

**ANALYSIS OF SUITABLE LANDS FOR AGGREGATE
MINING IN ANURADHAPURA AND GAMPAHA
DISTRICTS**

By

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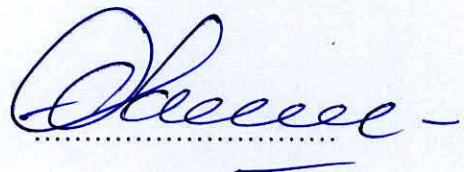
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DECLARATION

I do hereby declare that the work reported in this project report was exclusively carried out by me under the supervision of Prof. Sunethra Thennakoon and Dr. Ranjith Premasiri a report on this has not been submitted in whole or in part to any University or any other institution for another degree.

Date: 2016/3/20.....

A handwritten signature in blue ink, appearing to read 'Dahanayake', written over a dotted line.

T. Dahanayake

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- 1 Aggregate mines location details (XY GPS Points)

LIST OF ABBREVIATIONS

Abbreviation

AL	-	Artisanal Mining
DSD	-	Divisional Secretariat Divisions
CEA	-	Central Environmental Authority
EIA	-	Environmental Impact Assessment
GDP	-	Gross Domestic Product
GIS	-	Geographic Information System
GND	-	Grama Niladari Divisions
GNP	-	Gross National Production
GPS	-	Global Positioning System
GSMB	-	Geological Survey and Mines Bureau
IEER	-	Initial Environmental Examination Report
IML	-	Industrial Mining License

ANALYSIS OF SUITABLE LANDS FOR AGGREGATE MINING IN ANURADHAPURA AND GAMPAHA DISTRICTS

T.DAHANAYAKE

ABSTRACT

Aggregate mining industry in Sri Lanka increased during the last two three decades. After the civil war in the country, as a basic raw material for the construction industry, the demand for the aggregate rapidly increased. To fulfill this massive demand aggregate mining project are operating throughout the Island. Those mining activities have been created many social and environmental issues. Most of these projects are operating inappropriate locations.

Therefore, finding of economically viable, environmental friendly aggregate project is a prime requirement. This research was aimed to find suitable locations for the aggregate mining. For this research mainly data was collected from Geological survey and mines bureau. And also used land use maps from Survey Department. Anuradhapura and Gampaha districts were selected as study area. Accordingly available large scale aggregate mine sites selected as the sample. Mainly applied GIS tools for the research. By the research initially plotted all the aggregate mines. Then created buffers in several distance using proximity analysis GIS tool. The land use pattern surrounded by the mine sites was categorized. And calculated the percentages of each land use pattern within 300

meter range from the mines. It was decided to consider that some of the land use patterns are not suitable to operate the aggregate mines. Especially decided that home lands surrounded by the mines are not suitable. Further measured the distance to the buildings, roads and water body and water streams within 100 meters and 300 meter range from the mine sites. And categorized the suitability.

By the research, it was identify that the most of the mines locations are not in a suitable level. Only 16% mines were in suitable level. Nearly 50% mines were in not suitable level. Also nearly 33% mines were in moderate level. The main reason for the rejection of most of the mines was the nearby buildings. Therefore it is a rapid requirement to conduct the exploration and find suitable locations for further mining.

Keywords: rock outcrops, aggregates, GIS, Suitability

Chapter One

INTRODUCTION

1.1 Background of the study

Sri Lanka inherits a rich agrarian civilization. The remains of the ancient civilization provides ample testimonies to the world, the kind of well-developed and very well advanced construction industry of the historic Sri Lanka. The tacit knowledge base utilized, in building Sigiriya, Lowamahapaya, RuwanweliStupa&YodhaEla, was few that depicts the unparalleled pride of a nation. With a rich cultural heritage further refined by the Buddhist philosophy enabled to bring construction work to an advanced plateau. The technologies used in building massive tanks were amazing even to the most modern technologies of the present. Thus, construction industry has a very proud history in Sri Lanka.

Though stones were utilized in the construction industry in Sri Lanka for times immemorial, quarry mining gained importance with the use of cement during the late 17th Century in Sri Lanka. When the foreign invaders began their conquest for superiority in Sri Lanka, they built fortresses all over the island especially in the costal belt and to build the massive structures and stone walls, they destroyed the ancient temples to get the stones. Also, there were evidences that Portuguese, Dutch and English invaders used quarry mines for their construction purposes.

Construction industry is being recognized as a key contributor to the Sri Lankan national economy. The post war era is characterized by tremendous increase in investments on infrastructure building from both private sector and public sector. Massive rehabilitation projects were undertaken to develop the infrastructure facilities in North & East and it

was observed foreign investment coming in to the country under BOT (Build Operate and Transfer) schemes. The contribution of the construction industry to the Gross National Product (GNP) is significant and during the period of 2002 to 2012 the contribution of the construction industry to the GNP varies from 6.2% to 8.2%. The growth rates started to pick after 2009 as major buildings and other infrastructure projects have taken place during this period. Especially in 2011 and 2012 there is a drastic increase in the contribution of the construction industry to the Gross National Product (GDP) of Sri Lanka. As per the Central Bank Annual Report, 2012 construction sector GDP stood at Rs. 247 b (US\$ 1.9 b) in 2012 with a recorded growth of 21.6% in 2012 compared to the overall GDP growth of 6.4% and industrial sector growth was 10.3%.

As far as the growth of the construction is concerned, according to the central bank report, it can observe that during the year 2002 to 2012 there is a steady growth from 3% to 21.6%. Given the healthy and constant growth in years 2010, 2011 & 2012, the construction industry became one of the fastest growing segments in the national economy.

Due to the above circumstance building material based minerals industries were increased all over the Island legally or illegally to cater to the ever increasing demand of the economy. Geological Survey and Mines Bureau (GSMB) is the regulatory body for issuance of minerals mining licenses for any type of mineral base industries. The number of licenses issued increased dramatically during the last decade or so. According to the GSMB data the bureau has been issued 1272 mining licenses in year 1995 for all minerals and it has been increased up to 3593 in 2005. By the year 2014 this amount has been increased up to 4392.

During the period of 1995 to 2005 the number of mineral licenses issued increased by 2321 and it was a 182% increase when compared to 1995. During the period of 2005 to 2014 number of mineral licenses issued increased by 799 and it was an increase of 22% when compared to 2005. The increase of minerals mining was help to supply sufficient raw minerals for the construction industry. Mainly it was contributed to development of construction industry. When examine construction minerals sector especially for the cement industry limestone mineral was the major raw material. It was supplied by Aruwakkalu limestone mine in Puttalam. Also, after the civil war vast development projects could be seen in infrastructure development sector. Specially roads, highways, railways construction works rapidly increased. Not only that ports, airports, stadiums, grounds, mega building projects are also started to construct. At present also many mega development projects are going on. On the other hand population of the country is increasing day by day. As per the census department data Sri Lanka's first population census was held in 1871. At the time of that census Sri Lanka's population was two million. After 100 years of the first census, in 1971 it has increased up to 12.68 million. Within another 30 years this population has increased rapidly. In 2001 Sri Lanka population was 18.79 million. Year 2012 population census was the last census of the country. According to the 2012 census Sri Lanka's population was 20.36 million Also Sri Lanka's annual population increase rate is 0.7%. Further census department statistics shows that the population density of the country is increasing rapidly. In 1981 Sri Lanka population density was 230 per square kilometer. It was 300 by 2001. Further this figure has increased. In 2012 Sri Lanka's population density was 326 per square kilometer. When compare with some other large countries this is a higher density. When considered