

STUDY OF GROUND SOURCE HEAT PUMP AS COOLING SYSTEM
FOR LOCAL APPLICATIONS

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SUPERVISOR'S DECLARATION

I hereby declare that I have checked this project and in my opinion, this project is adequate in terms of scope and quality for the award of the degree of Bachelor of Mechanical Engineering.

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I hereby declare that the work in this project is my own except for quotations and summaries which have been duly acknowledged. The project has not been accepted for any degree and is not concurrently submitted for award of other degree.

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LIST OF SYMBOLS

| | |
|--------------------------------|---|
| A_s | Soil temperature amplitude , K |
| α | Soil thermal diffusivity , W/m.k |
| C_p | Specific heat , J/kg.k |
| h | Enthalpy , KJ/kg |
| K | Thermal conductivity , W/m.k |
| L | Coils length , m |
| p | Preassure , Pa |
| \dot{Q}_{cond} | Heat conduction , kW |
| s | Enthropy , kJ/kg |
| T | Temperature , K |
| $T_{\text{in}}-T_{\text{out}}$ | Temperature difference between temperature inlet and temperature outlet , K |
| $T_{g \text{ max}}$ | Maximum soil temperature , K |
| X_s | Soil depth , m |

LIST OF ABBREVIATIONS

| | |
|-----------------------------------|--|
| A/C | Air conditioning |
| ASHP | Air source heat pump |
| ASHRAE | American Society of Heating, Refrigerating and Air- conditioning |
| ASME | American Society of Mechanical Engineering |
| CF ₃ CH ₂ F | Tetrafluoroethane |
| CFCs | Chlorofluorocarbon |
| COP | Coefficient of performance |
| EESs | Earth –energy systems |
| GCHP | Ground-coupled heat pump |
| GSHP | Ground source heat pump |
| GWHP | Ground water heat pump |
| HDPE | High-density polyethylene |
| SDR | Standard Dimension Ratio |
| SWHP | Surface water heat pump |
| USA | United States Of America |

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