

Article

# A Systematic Approach of Optimal Land-Use Planning by Applying Geo-Environmental Techniques: A Case Study

Essam A. Morsy <sup>1,2</sup>

<sup>1</sup> Department of Environmental and Health Research, Umm Al-Qura University, P.O. Box 6282, Makkah 21555, Saudi Arabia; [essamibrahim@uqu.edu.sa](mailto:essamibrahim@uqu.edu.sa)

<sup>2</sup> Geophysics Department, Faculty of Science, Cairo University, Giza P.O. Box 12613, Egypt

**Abstract:** This article demonstrates the capabilities and integrity of the environmental geological and geophysical techniques for planning the suitability of the extension of Helwan city for construction and engineering purposes. The geological and topographical mapping were utilized as well as environmental geophysical techniques (seismic refraction, ground penetrating radar (GPR), and resistivity soundings) for optimal land-use planning. The seismic refraction profiles were conducted to evaluate the geotechnical characteristics of the bedrock, GPR was applied to define the main subsurface reflectors, and the geoelectrical resistivity survey was used to identify the subsurface stratigraphic sequence and the distribution of main structural elements impacting the investigated area. The integrated results and findings of the environmental geological and geophysical survey inferred two major distinctive subsurface layers: a thin surface layer represented by highly weathered limestone, with an average thickness of 3 m, and a bottom layer equivalent to the bedrock composed of hard limestone. In addition, GPR performed an analysis of two remarkable subsurface layers, which supported the generated model of other geophysical surveying techniques. Finally, all the geological and various geophysical techniques were integrated and merged to generate the optimal land-use plan of the extension of Helwan city for construction and engineering purposes and to avoid high-risk areas to reserve the sustainability of the new urban communities.

**Keywords:** integrity; environmental; geological; geophysical; sustainability



**Citation:** Morsy, E.A. A Systematic Approach of Optimal Land-Use Planning by Applying Geo-Environmental Techniques: A Case Study. *Appl. Sci.* **2023**, *13*, 1749. <https://doi.org/10.3390/app13031749>

Academic Editor: Jianbo Gao

Received: 17 November 2022

Revised: 15 January 2023

Accepted: 27 January 2023

Published: 30 January 2023



Copyright: © 2023 by the author. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

## 1. Introduction

As populations grow, available land will become a scarce natural resource, especially for the already-existing urban communities. As more land is planned to be developed, effective planning will counteract the negative effects of its use and development. The numerous benefits of effective land-use planning can include the following: creating a generic framework for the proposed urban project, aiding the anticipation of the future plan of the investigated site, implementing sustainable infrastructure utilities, direct positive impact on the local urban economy, optimal use and conservation of natural resources along with protection of the environment, minimizing the associated risks of the natural hazards, and avoiding land-use conflicts [1–3].

For an optimal planning and effective development of the investigated site, a suggested joint integrated approach of geophysical methods including the electrical resistivity, seismic refraction methods, ground penetrating radar, and geological mapping were implemented throughout the study area. Geophysical indicators, including electrical resistivity, seismic velocity, and electromagnetic signature, give a clear image about the subsurface layering sequence and the degree of rock weathering or fracturing [4,5].

The investigated site is situated at the southeastern sector of Cairo, Egypt, which was designated for a proposed residential extension of the already-existing Helwan city, to reduce/minimize the random distribution of the unplanned urbanization in addition to providing millions of job opportunities, which takes into account the provision of a

# Land Use Planning Abstracts Volume 4

**Oregon. Department of Geology and  
Mineral Industries**



## Land Use Planning Abstracts Volume 4:

Energy Abstracts for Policy Analysis ,1980      **Land Use Planning Abstracts** ,1975      **Urban Mass Transportation Abstracts** ,1982      **Scientific and Technical Aerospace Reports** ,1979      **Highway Noise; a Design Guide for Highway Engineers** Bolt, Beranek, and Newman,Bolt, Beranek, and Newman, inc,1971 Various methods of assessing noise loudness and noise annoyance are reviewed and explained sources types and intensities of traffic noise are noted typical means of abatement and attenuation are described design criteria for various land uses ranging from low density to industrial are suggested and compared with the results of previous BBN and British systems for predicting annoyance and complaint and a design guide for predicting traffic noise capable of being programmed for batch and on line computer applications is presented in form suitable for use as a working tool A flow diagram describes the interrelationships of elements in the traffic noise prediction methodology and each element is discussed in detail in the text The text is presented of a tape recording that takes the listener through a series of traffic situations with such variables as traffic distance flow velocity distance outdoors and indoors and presence or absence of absorbers and attenuators      Urban Transportation Abstracts ,1984      Library Searching Jacquelyn M. Morris,Elizabeth A. Elkins,1978      U.S. Government Research & Development Reports ,1970      Behavior & Society ,1979      **Index of Conference Proceedings** British Library. Document Supply Centre,2001      Government Reports Announcements & Index ,1978      **Abstract Journal in Earthquake Engineering** ,1981      **Selected Water Resources Abstracts** ,1991      Energy Research Abstracts ,1990      Bibliography and Index of Geology ,1977      Review of Potential Host Rocks for Radioactive Waste Disposal in the Southeast United States Dames & Moore,1980      **Host Bibliographic Record for Boundwith Item Barcode 30112124661692 and Others** ,2013      **Environmental Pollution & Control** ,1979      Government Reports Annual Index ,1982      Guidelines for Watershed Management Food and Agriculture Organization of the United Nations. Forest Conservation and Wildlife Branch,1977

Eventually, you will extremely discover a supplementary experience and completion by spending more cash. nevertheless when? do you believe that you require to acquire those every needs taking into consideration having significantly cash? Why dont you attempt to acquire something basic in the beginning? Thats something that will lead you to comprehend even more around the globe, experience, some places, following history, amusement, and a lot more?

It is your unconditionally own become old to perform reviewing habit. in the midst of guides you could enjoy now is **Land Use Planning Abstracts Volume 4** below.

[https://auld.rmjm.com/results/publication/default.aspx/How\\_To\\_Survive\\_As\\_A\\_Psychotherapist.pdf](https://auld.rmjm.com/results/publication/default.aspx/How_To_Survive_As_A_Psychotherapist.pdf)

## **Table of Contents Land Use Planning Abstracts Volume 4**

1. Understanding the eBook Land Use Planning Abstracts Volume 4
  - The Rise of Digital Reading Land Use Planning Abstracts Volume 4
  - Advantages of eBooks Over Traditional Books
2. Identifying Land Use Planning Abstracts Volume 4
  - Exploring Different Genres
  - Considering Fiction vs. Non-Fiction
  - Determining Your Reading Goals
3. Choosing the Right eBook Platform
  - Popular eBook Platforms
  - Features to Look for in an Land Use Planning Abstracts Volume 4
  - User-Friendly Interface
4. Exploring eBook Recommendations from Land Use Planning Abstracts Volume 4
  - Personalized Recommendations
  - Land Use Planning Abstracts Volume 4 User Reviews and Ratings
  - Land Use Planning Abstracts Volume 4 and Bestseller Lists
5. Accessing Land Use Planning Abstracts Volume 4 Free and Paid eBooks

- Land Use Planning Abstracts Volume 4 Public Domain eBooks
- Land Use Planning Abstracts Volume 4 eBook Subscription Services
- Land Use Planning Abstracts Volume 4 Budget-Friendly Options
- 6. Navigating Land Use Planning Abstracts Volume 4 eBook Formats
  - ePub, PDF, MOBI, and More
  - Land Use Planning Abstracts Volume 4 Compatibility with Devices
  - Land Use Planning Abstracts Volume 4 Enhanced eBook Features
- 7. Enhancing Your Reading Experience
  - Adjustable Fonts and Text Sizes of Land Use Planning Abstracts Volume 4
  - Highlighting and Note-Taking Land Use Planning Abstracts Volume 4
  - Interactive Elements Land Use Planning Abstracts Volume 4
- 8. Staying Engaged with Land Use Planning Abstracts Volume 4
  - Joining Online Reading Communities
  - Participating in Virtual Book Clubs
  - Following Authors and Publishers Land Use Planning Abstracts Volume 4
- 9. Balancing eBooks and Physical Books Land Use Planning Abstracts Volume 4
  - Benefits of a Digital Library
  - Creating a Diverse Reading Collection Land Use Planning Abstracts Volume 4
- 10. Overcoming Reading Challenges
  - Dealing with Digital Eye Strain
  - Minimizing Distractions
  - Managing Screen Time
- 11. Cultivating a Reading Routine Land Use Planning Abstracts Volume 4
  - Setting Reading Goals Land Use Planning Abstracts Volume 4
  - Carving Out Dedicated Reading Time
- 12. Sourcing Reliable Information of Land Use Planning Abstracts Volume 4
  - Fact-Checking eBook Content of Land Use Planning Abstracts Volume 4
  - Distinguishing Credible Sources
- 13. Promoting Lifelong Learning
  - Utilizing eBooks for Skill Development

- Exploring Educational eBooks

#### 14. Embracing eBook Trends

- Integration of Multimedia Elements
- Interactive and Gamified eBooks

### **Land Use Planning Abstracts Volume 4 Introduction**

Free PDF Books and Manuals for Download: Unlocking Knowledge at Your Fingertips In today's fast-paced digital age, obtaining valuable knowledge has become easier than ever. Thanks to the internet, a vast array of books and manuals are now available for free download in PDF format. Whether you are a student, professional, or simply an avid reader, this treasure trove of downloadable resources offers a wealth of information, conveniently accessible anytime, anywhere. The advent of online libraries and platforms dedicated to sharing knowledge has revolutionized the way we consume information. No longer confined to physical libraries or bookstores, readers can now access an extensive collection of digital books and manuals with just a few clicks. These resources, available in PDF, Microsoft Word, and PowerPoint formats, cater to a wide range of interests, including literature, technology, science, history, and much more. One notable platform where you can explore and download free Land Use Planning Abstracts Volume 4 PDF books and manuals is the internet's largest free library. Hosted online, this catalog compiles a vast assortment of documents, making it a veritable goldmine of knowledge. With its easy-to-use website interface and customizable PDF generator, this platform offers a user-friendly experience, allowing individuals to effortlessly navigate and access the information they seek. The availability of free PDF books and manuals on this platform demonstrates its commitment to democratizing education and empowering individuals with the tools needed to succeed in their chosen fields. It allows anyone, regardless of their background or financial limitations, to expand their horizons and gain insights from experts in various disciplines. One of the most significant advantages of downloading PDF books and manuals lies in their portability. Unlike physical copies, digital books can be stored and carried on a single device, such as a tablet or smartphone, saving valuable space and weight. This convenience makes it possible for readers to have their entire library at their fingertips, whether they are commuting, traveling, or simply enjoying a lazy afternoon at home. Additionally, digital files are easily searchable, enabling readers to locate specific information within seconds. With a few keystrokes, users can search for keywords, topics, or phrases, making research and finding relevant information a breeze. This efficiency saves time and effort, streamlining the learning process and allowing individuals to focus on extracting the information they need. Furthermore, the availability of free PDF books and manuals fosters a culture of continuous learning. By removing financial barriers, more people can access educational resources and pursue lifelong learning, contributing to personal growth and professional development. This democratization of knowledge promotes

intellectual curiosity and empowers individuals to become lifelong learners, promoting progress and innovation in various fields. It is worth noting that while accessing free Land Use Planning Abstracts Volume 4 PDF books and manuals is convenient and cost-effective, it is vital to respect copyright laws and intellectual property rights. Platforms offering free downloads often operate within legal boundaries, ensuring that the materials they provide are either in the public domain or authorized for distribution. By adhering to copyright laws, users can enjoy the benefits of free access to knowledge while supporting the authors and publishers who make these resources available. In conclusion, the availability of Land Use Planning Abstracts Volume 4 free PDF books and manuals for download has revolutionized the way we access and consume knowledge. With just a few clicks, individuals can explore a vast collection of resources across different disciplines, all free of charge. This accessibility empowers individuals to become lifelong learners, contributing to personal growth, professional development, and the advancement of society as a whole. So why not unlock a world of knowledge today? Start exploring the vast sea of free PDF books and manuals waiting to be discovered right at your fingertips.

### **FAQs About Land Use Planning Abstracts Volume 4 Books**

How do I know which eBook platform is the best for me? Finding the best eBook platform depends on your reading preferences and device compatibility. Research different platforms, read user reviews, and explore their features before making a choice. Are free eBooks of good quality? Yes, many reputable platforms offer high-quality free eBooks, including classics and public domain works. However, make sure to verify the source to ensure the eBook credibility. Can I read eBooks without an eReader? Absolutely! Most eBook platforms offer webbased readers or mobile apps that allow you to read eBooks on your computer, tablet, or smartphone. How do I avoid digital eye strain while reading eBooks? To prevent digital eye strain, take regular breaks, adjust the font size and background color, and ensure proper lighting while reading eBooks. What the advantage of interactive eBooks? Interactive eBooks incorporate multimedia elements, quizzes, and activities, enhancing the reader engagement and providing a more immersive learning experience. Land Use Planning Abstracts Volume 4 is one of the best book in our library for free trial. We provide copy of Land Use Planning Abstracts Volume 4 in digital format, so the resources that you find are reliable. There are also many Ebooks of related with Land Use Planning Abstracts Volume 4. Where to download Land Use Planning Abstracts Volume 4 online for free? Are you looking for Land Use Planning Abstracts Volume 4 PDF? This is definitely going to save you time and cash in something you should think about. If you trying to find then search around for online. Without a doubt there are numerous these available and many of them have the freedom. However without doubt you receive whatever you purchase. An alternate way to get ideas is always to check another Land Use Planning Abstracts Volume 4. This method for see exactly what may be included and adopt these ideas to

your book. This site will almost certainly help you save time and effort, money and stress. If you are looking for free books then you really should consider finding to assist you try this. Several of Land Use Planning Abstracts Volume 4 are for sale to free while some are payable. If you arent sure if the books you would like to download works with for usage along with your computer, it is possible to download free trials. The free guides make it easy for someone to free access online library for download books to your device. You can get free download on free trial for lots of books categories. Our library is the biggest of these that have literally hundreds of thousands of different products categories represented. You will also see that there are specific sites catered to different product types or categories, brands or niches related with Land Use Planning Abstracts Volume 4. So depending on what exactly you are searching, you will be able to choose e books to suit your own need. Need to access completely for Campbell Biology Seventh Edition book? Access Ebook without any digging. And by having access to our ebook online or by storing it on your computer, you have convenient answers with Land Use Planning Abstracts Volume 4 To get started finding Land Use Planning Abstracts Volume 4, you are right to find our website which has a comprehensive collection of books online. Our library is the biggest of these that have literally hundreds of thousands of different products represented. You will also see that there are specific sites catered to different categories or niches related with Land Use Planning Abstracts Volume 4 So depending on what exactly you are searching, you will be able to choose ebook to suit your own need. Thank you for reading Land Use Planning Abstracts Volume 4. Maybe you have knowledge that, people have search numerous times for their favorite readings like this Land Use Planning Abstracts Volume 4, but end up in harmful downloads. Rather than reading a good book with a cup of coffee in the afternoon, instead they juggled with some harmful bugs inside their laptop. Land Use Planning Abstracts Volume 4 is available in our book collection an online access to it is set as public so you can download it instantly. Our digital library spans in multiple locations, allowing you to get the most less latency time to download any of our books like this one. Merely said, Land Use Planning Abstracts Volume 4 is universally compatible with any devices to read.

#### **Find Land Use Planning Abstracts Volume 4 :**

**how to survive as a psychotherapist**

**manual alcatel temporis 700 espanol**

~~walther ppk-s co2 bb-gun owners manual~~

*aprilia 150cc scooter service manual*

~~labyrinths selected stories and other writings~~

**trane zone controller manual**

science research paper outline sample



**2000 ford ranger repair manual**

operating manual audi a6 avant

**the rusty nail august 2012**

~~natures building blocks an a z guide to the elements~~

**spanish learning guide**

~~suzuki f10a engine manual~~

germany since 1815

*1970 mgb service manual*

### **Land Use Planning Abstracts Volume 4 :**

NFPA 1407 Standard Development This standard specifies the basic training procedures for fire service personnel to conduct fire fighter rapid intervention operations so as to promote fire ... NFPA 1407 Standard Development This standard specifies the basic training procedures for fire service personnel to conduct fire fighter rapid intervention operations so as to promote fire ... Free access NFPA codes and standards NFPA is proud to have been the first organization to provide free public access to privately developed codes and standards, and are pleased to see other ... NFPA 1407, Standard for Training Fire Service Rapid ... NFPA 1407, Standard for Training Fire Service Rapid Intervention Crews (2020). SKU: 140720PDF. List Price: USD \$149.00. For Members: USD \$134.10. Edition. NFPA 1400 Standard Development Standard on Fire Service Training ... Please note: NFPA 1400 is in a custom cycle due to the Emergency Response and Responder Safety Document Consolidation Plan ( ... RAPID INTERVENTION CREW TECHNICIAN & LEADER Skills listed in this packet are consistent with NFPA 1407: Standard for Training Fire Service Rapid Intervention Crews, · 2015 edition. The Alaska Fire ... NFPA Standards: NFPA 1407: Updates for Better RIC Training Oct 1, 2020 — rapid-intervention operations training program; required performance for RIT crews. The standard was revised in 2015 and, now, in 2020. Each ... Rapid Intervention Crew (RIC) NFPA 1407, 2020 Standard for Training Fire Service Rapid Intervention Crews ... Toll Free 800-634-7854. Contact OSFM · Employee Directory · Careers at OSFM Military Specification for Fire Extinguishing Agent, Fluorine- ... Jan 12, 2023 — This specification covers fluorine-free (see 6.5.6) foam (F3) liquid concentrate fire extinguishing agents intended for use on class B ... RAPID INTERVENTION TEAM - National Fire Academy NFPA 1407, Standard for Training Fire Service Rapid Intervention Crews (2015) recommends that all departments have written RIT procedures that are reinforced by ... 1984-1993-factory-service-manual.pdf ... free cloth. They must be kept spotlessly clean. Connecting rod bearing oil clearance check. 3 Clean the back side of the new upper bearing insert, then lay ... Jeep Service Manuals May 29, 2012 — Here is a site with PDF format Mopar - Chrysler OEM parts catalogs for your year XJ. These are handy because they show exploded views of every ... Repair

Manuals & Literature for 1992 Jeep Cherokee Get the best deals on Repair Manuals & Literature for 1992 Jeep Cherokee when you shop the largest online selection at eBay.com. Free shipping on many items ... Free online repair manuals? : r/MechanicAdvice Key word being "free." Looking for a source that would have a library of factory repair manuals - the kind technicians would actually use ... factory service repair manual madness Jun 10, 2016 — I have some manuals below. You'll notice that the 1995 manual covers Cherokee and Wrangler. The 2000 manual only covers the Cherokee. I believe ... Jeep Cherokee Repair & Service Manuals (740 PDF's Jeep Cherokee service PDF's covering routine maintenance and servicing; Detailed Jeep Cherokee Engine and Associated Service Systems (for Repairs and Overhaul) ... 1992 Service Manual? Oct 25, 2008 — If you want a reasonable book that will show you much of what you need to know for maintenance, some rebuild & repairs, and especially for those ... Free Online Auto Repair Manuals and Wiring Diagrams Download free Jeep repair manuals [pdf] for do-it-yourselfers. Each Jeep repair manual contains the detailed description of works and wiring diagrams... JEEP Cherokee XJ 1992-1996 Factory Workshop Manual Complete shop manual with easy, step by step instructions for the DIY mechanic or professional technician to help maintain, repair or restore the JEEP Cherokee ... Jeep Cherokee 1984-2001 Workshop Repair Manual ... Official Jeep Cherokee Workshop Manual is the complete Service Repair Information System containing comprehensive illustrations and Wiring diagrams, accurate, ... 2023 Judges course? I'm struggling with "How many no reps? 3a". Obviously, his elbows aren't forward on some cleans, and he doesn't reach hip extension on some ... Judges Test [Archive] Feb 28, 2013 — Has any finished the online Judges training yet? I have started but I got stuck on the test in Module 4. Just wondering if anyone else had ... ONLINE JUDGES COURSE....EEEEK!!! Mar 3, 2013 — The online judge's course is an idea with good intentions. Take the course and BAM!, you are ready to judge anyone. Unfortunately, mistakes will ... The CrossFit judges course is worthless? - YouTube Guidelines For Being a Judge at the CrossFit Open - YouTube CrossFit Judges Under Fire - YouTube The CrossFit Open... all your questions answered! Oct 3, 2019 — Who judges it? All of the coaches and many of our members are verified judges. They will have taken the online CrossFit Judge certificate and ... How To Judge At A CrossFit Competition Jun 22, 2021 — Ask questions at the briefing if unsure of anything; Introduce yourself to the individual or team you are judging; You will need a score sheet ... What it's like to judge CrossFit Competitions Jun 12, 2021 — Matt is one of those judges who is able to still keep it fun. He loves CrossFit and training but also when he's judging he is clear and fair.