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NET ZERO READY OR ULTRA-EFFICIENT
COMMUNITY SCALE DEVELOPMENTS

MARKHAM GEOTHERMAL COMMUNITY

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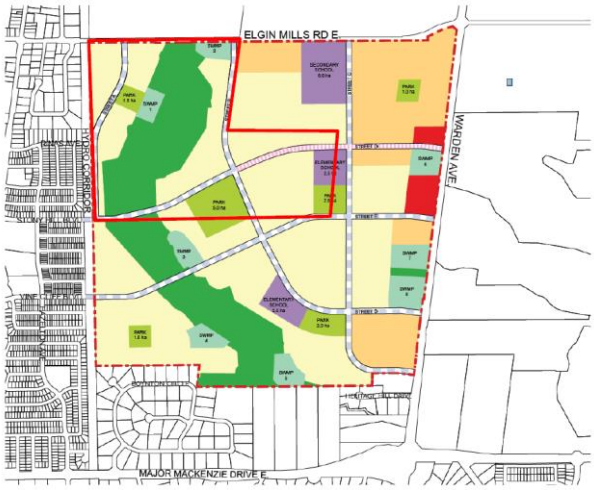
PROJECT OVERVIEW

- LOCATION: MARKHAM ONTARIO
- NUMBER OF RESIDENCES: 300
- PRODUCT TYPE: MIXED
- DISTRICT GEOTHERMAL HEATING AND COOLING SYSTEM



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TARGETED PRODUCT SPECS

- CEILING /ROOF : R60 BLOWN IN
- ABOVE GRADE WALL: 2X6 @ 19.2" O.C. w/ R22 BATTS + R10 Ci
- WINDOWS: U VALUE 1.1 $W/m^2.K$ – SHGC: 0.40 (Triples)
- BASEMENT WALL: 2X4 @ 24" O.C. w/ R14 BATTS + R10 Ci
- SLAB: R10 UNDER SLAB w/ R10 AT SLAB EDGE
- AIR TIGHTNESS- ACH 50 OR NLR: MIN. 1.5 ACH (2.0 for attached) @ 50 Pa
- HEATING: GEOTHERMAL
- COOLING: GEOTHERMAL
- DOMESTIC HOT WATER: GEOTHERMAL
- VENTILATION: ERV w/ 67% SRE + ECM MOTOR

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WHAT PROMPTED THE INITIAL IDEA TO DEVELOP A LOW LOAD COMMUNITY?

1. OFFER A LOW CARBON ALTERNATIVE TO CONVENTIONAL HEATING AND COOLING SYSTEMS THAT COULD TAKE ADVANTAGE OF ECONOMIES OF SCALE AND A SHARED RESOURCE.
2. CHANGE THE WAY IN WHICH THE RESIDENTIAL CONSUMER RECEIVES SERVICES AND REMOVES THE NEED FOR MAINTENANCE OF HEATING AND COOLING EQUIPMENT ON THEIR PART
3. TURN BASEMENTS INTO COMFORTABLE AND USABLE LIVING SPACES AND ELIMINATE THE CONVENTIONAL FURNACE ROOM

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PRELIMINARY WORK

1. 2 YEARS PLUS SPENT DOING RESEARCH AND PREPARATION
2. PARTNERED WITH THE CITY OF MARKHAM, ENWAVE, RDH AND BKC AS WELL AS OTHER MATTAMY TRADES AND CONSULTANTS
3. PILOTED DUAL ZONE DUCTWORK, AEROBARRIER, MINI DUCT HVAC SYSTEM. CONSTRUCTED MOCK UPS OF 2 SOLAR PV TECHNOLOGIES. USED ONGOING TESTING AND MODIFICATION OF HVAC DESIGN AND INSTALLATION. PARTICIPATED IN ecoEII NET-ZERO PROJECT (5 NZ HOMES BUILT IN CALGARY)
4. BASED ON 5 NET ZERO HOMES BUILT WE LEARNED THAT PROPER DELIGENGE WITH PERFORMANCE MONITORING IS CRITICAL AS IS BUILDER, TRADE, AND HOMEOWNER UNDERSTANDING OF THE OPERATION OF HVAC EQUIPMENT…UNLESS THE RESPONSIBILITY FOR OPERATION OF THAT EQUIPMENT CAN BE TAKEN AWAY FROM THE HOME OWNER.

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KEY TECHNOLOGIES

IDENTIFY 4 KEY TECHNOLOGIES OR PROCESS THAT ARE CRITICAL TO ACHIEVING YOUR GOALS FOR THE COMMUNITY?

1. BUILDING ENVELOPE SYSTEMS
2. BUILDING SIDE GEOTHERMAL HEAT PUMP EQUIPMENT AND DISTRIBUTION SYSTEM
3. GEOTHERMAL SITE INFRASTRUCTURE
4. CUSTOMER INTERFACE

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TECHNOLOGY OR PROCESS OPPORTUNITIES

WHAT ARE YOU KEEPING AN EYE ON AS PROMISING FUTURE TECHNOLOGY OR PROCESS OPPORTUNITIES THAT COULD MAKE THESE PROJECTS EASIER AND AFFORDABLE? …

1. EXTERNAL AIR BARRIER VAPOUR BARRIER SYSTEMS
2. HEAT PUMP TECHNOLOGIES
3. PREFABRICATED OR PANELIZED HIGH PERFORMANCE WALL SYSTEMS
4. BIPV
5. MORE AFFORDABLE AND EFFICIENT TECHNOLOGIES WHICH HELP REDUCE ELECTRICITY CONSUMPTION

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OPPORTUNITIES FOR FUTURE DEVELOPMENT

IF NZ COMMUNITIES ARE GOING TO BECOME MAIN-STREAM, WHAT TECHNOLOGIES OR CONCEPTS NEED FURTHER DEVELOPMENT ? …

1. CUSTOMER FACING TECHNOLOGIES THAT ALLOW STRAIGHTFORWARD AND REALTIME MEASUREMENT OF ENERGY USE (AND PRICE.)
2. BETTER ENERGY EFFICIENT AND WATER EFFICIENT FIXTURES AND APPLIANCES
3. BETTER DRAIN WATER HEAT RECOVERY
4. RAINWATER HARVESTING AND GREY WATER RECYCLING

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CHANGES TO HELP WITH ADOPTION

WHAT BUILDING CODES, INFRUSTRUCTURE DESIGN OR PLANNING PROTOCOLS NEED TO CHANGE FOR LOW LOAD, NZ COMMUNITES TO BECOME THE "NORM"?

POLICY FRAMEWORK FROM GOVERNMENT AND FINANCIAL INSTITUTIONS WHICH INCENTIVIZES BUILDERS AS WELL AS CONSUMERS TO BUILD AND PURCHASE NET ZERO OR NET ZERO READY HOMES:

REDUCED DEVELOPMENT FEES

DENSITY BONUSING

EXPEDITED APPROVALS

CONSUMER SIDE REBATES AND INCENTIVES (SIMPLE REBATES OR LOW INTEREST FINANCING)

UTILITY COMPANY POLICIES TO FACILITATE MICROPOWER AND OR NET METERING

ENERGY EFFICIENCY REQUIREMENTS WITHIN BUILDING CODES

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LESSONS

WHAT 2 PIECES OF CRITICAL WISDOM WOULD YOU IMPART TO BUILDERS/DEVELOPERS WHO ARE CONSIDERING COMMUNITY SCALE DEVELOPMENT?

1. WORK IN PARTNERSHIP WITH THE MUNICIPALITY AND LOCAL UTILITIES
2. ENGAGE TECHNICAL ADVISORS, ENGINEERING CONSULTANTS AND KEY SUPPLIERS EARLY ON IN THE PROCESS

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THANK YOU

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