

FEBRUARY

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**ENGINEERING
TECHNICAL
COMMUNICATIONS
WEEK #5
LESSON 1**

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Announcements



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Assignment #1: Project Problem Description

Due Friday, Feb 17

For additional context and information, remember to read:

**Project Planning:
Introduction to the Four
Smart Design Lenses**



RECAP

LAST CLASS

- Academic Integrity
- Research/Evaluating Sources
- Citing and Referencing

Today:

- Citing and Referencing Practice
- Incorporating Sources
 - Paraphrase
 - Building Credible Arguments

CITING AND REFERENCING PRACTICE

Let's try to generate an accurate IEEE-style reference entry.

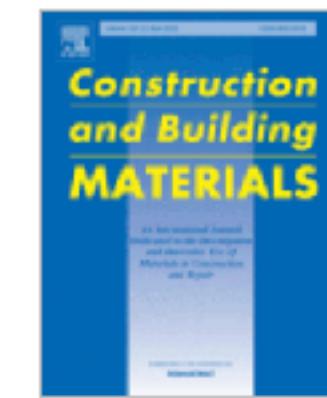


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Construction and Building Materials

Volume 329, 25 April 2022, 127139



Review

A review of electrically conductive concrete heated pavement system technology: From the laboratory to the full-scale implementation

Md Lutfor Rahman ^a , Amir Malakooti ^a , Halil Ceylan PhD ^b , Sunghwan Kim PhD ^d , Peter C. Taylor PhD ^c

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Kahoot!

So, what do we know?

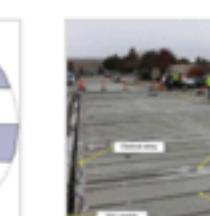
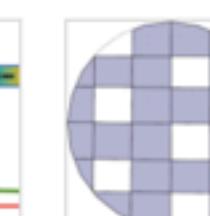
- **Type of source:** Journal Article
- **Article title:** A review of electrically conductive concrete heated pavement system technology: From the laboratory to the full-scale implementation,
- **Journal Title:** Construction and Building Materials,
- **Authors:** M. L. Rahman, A. Malakooti, H. Ceylan, S. Kim, and P. C. Taylor
- **Volume:** 329
- **Date and Year:** April 2022
- **DOI:** <https://doi.org/10.1016/j.conbuildmat.2022.127139>

Periodicals

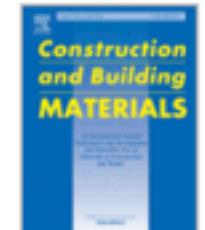
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[#] Author, “Title,” *Journal*, volume, number, page range, month year, DOI.

[7] K. M. Bivens and K. Cole, “The grotesque protest in social media as embodied, political rhetoric,” *Journal of Communication Inquiry*, vol. 42, no. 1, pp. 5-25, Jan. 2018, doi: 10.1177/0196859917735650.

[View PDF](#)[Download full issue](#)[Outline](#)[Highlights](#)[Abstract](#)[Keywords](#)[Abbreviations](#)[1. Introduction](#)[2. Resistive heating](#)[3. Influencing material related factors on the perf...](#)[4. Performance testing of ECON in laboratory](#)[5. Application of advanced concrete technology in...](#)[6. Full-scale implementation of ECON](#)[7. Application of ECON resistive heating technolo...](#)[8. Challenges and future recommendations](#)[9. Conclusions](#)[Declaration of Competing Interest](#)[Acknowledgments](#)[References](#)[Show full outline ▾](#)[Cited By \(4\)](#)[Figures \(9\)](#)[Abstract](#)[View PDF](#)[Download full issue](#)**Construction and Building Materials**

Volume 329, 25 April 2022, 127139



A review of electrically conductive concrete heated pavement system technology: From the laboratory to the full-scale implementation

Md Lutfor Rahman ^a , Amir Malakooti ^a , Halil Ceylan PhD ^b , Sunghwan Kim PhD ^d , Peter C. Taylor PhD ^c

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Highlights

- Reviewed electrically conductive concrete (ECON) heated [pavement system \(HPS\)](#) technology.
- Discussed the material-related factors influencing the performance of ECON HPS.
- Analyzed all full-scale ECON HPS projects.
- Identified the challenges that ECON HPS technology needs to overcome.

Recommended articles

[The experimental study on the correlation of resistivity and damage for conductive...](#)

Cement and Concrete Composites, Volume 67, 2016, ...

Hong-yan Chu, Jian-kang Chen

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[Influence of mix design variables on engineering properties of carbon fiber-...](#)

Construction and Building Materials, Volume 152, 201...

Alireza Sassani, ..., Peter C. Taylor

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[Steel fiber confined graphite concrete for pavement deicing](#)

Composites Part B: Engineering, Volume 155, 2018, p...

Rui Rao, ..., Chunhui Liu

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Article Metrics

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Citation Indexes:

4

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- [114] D.D. Chung, Dispersion of Short Fibers in Cement, *J. Mater. Civ. Eng.* 17 (2005) 379–383, [https://doi.org/10.1061/\(asce\)0889-1561\(2005\)17:4\(379\)](https://doi.org/10.1061/(asce)0889-1561(2005)17:4(379)).
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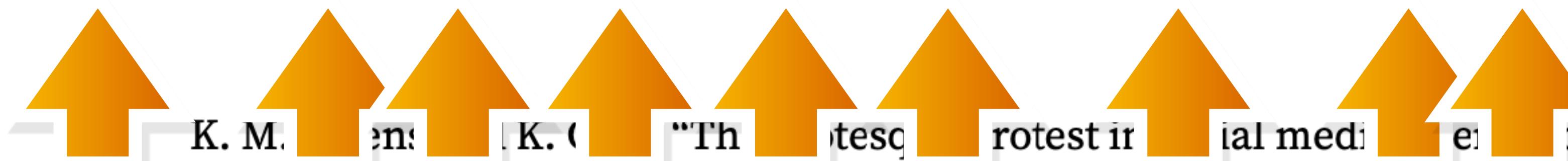


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- **Page range:** 1-19

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[#] Author, "Title," *Journal*, volume, number, page range, month year, DOI.



K. M. Jensen, "The protest rhetoric in traditional media and political
rhetoric," *Journal of Communication Inquiry*, vol. 42, no. 1, pp. 5-25, Jan. 2018, doi:
[10.1177/0196859917735650](https://doi.org/10.1177/0196859917735650).

- [1] M. L. Rahman, A. Malakooti, H. Ceylan, S. Kim, and P. C. Taylor, “A review of electrically conductive concrete heated pavement system technology: From the laboratory to the full-scale implementation,” *Construction and Building Materials*, vol. 329, pp. 1-19, Apr. 2022, doi: 10.1016/j.conbuildmat.2022.127139.

INCORPORATING SOURCES

You have two options:

1. Direct quotation
2. Indirect citation

- Direct quotations require quotation marks
- Indirect citation required paraphrase
- *Both* require a parenthetical (in-text) citation

Incorporating Sources: Direct Quotation

General rule: Excerpts of **three or more successive words taken directly from the source text** must be denoted with quotation marks and followed by a citation with page number. Longer quotations should be formatted as a block quote.

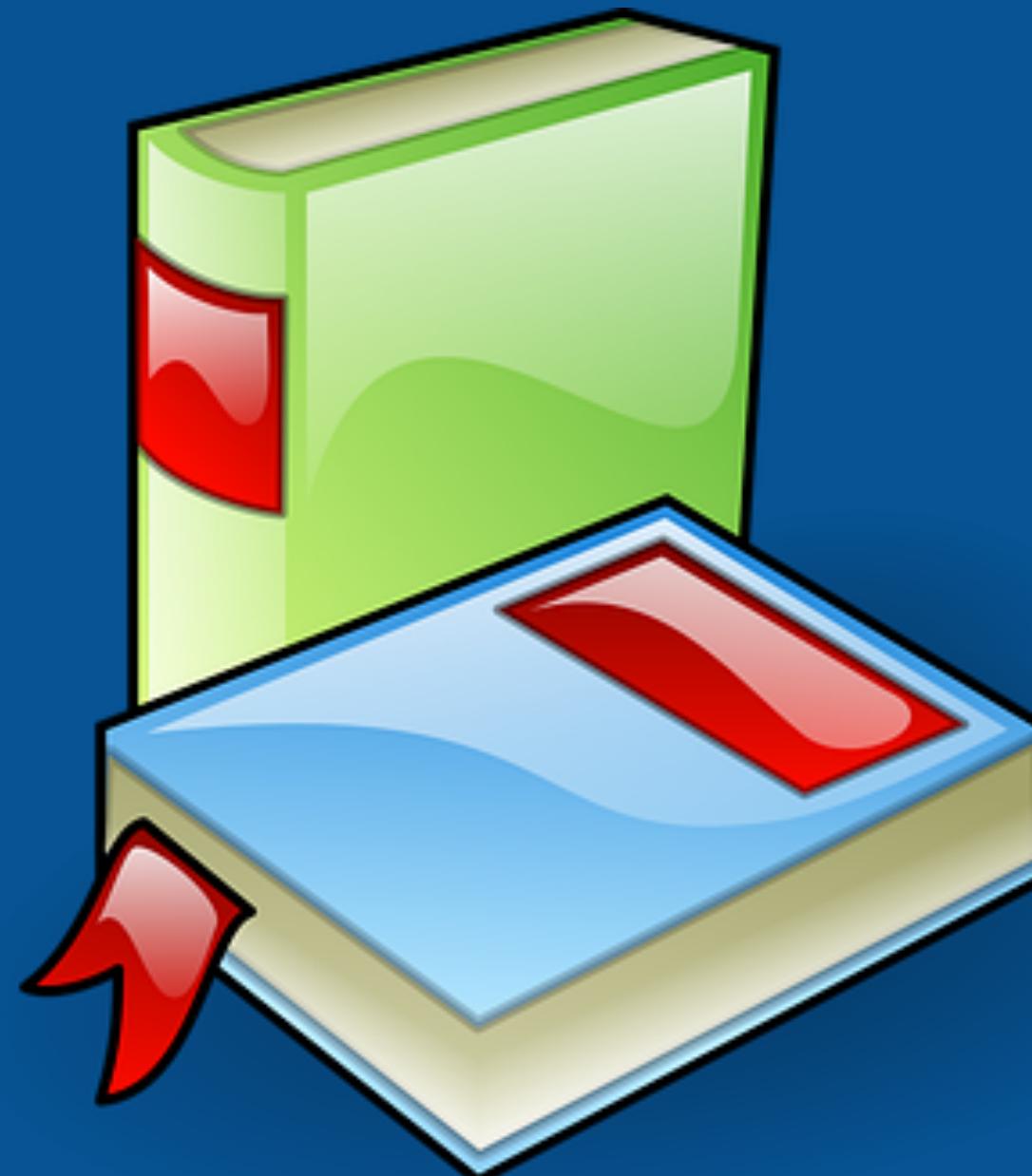
Example of an IEEE citation for a direct quote:

- In order to reduce the emissions from cars in the USA, regulations have been introduced in many states. For example, “in California, 2% of each major car manufacturer's sales must be zero-emission vehicles in 2002, increasing to 5% in 2005 and 10% in 2007” [9, p.103].

Incorporating Sources: Paraphrase

Paraphrasing:

- Presenting the ideas of your source material in your own words, followed by a citation.



READ & PROCESS



LOOK AWAY



WRITE IN YOUR
OWN WORDS

Paraphrase Examples

Original:

(from “Effects of Robotic Knee Exoskeleton on Human Energy Expenditure”):

Our results show that using the robotic knee exoskeleton significantly reduces physiological responses during squatting if an appropriate control approach is applied.

“Our results show that using the robotic knee exoskeleton significantly reduces physiological responses during squatting if an appropriate control approach is applied.”

“Gams et al. (2013) showed that an assistive exoskeleton device definitely lowers physiological demands while squatting, provided a reasonable control scheme is used.”



Substitution of synonyms but keeping original word order is plagiarism.

“Our results show that using the robotic knee exoskeleton significantly reduces physiological responses during squatting if an appropriate control approach is applied.”

“Gams et al. (2013) showed that if an appropriate control approach is applied, physiological responses during squatting are significantly reduced when using a robotic knee exoskeleton.”



Modifying the sentence structure but keeping original language is plagiarism.

“Our results show that using the robotic knee exoskeleton significantly reduces physiological responses during squatting if an appropriate control approach is applied.”

“Gams et al. (2013) performed experiments with users performing a squatting motion while using a knee-based assistive exoskeleton device with different control schemes. A reduction in physiological responses was achieved for some, but not all, control schemes.”

Changing the sentence structure and wording is necessary to avoid plagiarism.



DEVELOPING CREDIBLE ARGUMENTS

Structure of an Argument

1. **Claim:** Asserts that an idea is true, applicable, or relevant.
May be a recommendation, a point of analysis, an interpretation of data, or an hypothesis.
2. **Justification:** For the claim to be believable, it requires clear explanation and logical reasoning (how the claim is built from facts).
3. **Evidence:** Scientific objective data, testing, modelling, scientific or mathematical principles, prior design, research.

Engineering Arguments

What claim do I want my audience to understand, accept, use, or do?

- What support does it need?

(The claim does not stand alone)

- Can the claim go first?

(Claim-first is strongest)

Does my argument help the reader understand or accept?

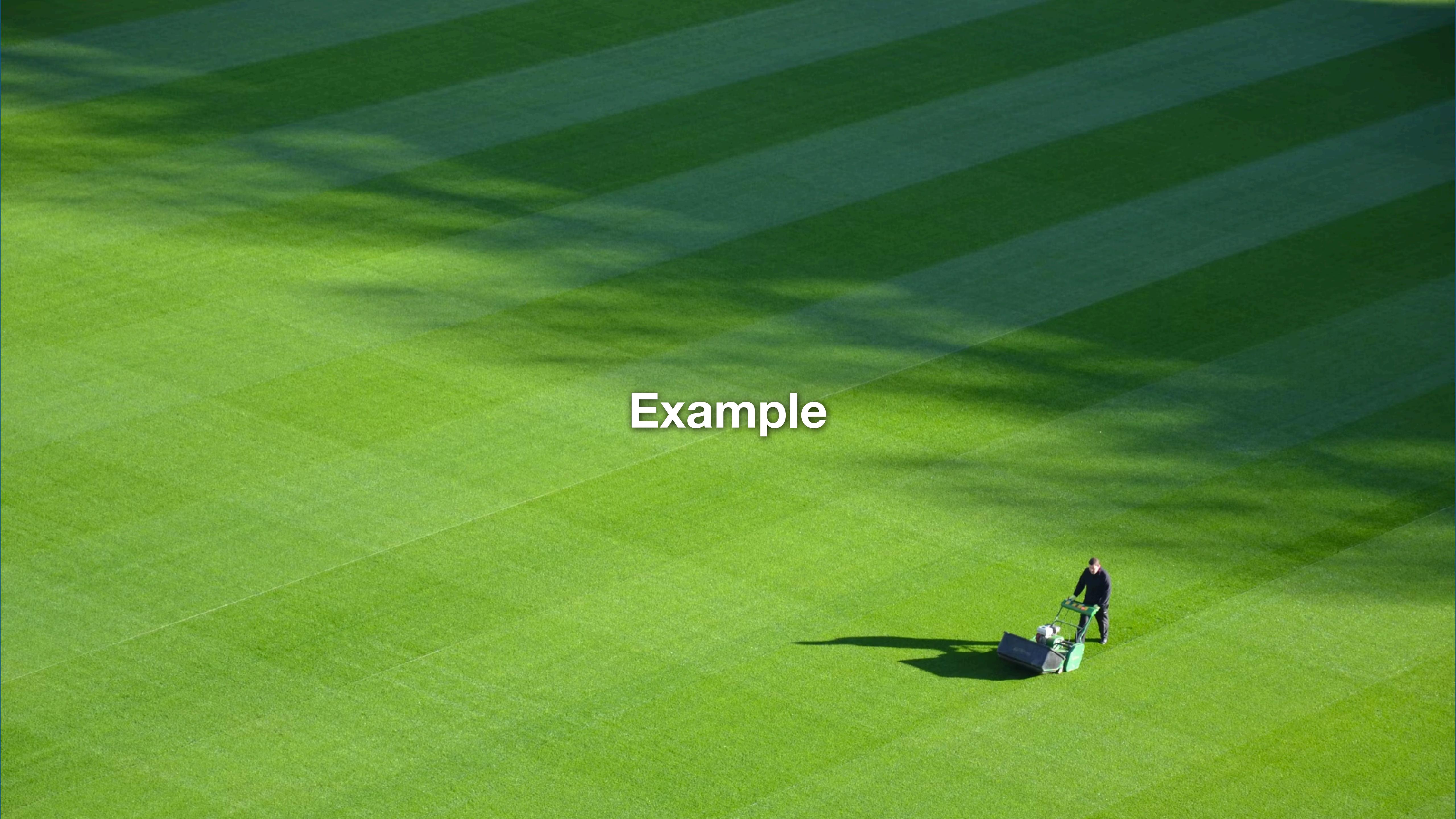
- Does the argument answer “So what?” as well as “What?”

(Interpretation is more valuable than analysis)

Have I built trust?

- Have I demonstrated credibility and humanity (logos, ethos, pathos)?

(Logic is best, but rarely works alone)

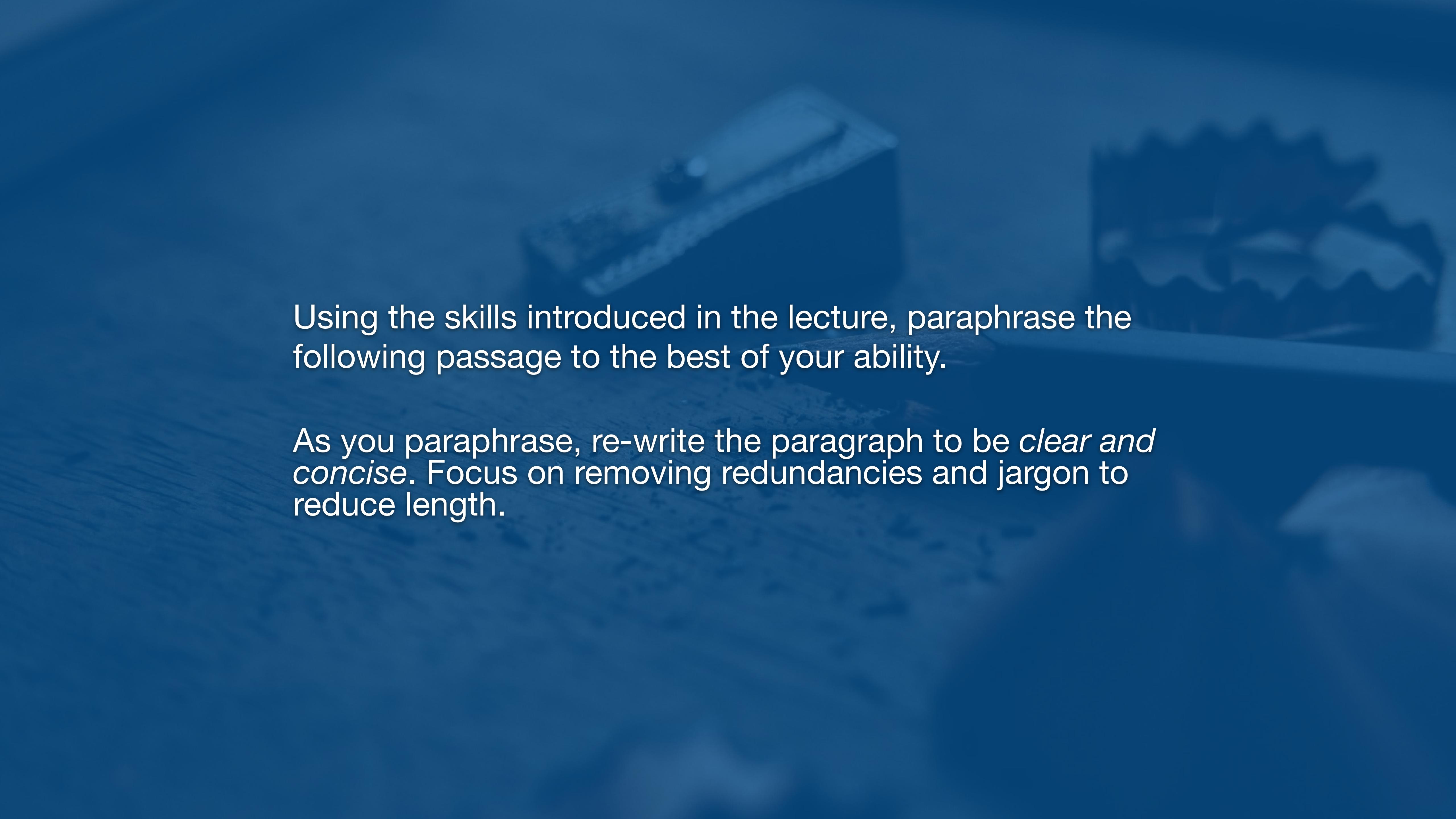


Example

1. **Claim:** Electric battery-powered lawnmowers are better for the planet than gasoline-powered lawnmowers.
2. **Justification:** Battery-powered lawnmowers generate less noise and produce significantly less airborne pollution at the site of use and the site of energy generation.
3. **Evidence:** According to a 2018 study from the University of Texas, ambient noise levels on a public lawn during routine municipal lawn maintenance in Austin measured ... [1]. According to a series of studies in Ontario in 2021, on average, 1 kilowatt-hour of municipal electricity requires the production of x tonnes of carbon dioxide equivalent (tCO₂e), while the equivalent amount of energy derived from the combustion of gasoline produces $2x$ (tCO₂e).

Electric battery-powered lawnmowers are better for the planet than gasoline-powered lawnmowers. Battery-powered lawnmowers generate less noise and produce significantly less airborne pollution at the site of use and the site of energy generation. According to a 2018 study from the University of Texas, ambient noise levels on a public lawn during routine municipal lawn maintenance in Austin measured ... [1]. According to a series of studies in Ontario in 2021, on average, 1 kilowatt-hour of municipal electricity requires the production of x tonnes of carbon dioxide equivalent (tCO₂e), while the equivalent amount of energy derived from the combustion of gasoline produces 2 x (tCO₂e) [2].

In-Class Exercise #2: Paraphrase

The background of the slide is a blue-tinted photograph of a landscape. It features a winding road or path leading through a valley, with mountains visible in the distance under a hazy sky.

Using the skills introduced in the lecture, paraphrase the following passage to the best of your ability.

As you paraphrase, re-write the paragraph to be *clear and concise*. Focus on removing redundancies and jargon to reduce length.

Rewriting and Paraphrasing Exercise

The first phase of the environmental site assessment (ESA) has now revealed at this time significant measured levels of arsenic in the soil of 20 parts per billion on the property. It is estimated that if these levels are not remediated to within the appropriate standards of 10 parts per billion, that the additional cancer risk to the residents living nearby in the area would be 1 in 1000. Several ideas have been proposed for the remediation of the soil. The only single solution that is expected to reduce the arsenic levels to the desired acceptable value of 10 ppb is the ‘dig and dump’ solution which involves removing the soil on the property and replacing it with fresh, uncontaminated fill (~0 parts per billion). This will require significant time and resources to complete. This will also be an expensive option with an estimated cost of \$25,000. On the other hand, other options have been proposed and may be appropriate if the property is not used for commercial or residential purposes and is instead converted to a parking lot or similarly paved structure, but this might be pushing our luck.