ... Are. As well as information taken from maps of the album consists of executive plans: Site plan of the city, the conductor, street names, Mnhvl, is.

### 3-1-3 - using data

Engineering for Azdadh on base map prepared in 1:2000 scale, according to the drawings coordinate with each other, in reference to the first stage (Georeference) maps by selecting control points in common between them took to the map accurate coordinates are transferred to her. Notably, the total data base and the collection and preparation of technical editing and digital file formats have been used. In order to provide better information to users with a simple structure and descriptive information plus maps with format conversion and also allows analysis with GIS on it by some software is possible, this data format Shape - File [7] to store the . Also,

this file format with a minimum of 3 Extension of shx, shp and dbf has been established. Provide descriptive information for each file listed in the Comprehensive List of Persian given operating system, Windows, Microsoft used the standard. Also, this information is integrated (Seamless) is presented.

### 3-2- Preparation and database management and processing maps

Due to the application requirements, we can design and produce a logical model of the action. Logical modeling phase of the translation information in the conceptual modeling language for software to be understood [5]. Spatial database model used in this study, model 4 is Zhyvdytabys ArcGIS software it supports. This model is able to hold all data in a database structure Zhyvdytabys Feature Dataset in order to organize relevant information to use. Representation in the ArcGIS environment, then the ability to store graphic profile of side effects, along with other information, is used.

### 3-3 - Data Analysis

Management sector, the data flow to productive sectors and analyzing the transmitted information. This section is composed of three parts. The resulting output that results from any part of this system is implemented in the management and construction related projects will be used. It is worth noting that each of these three parts are: 1 - analysis using Arc GIS software tool kit that includes capabilities for the system defined by the 2 - Abzartrahy bar using Visual Basic feature that is specific [6] 3 - analysis using the software program has been implemented in Arc GIS software environment, the three sectors mentioned efficiency and analysis necessary In order to collect surface water management studies conducted in areas with lower costs is optimal. In the case briefly with each of these three sections in the field of management plans Mrbvz:h Karabrdshan is described.

#### 3-3-1 - Data analysis software toolbox

Below are some of the features of this information is fluid.

- 1- Search Spatial data and descriptive information based
- 2- The logical question based on various parameters
- 3-Create buffer, the desired effects
- 4-Connectivity various documents to the effects of spatial
- 5-Classification maps based on specific parameters
- 6-Simultaneous viewing of raster and vector data for updating maps
- 7- To produce the desired outputs such as maps, reports, charts
- 8- To produce a profile of desired routes

9-Check the status quo with the detailed plans (to generate statistical reports required)

10-Zoning and generate thiesen polygon

11 - Three-dimensional model and determine the slope and elevation, at any point

### 3-3-2 - the analysis using the software program in Arc GIS

This section simulates the flow of surface waters [8,9,10] is in the study area, the aim of Created this, which will determine what areas in the city are threatened by floods? And the flood Routes will be over? Below outline this model in order to show the result of the above Offers.

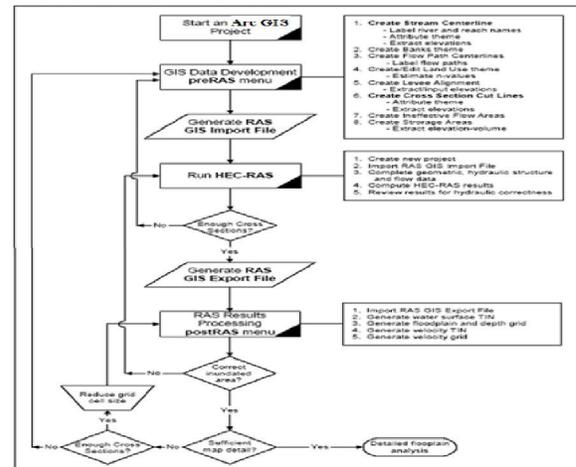


Figure 2 - The cycle of the relationship between GIS and modeling information

Using the model created in the surface waters of the flood flow has been high. View Part of the digital elevation models (DEMs) and triangulated irregular networks (TINs) in surface water flow the study area is shown below (fig 3, 4).



Figure 3 -Triangular irregular networks (TINs)

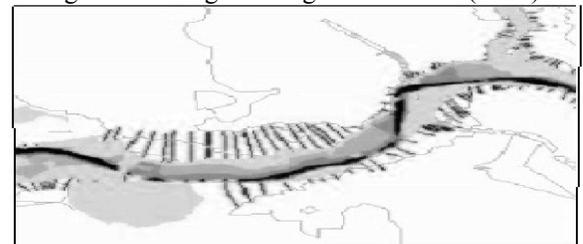


Figure 4 -Digital Elevation Models (DEMs)

**3-3-3 - Data analysis tool bar designed by the user in software**

Specific system functionality using Visual Basic programming language is designed as a tool bar. Their applications are briefly described below. It is worth noting that this part of the cost management of construction projects that are not relevant in considering the results of this analysis in order Bhrvry cost management has been identified (Figure 5).



Figure 5 - specific system functionality toolbar

**2-3-2-1-Defining a new project**

To create a new project in the project layer, the layer desired to be drawn. Information on the new layer under the name and other information that is relevant to the table. Selecting the option "Define Project" will form the list of selected projects will be displayed that lists the set of operations, using two options: "Add operation" or "removal action" in this new form to be added or subtracted to the project (Figure 6).

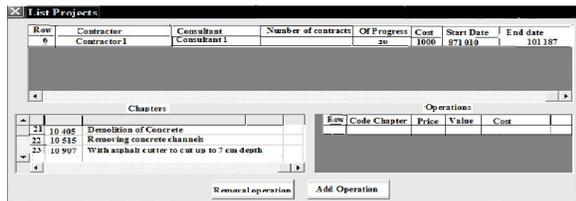


Figure 6 - Adding or Removing a New Project

**2-3-2-2- Based on the estimated funding**

Knowing that the existing budget of how things can be done, will be very useful. This system is currently anticipated that the cost of each operation can be work to calculate the amount of the budget is low (Figure 7).

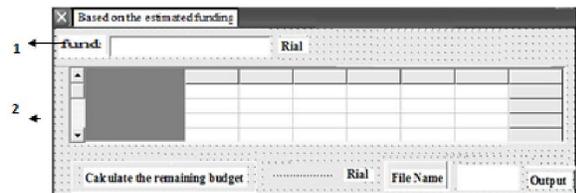


Figure 7 - Based on the estimated funding

In the figure above, Part 1 is devoted to input the amount of money. Double-click on any of the two phases of work following window opens. Includes the under priorities of each work phase and the phase of the work of the unit. This window has been completed and approved, then click the option

to calculate the budget in Figure 3. The remaining budget in the following window is displayed. Thus, users can know the amount of money, a list of desired work processes so that the appropriate budget is allocated. Use the form below with the option "Text output" generated list as a text file is also stored (Figure 8).



Figure 8 - Run the command window and set the budget priorities and actions

**2-3-2-3-reporting costs**

Downloadable report costs in the system before they can be examined. Projects relevant to note that the total funds allocated in one phase does not. Consultants design studies, several high priority projects in order to estimate the incremental costs are classified. This classification and pay any part of the template is created in the system. Click on Options on the toolbar to report expenses. Relevant information to each priority and each of them and the cost of each subset are shown. Over time from year to year cost of implementing the priorities will change. This allows the system to update the information provided. The case will be discussed (Figure 9).

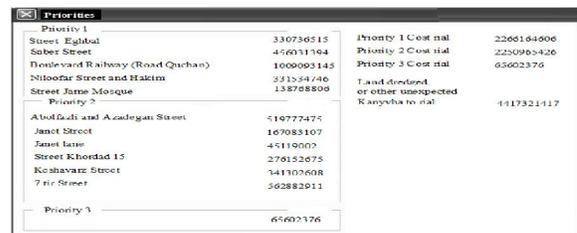


Figure 9 - Display the option of reporting costs

**2-3-2-4- Show separately the costs of operations performed**

Related projects have been prioritized due to restrictions of transfer credits. These priorities have been classified as main priorities. and in every major priority under the priority of priorities and a breakdown of each also conducted a series of operational performance. It is noteworthy that each of the operations with the code name of code, quantity, cost per chapter and code Formed. For documentation of the cases mentioned, the ability to

"show costs separately operations", is designed. Given what was said in the documentation process. if you consider the time factor. May change operations arise. This system could easily change with the operating time required for the operation, the cost of each operation and the operation rate. Is possible. another our capabilities of this system can display the progress of each operation. (Figure 10)

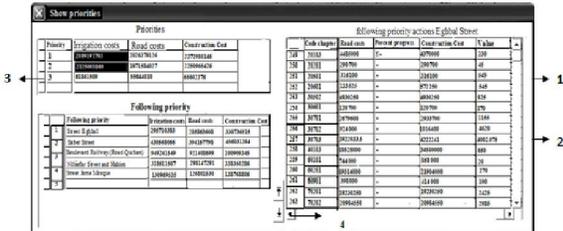


Figure 10-Show separately the costs of operations performed

In the above, in Part 1, the list of priorities and the cost of each of the three types of rates: "buildings", "The airport and railway infrastructure" and "Irrigation and Drainage" exists. Select the priority of this section, the following list of priorities and costs related to each of the three types based on the rates mentioned above, is shown in Part 2. The following priorities are selected from Part 2. All operations in the priority list in Part 3 are shown below. Part 3 of the cost of operations based on three types of fees and expenses as the cost of doing the work progress will be displayed. Selecting the option in Part 4, according to the rates application is shown (Figure 11).

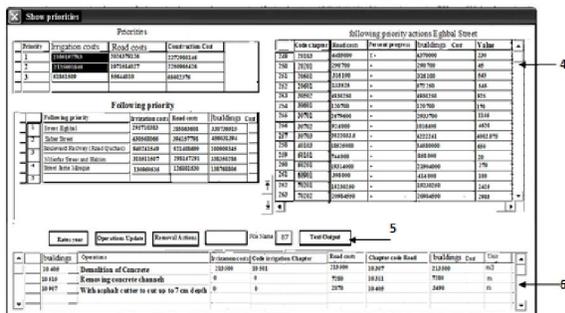


Figure 11 - Application Rates associated with the desired

In this Figure, Part 5 consists of four options: "Delete Operations", "updated information", "rates year" and "output text" is. The option to "remove the" cause of action in Part 3 of the already selected, will be removed. Select "Update Details" to enter the changes in operations on the following priorities are priorities and fit it on. Option "rates

year" for rates based costs used in the request, because of year to year, some of the rates will change. Therefore, costs are calculated based on the new rates. To do so, should the Excel file to the existing rates in the project, a new year is called Datasheet. The new rates information required to be entered in a sheet. After this step, in section 5 form, and enter the corresponding rates option is selected. Perform these operations with the new rates levels have been attributed to the operation. And costs were calculated based on the new rates is shown in Part 7. Select "Text output" of the five is the last option. The priority will be selected from a text file. And double opt Part 7 below will be displayed (Figure 12).



Figure 12 - Form of the progress of each operation

Enter the percentage of operations in progress. Approved expenditures made by selecting the relevant operations are shown in Part 7. The user will be able to operate on the basis of the amount of money spent on development and related charges (which shall be communicated in different years), shall see. Also, double clicking a window will open with section 6 in Figure 8. In this window, enter the amount and confirm the option we choose. This action adds to our existing sub-priorities (Figure 13).

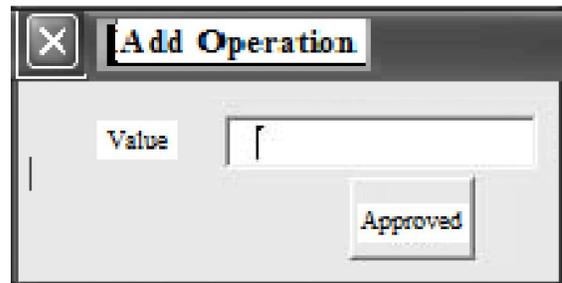


Figure 13 - Adding forms to a subset of operational priorities

### 2-3-2-5- Show Rates

Option "Show Rates" rates years of operation will be displayed. This option has all the information on rates (Figure 14).

Construction code	Operations	Construction code	Chapter code Road	Unit
21 10 405	Demolition of Concrete	213500	10 307	m3
22 10 515	Removing concrete channels	7280	10 311	m
23 10 907	With asphalt cutter to cut up to 7 cm depth	2190	10 405	m

Figure 14 - Form Show Rates

### 2-3-2-6-Show information about the priorities selected on the map

To use this feature, the range selected on the map. Select "is selected report" from the toolbar, the following list of priorities along with their related costs in the selected range is displayed (Figure 15).

Sub-set of priority	Cost
Street Eghbal	456031394
Abolfazli and Azadegan Street	219797475
Keshavarz Street	66602376
Boulevard Railway (Road Quchan)	1009093145
Niloufar Street and Hakim	330360286
Street Jame Mosque	139788806
Janet Street	167083107
Janet lane	48119002
Street Khordad 15	22153405

Figure 15 - Information about the priorities set

### 3- Results and recommendations

In addition to having the system, with public functions in the field of management studies, research projects at the heart of it was pointed out, was able, using specially designed features, reporting costs, show costs operations are performed separately, to display information about priorities and the priorities selected on the map, you can define new projects, calculate costs based on available funding and display the list of tariffs based on the desired returns the survey results are. Also, the modeling of surface water flooding in the study area of this study is obvious. The hope is that this achievement and future capabilities of this system to the following questions be answered?

- 1 - Using Urban flood risk modeling of surface waters in the study area, specify the city in what areas are most threatened? What routes will be over? How to conduct flood and surface waters in order to reduce the waste?
- 2 - which range from buildings and have less resistance against flood risk will be more destruction and in this case, what obstacles are hindering relief?

### 4-Conclusion

Management system implementation in order to determine the influence of surface water collection schemes to make some changes after the system implementation in the relevant organization, a brief mention.

- 1 - When making a rapid and coordinated spatial and descriptive information
- 2 - Classification of fabric and an all terrain modeling
- 3 - create archive classified information and spatial data
- 4 - Create digital terrain model
- 5 - Mapping Integration
- 6 - Modeling
- 7 - to achieve a quality level suitable for point of information, through to follow a single standard
- 8 - to facilitate the conversion and exchange of information and thus save costs.
- 9 - Increased accuracy in statistics and data from multiple
- 10 - reduced cost management practices Silyqhay
- 11 - Reduction of operating expenses decreased as a result of trial and error and risk management decision
- 12 - Creating an information infrastructure for researchers and experts

Shine is the mention that part of the system modeled in this study are significant achievements. The major advantages of the system below the spatial information in modeling the flow of surface water that is flooding. That these benefits in order to better manage project synchronic collect surface waters have the model built.

- 1 - create a system associated with the model built
- 2 - increase the modeling capabilities
- 3 - number of attempts to model
- 4 - Increase Aghtbar input and output
- 5 - Increased functionality Grafygy entry and exit and re-edited due to its simplicity
- 6 - Standard information and the ability to do its share with other applications and users

### 5- Footnotes

- 1- VB.Net
- 2-Full Structure Data
- 3-GIS Ready
- 4-Geo database
- 5-Arc Tool box
- 6-GIS Tools
- 7-Thiessen polygon
- 8-Datasheet

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