

Asset Liability Modeling (ALM) Study for the **City of Hamilton** pension plans

November 24, 2020

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Why do an Asset-Liability Modeling Study (AL Study) now?

- **Review/calibrate investment strategy for the pension assets**
 - Review the investment objectives and risks
 - Incorporate most recent regulations
 - Incorporate current capital market assumptions

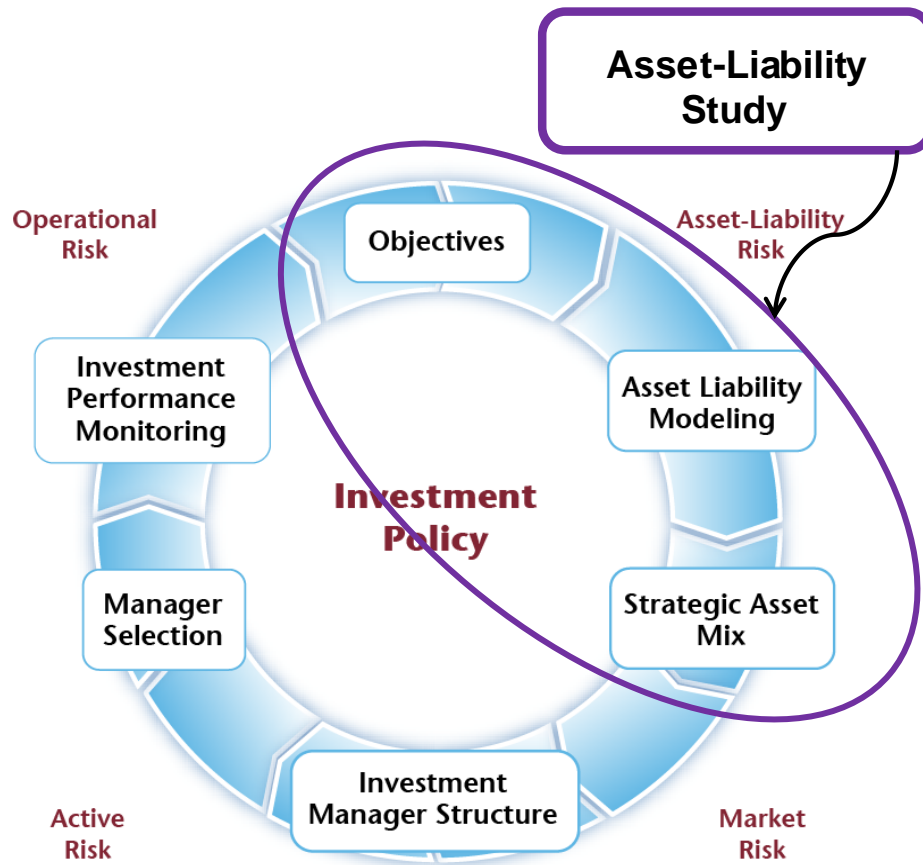
- **Fulfill the requirements of the Statement of Investment Policies and Procedures (SIPP) which requires AL study when:**
 - There are significant changes to the regulations (2019 Ontario Funding Reform)
 - Capital market conditions change significantly compared with the ones used in the previous study (performed in 2010)

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Asset-Liability
Model and
Process



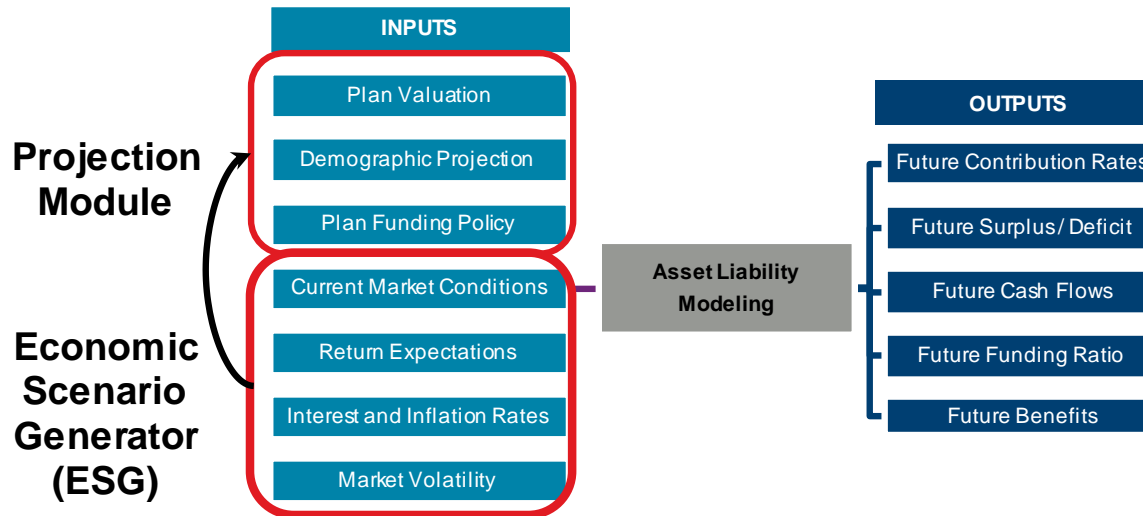
Investment Policy Governance Process



- The Asset-Liability Study is the first step in setting and monitoring the investment policy
 - Purpose is to determine an asset mix that best meets the risk and return objectives
 - The Study starts with setting the objectives for the investment policy
 - The outcome is a decision on strategic asset mix policy
- Once the asset mix strategy is set, implementation follows, including selection of investment managers and ultimately monitoring the funds' managers and strategy

Asset-Liability Model

Projection Module and Economic Scenario Generator



- Produces 1,000 scenarios of interest rates, asset returns and inflation
- Projection model allows maximum flexibility in projecting plan demographics, funding policy and any outputs or metrics
- Demographic and liability projections performed

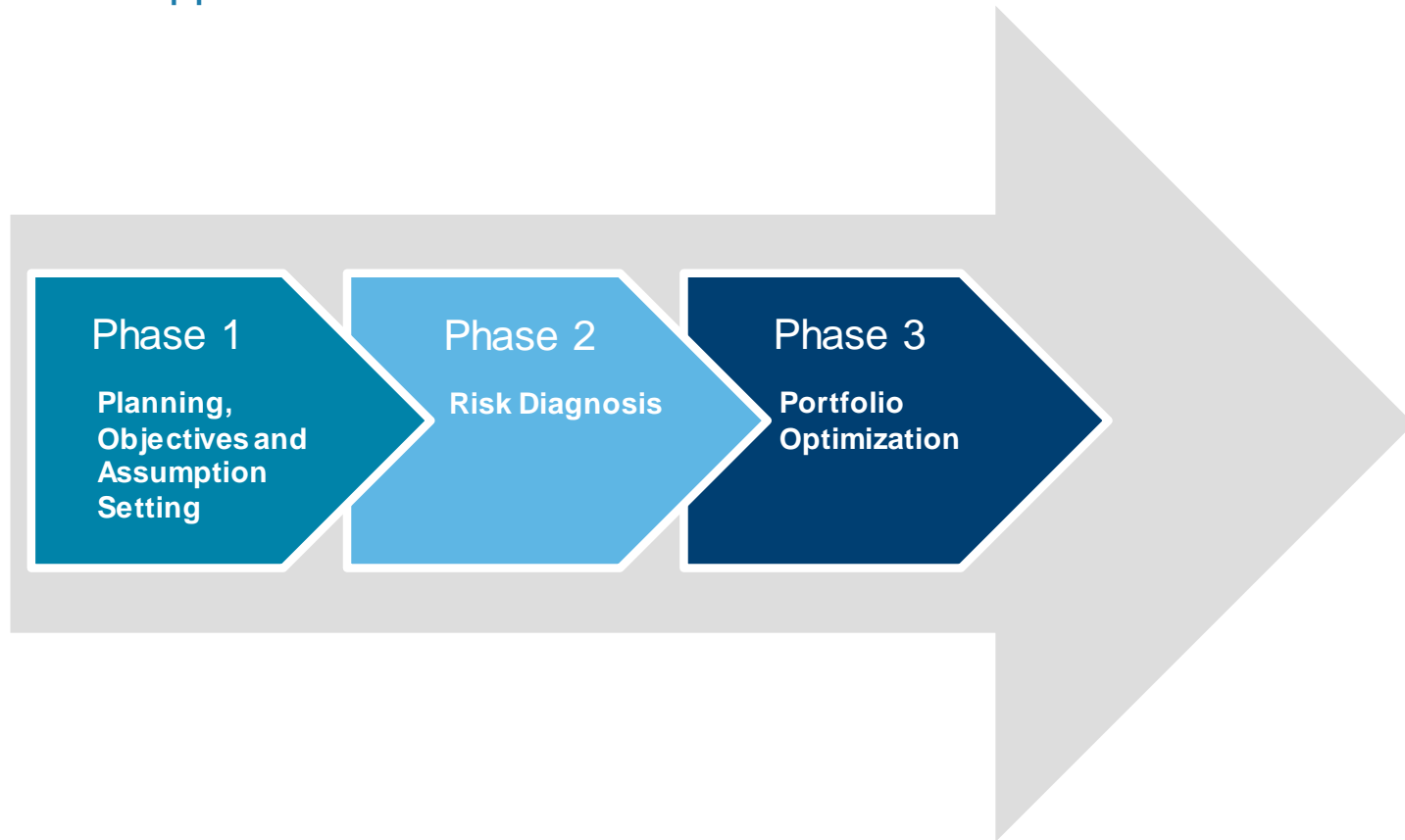
ALM Assumptions

Capital Market Assumptions Setting Process

- Established by a global committee of Aon Investment and Risk Management Practitioners
 - Qualitative and Quantitative analysis of historical returns, research articles, state of the market
 - Judgment of the committee
 - Reflect analyses and research by colleagues in the US and UK for global consistency
- Inputs to the capital market simulations:
 - Expected value – CPI, asset class returns and yields
 - Combination of qualitative and quantitative analysis
 - Most asset classes based on historical spread analysis, discounted cash flow approach or risk premium approach
 - Correlations and Standard deviations:
 - Models are calibrated to historical data
- Continuously updated and improved

Asset-Liability Process

Overview of Approach



Asset-Liability Process

Phase 1

Planning, Objectives and Assumption Setting

- Discuss work plan and objectives
- Discuss and confirm assumptions
- Discuss asset classes for inclusion
- Assess the Trustees' risk tolerance
 - Discuss risk-tolerance and preferences
 - What are the main risks to be managed?
 - What are the investment beliefs that should be considered?
 - Clearly establish the Trustees' objectives in terms of risk management
 - Identify potential strategies to improve risk management
 - What's in the toolbox?
 - What are the constraints?
 - What kind of de-risking strategies should be tested?

Asset-Liability Process

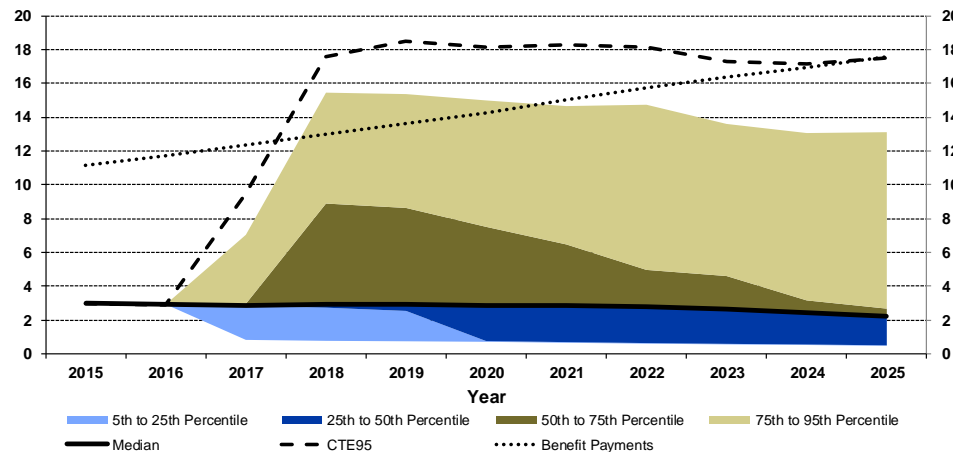
Phase 2

Risk Diagnosis

Risk Diagnosis

- Obtain a clear picture of the plans' risks under the current investment strategy
 - Tested against the risk tolerance and objectives identified in Phase 1
- This phase will allow the Trustees to quantify risk tolerance
- Also includes a demographic projection of the plans

Contributions (\$ millions)



Helps steer portfolio design discussion and serves as reference for alternative investment strategies

Asset-Liability Process

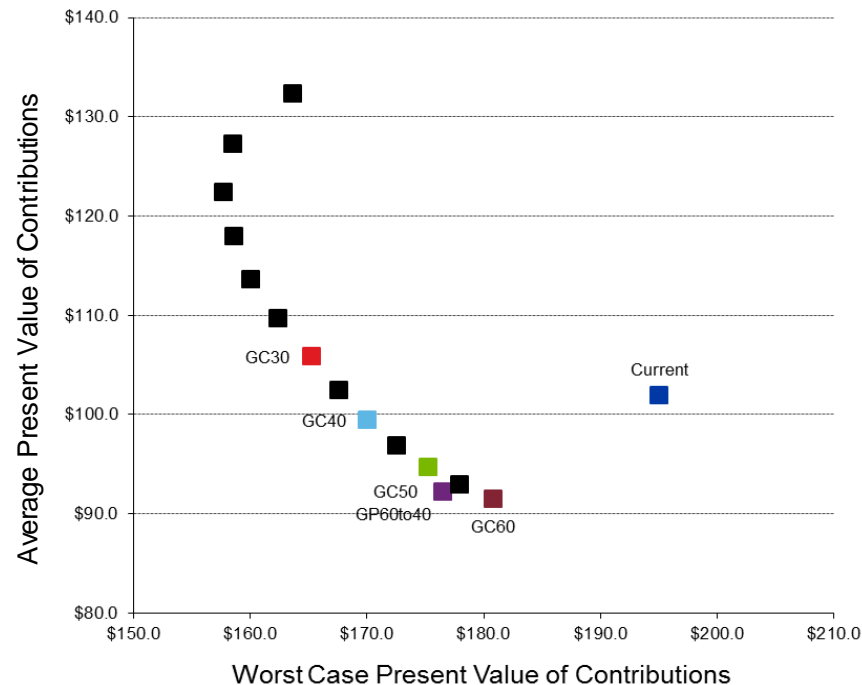
Phase 3

Portfolio Optimization

Optimization

- Risk-reward trade-off tested for any combination of variables that depend on both assets and liabilities
 - e.g. we can construct an efficient frontier that optimizes based on plan contributions

Present Value of Contributions (\$ millions)



	Present Value of Contributions plus Present Value of Notional Capital			
	Average	Δ from Current	Δ from CTE	Current
Current	\$101.9			\$195.0
GC60	\$91.4	-\$10.5	\$180.9	-\$14.1
GC50	\$94.7	-\$7.2	\$175.3	-\$19.7
GC40	\$99.4	-\$2.5	\$170.1	-\$24.9
GC30	\$105.9	\$4.0	\$165.2	-\$29.8
GC60to40	\$92.2	-\$9.7	\$176.6	-\$18.4

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Project
Timeline and
Deliverables



Project Timeline

Meeting	Preparatory Activities	Meeting Outcomes	Timeline
Planning	<ul style="list-style-type: none"> • Prepare discussion document for Planning Meeting 	<ul style="list-style-type: none"> • Discuss asset liability methodology • Review current status of plans • Identify asset classes to include in analysis • Confirm asset and liability assumptions and metrics for the study • Outcome: Assumptions set and objectives understood and agreed upon 	TBD
Risk Diagnosis	<ul style="list-style-type: none"> • Run projection of plans demographics and stochastic projection of liabilities and assets • Prepare discussion document for Risk Diagnosis Meeting 	<ul style="list-style-type: none"> • Review projected evolution of the plans' demographics • Review the projection of plan liabilities • Review the projection of the plans' funded statuses under current asset mix policy • Review the projection of contributions under the current asset mix • Outcomes: <ul style="list-style-type: none"> • Determine the appropriate reward and risk measures for the Optimization 	6 Weeks after Planning Meeting

Project Timeline

Meeting	Preparatory Activities	Meeting Outcomes	Timeline
Optimization Meeting	<ul style="list-style-type: none"> • Run stochastic projections for a large number of portfolios • Rank portfolios according to the reward and risk variable(s) and draw an efficient frontier line • Prepare Optimization document 	<ul style="list-style-type: none"> • Determine the optimal asset allocation while taking into account the plans' commitments and the trustees' risk tolerance level • Optimization of growth component of portfolio • Optimization of liability matching component of study • Outcome: Determine the mix between growth and liability matching components, including possible glide paths 	6 Weeks after Risk Diagnosis

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