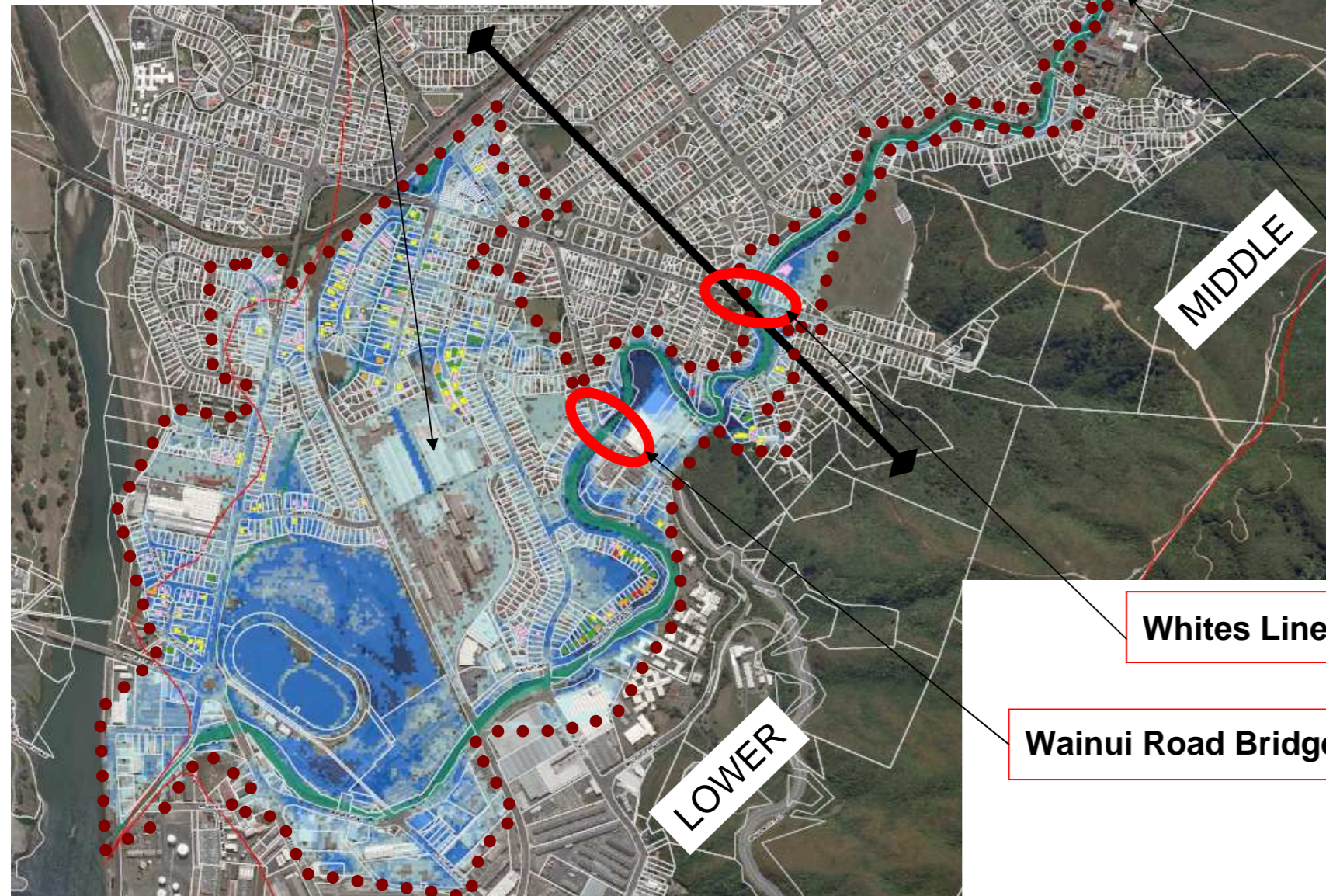
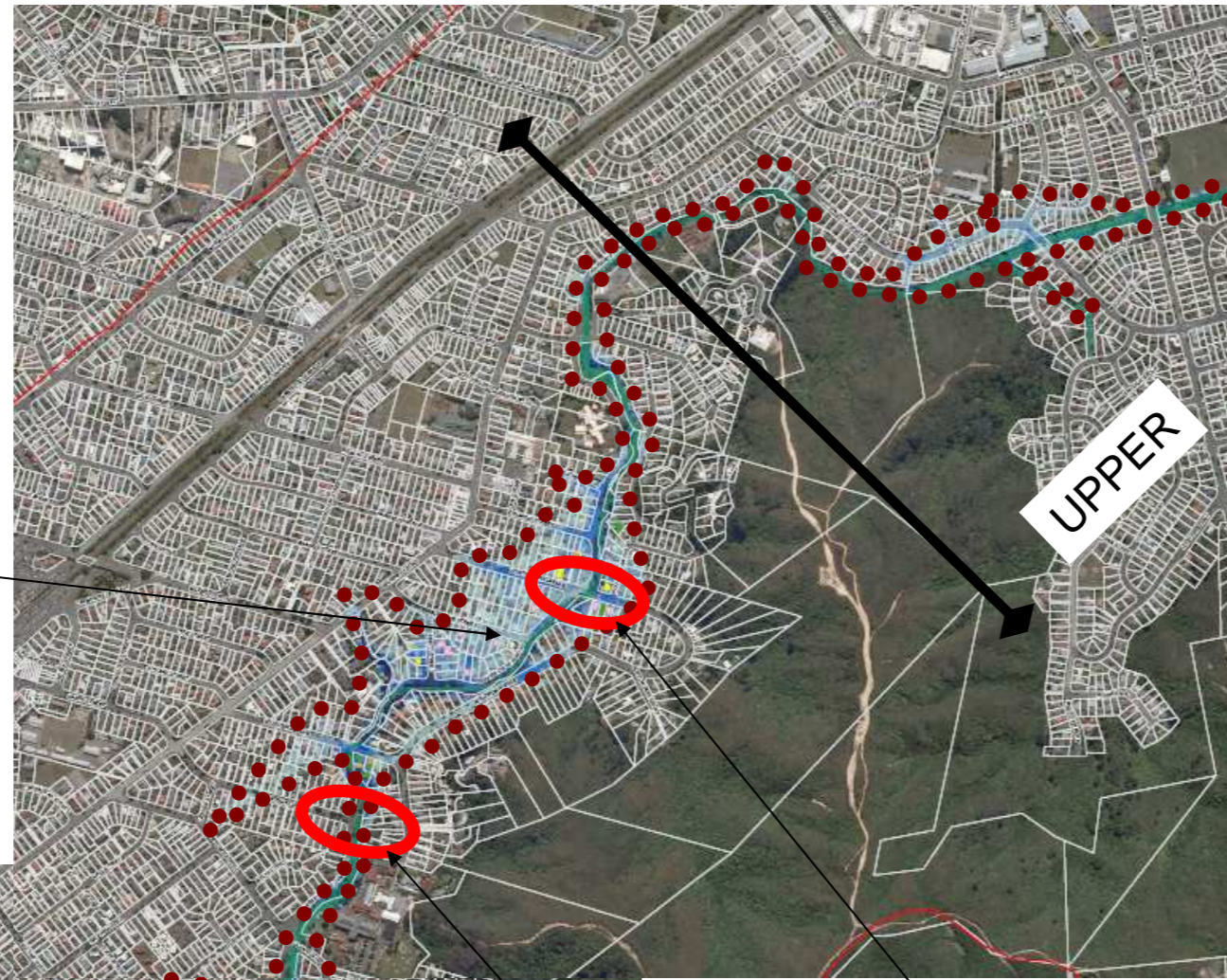


A total of 225 Houses could be expected to have flood water above floor level in this scenario

Option 2 Planning Control Implications;

- Density** - Planning controls how small a section can be in flood prone areas
- Floor Levels** – Control to make minimum floor levels 1-in-100 year flood level for new development
- Access** – Controls to require new developments have safe access in a 1-in-100 year flood event

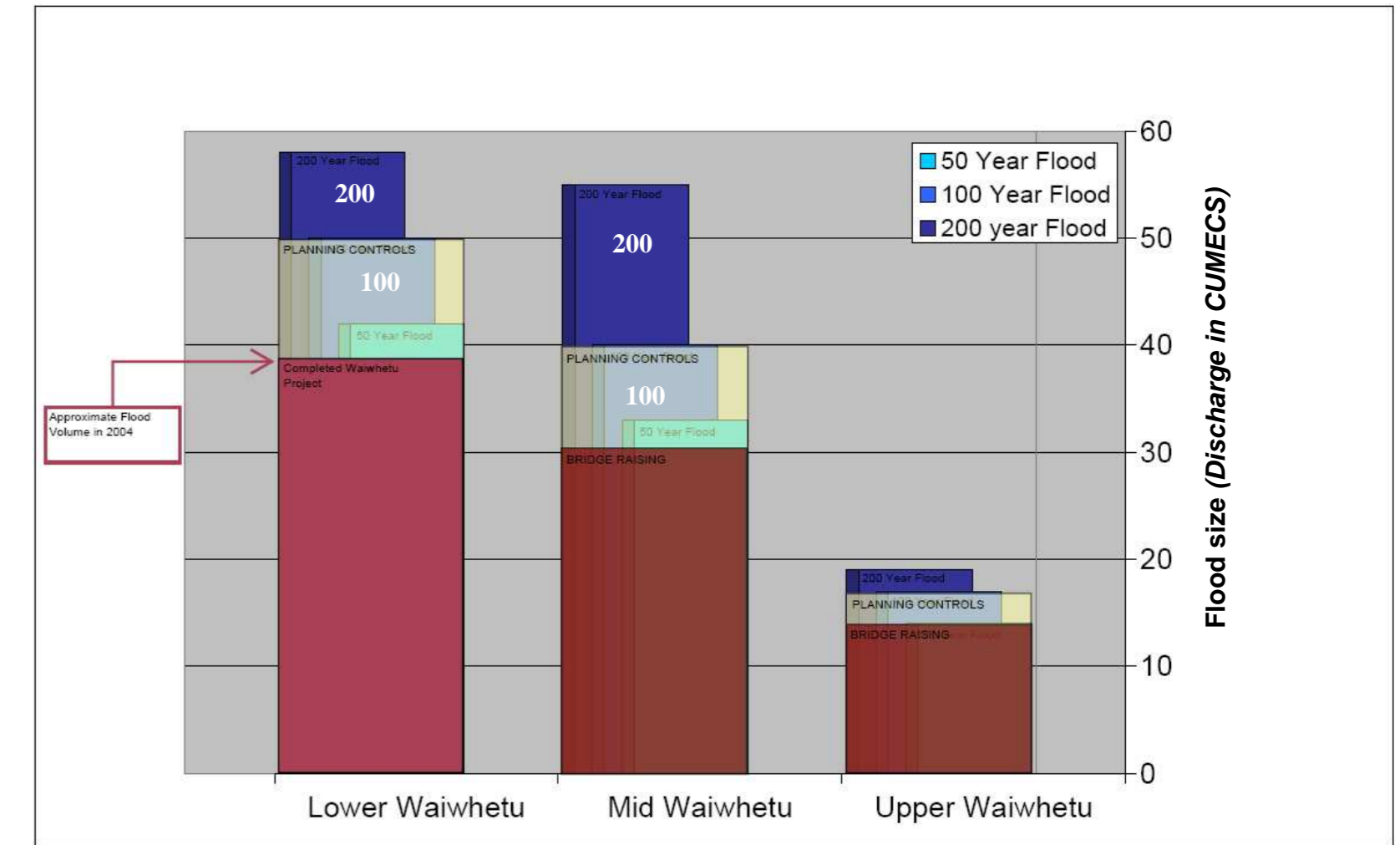


Norton Park Avenue Bridge

St Ronans Avenue Bridge

Whites Line East Bridge

Wainui Road Bridge



Option	Description	Estimated Cost
Raise private access bridge at end of St Ronans Avenue	Increase capacity	\$0.3 Million
Raise Norton Park Avenue bridge	Increase capacity	\$0.4 Million
Raise Whites Line East bridge	Increase capacity	\$0.7 Million
Raise Wainui Road bridge	Increase capacity	\$1 Million
Total costs		\$2.5 Million
Environmental enhancement	<i>Based on a 5% environmental expense cost of Hutt River FMP</i>	\$150,000

Total cost	\$2.7 Million
Direct damages saved (in a single 1-in-100 year event)	\$55 Million
Individual ratepayer cost per year per \$100,000 of property value (HCC ratepayers over a 20 year loan funded works repayment schedule)	\$1.45 p.a/\$100,000

Disclaimer;

All dollar values used are approximations and may change during further detailed investigation; Calculations use the 2007 dollar value; Direct damages saved only consider one occurrence of a 1-in-100 year flood event; Individual rate payer cost is a guideline only and may not reflect final rating values.

Option 2 – Bridge Raising

Description – Raising of access bridges at end of St Ronans Ave, Norton Park, Whites Line East and Wainui Road Bridge.

Strengths - Lowers flood levels immediately adjacent to the bridges. Reduces potential for blockages. Works and costs can be staged by upgrading one bridge at a time. Has greater benefit on smaller than 1-in-100 year floods.

Weaknesses - Does not protect to 1-in-100 year level. Constraints on maximum each bridge can be raised.



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Waiwhetu Stream Floodplain Management Plan – Options Development