

# Methodology

# **COMPASS Q Score**

### **Bespoke Metrics**

Proposed: January 14, 2025

#### **Table of Contents**

Executive Summary	I			
1. Introduction	2			
2. Data Collection Process	3			
3. The Q Score Framework	4			
4. The Q Score Methodology	5			
5. Integration with Industry Practices	7			
6. Independence and Transparency	8			
7. Updates, Revisions, and Adjustments				
over Time	9			
8. Limitations and Scope	10			
9. Disclaimer				
10 Appendices				

#### **Contacts**

#### **Derrick Decloe**

Chief Innovation Officer ddecloe@bespokemetric.com +1 416-919-9031

#### Samuel Susetyo

Senior Analytics Engineer ssusetyo@bespokemetrics.com +1 519-721-6917

# **Executive Summary**

This methodology provides an overview of how Bespoke Metrics, through the COMPASS platform, evaluates subcontractor risk (COMPASS Q Score) within the construction industry.

The COMPASS platform can be utilized by Insurance entities, General Contractors and Subcontractors to facilitate the construction prequalification process. COMPASS was specifically designed as a shared database of subcontractor information, continuously collecting standardized Business, Finance, and Health & Safety information from a broad network of subcontractors.

Subcontractors submit data using the COMPASS 1Form, a standardized collection tool that ensures consistency across submissions. Each submission undergoes a rigorous verification process by a dedicated team of analysts, ensuring the accuracy and reliability of the data. This verified, standardized data set serves as the foundation for COMPASS's risk assessment tools, including the COMPASS Q Score.

As an independent and impartial third party, Bespoke Metrics combines its comprehensive dataset with insights from General Contractor risk management practices and contract award history. This unique integration delivers objective, datadriven evaluations of subcontractor performance and reliability.

The COMPASS Q Score, a standardized metric of subcontractor risk was developed using advanced analytical models and historical industry data. The Q Score ranks subcontractors on a scale from QI (low risk) to Q7 (high risk). This transparent and consistent scoring system enables users—General Contractors, lenders, and insurance entities—to make more informed decisions when evaluating subcontractors.



### 1. Introduction

# **Purpose of Methodology**

The purpose of this methodology is to provide a comprehensive overview of the COMPASS Q Score and its role in standardizing risk evaluation within the construction industry. This document outlines how data is collected through the 1Form, how the Q Score is calculated, and its alignment with industry best practices, ensuring it serves as a trusted tool for informed decision-making across stakeholders.

### **Overview of COMPASS by Bespoke Metrics**

COMPASS by Bespoke Metrics, is the leading prequalification platform that drives industry-wide data collection, verification, and analytics for the construction sector. Founded by a team of executives with over 50 years of combined experience in global credit rating services, COMPASS leverages this expertise in evaluating and benchmarking risk to bring rigor and reliability to subcontractor risk assessment.

Over the past seven years, COMPASS has built an expansive network of General Contractors, Subcontractors, insurers, and lenders. This collaboration has allowed COMPASS to gather valuable data at scale through 1Form and other sources, gaining extensive insights into how industry stakeholders evaluate and measure risk.

With an extensive dataset, insights into the industry's risk management best practices, and partnerships with leading construction platforms, COMPASS is one of the industry experts in prequalification, setting a benchmark for reliability and transparency in the construction sector.



# 2. Data Collection Process

#### Sources of Data

The COMPASS database is the analytical foundation of the COMPASS Q Score. It contains thousands of unique data variables and millions of records of data to provide a comprehensive view of the construction landscape.

This information is sourced from:

- Subcontractors: Data and documents directly through the COMPASS 1Form.
- General Contractors: Contract details, post-project reviews, and historical prequalification records.
- **Third-Parties:** Financial profiles, legal documentation, corporate structure details, and executive management information.
- Models and Statistics: Model outputs and statistics from other databases.

By integrating these diverse data sources, the COMPASS database reflects a broad view of the construction industry, ensuring the COMPASS Q Score is based on timely, accurate and reliable information.

### **Data Standardization**

Subcontractor information is provided to COMPASS through the COMPASS 1Form, a secure, online standardized data collection tool. Developed in collaboration with a consortium of General Contractors, Subcontractors, Insurers, and other stakeholders, the 1Form is designed to address the construction industry's collective data requirements.

The intentional standardization of the 1Form improves consistency in data collection, facilitating dependable data analytics and year-over-year trend analysis. It also allows for data verification at scale, ensuring the accuracy and reliability of COMPASS' analytics and risk assessments.

Although the 1Form is standardized, it undergoes an annual review to ensure the data collected remains relevant and aligned with evolving industry standards. This ongoing evolution allows the 1Form to capture any new requirements and incorporate emerging trends, ensuring that the data and the resulting Q Score continue to reflect the current risks and landscape.

#### **Data Verification Process**

Verification is essential to ensure that the COMPASS database contains accurate data and that analytics remain reliable and trustworthy. The provided data goes through a series of automated checks during the submission process for accuracy and completeness, alerting the user and providing the opportunity to correct and update the data prior to submission. The submitted data is thoroughly examined and cross-referenced with supporting documents by a dedicated team of data verification analysts to ensure accuracy. Throughout this process, data points are marked as verified or unverified and are recorded in the COMPASS database as additional data points available to incorporate into the Q Score.

The instant feedback and the rigorous verification process ensures the reliability and accuracy of 1Form submissions, enhancing the quality of information collected on the platform. This allows COMPASS to rely on subcontractor information in calculating the Q Score and other analytical outputs.



# 3. The Q Score Framework

The COMPASS Q Score is a measure of subcontractor risk, offering a data-driven evaluation that serves as an industry benchmark. Stakeholders across the COMPASS platform rely on the Q Score as a critical component in their Subcontractor evaluation process.

Q Scores are represented by a numerical value from Q1 to Q7 called the Q Scale. A Q1 indicates low risk, whereas a Q7 indicates high risk. Q Scores are also color-coded to group subcontractors into different risk profiles:

#### • Green (Q1): Very Low Risk

Subcontractors are strong across all key criteria and require minimal review, justifying a larger pricing premium.

#### • Green (Q2-Q3): Low Risk

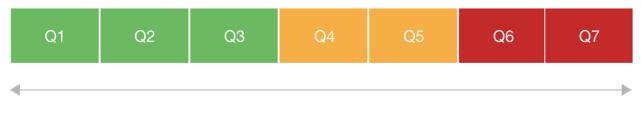
Subcontractors may have minor issues, but their overall performance is above average, justifying a pricing premium

#### Yellow (Q4–Q5): Moderate risk

Further evaluation or risk mitigation measures may be required.

#### • Red (Q6-Q7): High risk

Additional due diligence or information is required prior to selection.



Lowest Risk Highest Risk



# 4. The Q Score Methodology

#### Overview

The Q Score methodology combines two critical components to provide a comprehensive assessment of subcontractor risk.

- 1. **Section Scoring** Business, Finance, and Health & Safety ratios/metrics are evaluated against a custom benchmark. Results from each section contribute to the overall Q Score.
- 2. **Significant Risk Indicators** While the section scoring drives the overall Q Score, certain results represent risks that are so severe, it requires immediate attention regardless of the section scoring. When these key risk indicators are triggered, they function as a cap, limiting the ability of a subcontractor to achieve a strong Q Score, ensuring that all aspects of subcontractor risk are fully incorporated into the Q Score.

# **Components**

#### **Section Scoring**

A range of relevant ratios/metrics across Business, Finance, and Health & Safety are evaluated to quantify subcontractor risk. Each section contributes to the overall Q Score. The contribution weights, as well as select metrics considered, are:

- Business (50%): Employee turnover, revenue diversification, and contract ratio.
- Finance (40%): Turnover, liquidity, profitability, and leverage.
- Health & Safety (10%): Incident rate, claims percentage, and safety policies.



#### Significant Risk Indicators

While ratio performance is the primary driver of the Q Score, certain significant risks, when identified, warrant a cap to the Q Score, regardless of the strength of the ratios or the section weightings. These significant risks can include:



- **Inadequate Safety Measures:** Severe accidents or fatalities, lack of a formal health and safety program, or absence of designated health and safety personnel.
- **History of Legal Issues:** Frequent or severe legal disputes, lawsuits, or regulatory violations, particularly those involving contract breaches, safety violations, or fraud.
- **Severe Financial Weaknesses:** Excessively high leverage, very low liquidity, or consistently negative profitability.
- **Insolvency or Financial Distress:** Evidence of insolvency filings, bankruptcy proceedings, or other signs of financial instability.
- **Expired or Insufficient Data:** Outdated financial statements, expired certificate/licenses, unverified data, or incomplete records that prevent a thorough evaluation of the subcontractor's current risk status.

### **Final Q Score Calculation**

The expanded Q Scale table below outlines how the Section Scoring and Significant Risk Indicators (caps) interact to produce the assigned Q Score.

	Very Low Risk				
Q1	Strong results across all sections, no significant risk Indicators. Information is verified and up-to-date.				
Q2	Low Risk				
Q3	Strong section scoring overall, but there are ratios or certain parts of a section that may be weak. Minimal significant risk indicators identified. Information is verified and up-to-date.				
Q4	Moderate Risk				
	Average across most ratios or a mix of stong and below average ratios leading to an average section				
Q5	score. Likely some significant risk indicators that would cap their Q Score such as some information being recently expired.				
Q6	High Risk				
	Ratios are weak across Finance, Business, and Health & Safety, multuple significant risk indicators				
Q7	have been identified and resulted in caps. Information is expired or missing. Additional data or risk mitigation plan is required if selected.				

For a comprehensive breakdown of how ratios are calculated, weighted, and capped, refer to **Appendix A: Detailed Q Score Calculation Steps**.



# 5. Integration with Industry Practices

### **Industry Standards**

The COMPASS Q Score methodology is designed to align with established industry standards and best practices. It incorporates key methodologies such as financial ratio analysis, credit default analytics, and surety bond performance. COMPASS also leverages insights from GC partners, reviewing thousands of approval processes to ensure that the Q Score is in line with broader industry practices.

Additionally, the methodology undergoes rigorous validation through backtesting, where historical data is compared to past Q Scores to confirm the model's accuracy and reliability. This process allows COMPASS to continuously refine the Q Score, ensuring it provides consistent and dependable evaluations that stakeholders can trust for informed decision-making.

#### **General Contractor Use Cases**

The Q Score offers General Contractors comprehensive and valuable insights into the risk profile of Subcontractors. Using the Q Score allows General Contractors to efficiently prequalify Subcontractors by identifying risks early in the project lifecycle.

General Contractors can also leverage the Q Score's risk identification capabilities to implement tailored risk mitigation practices and address specific concerns. This underlines the importance of the Q Score as a useful asset for improving project outcomes and confidence in operations.

#### **Subcontractor Use Cases**

The Q Score allows subcontractors to evaluate their standing relative to their peers, offering a first-time glimpse into how they're being assessed. With tailored feedback, management can implement strategies and procedures to mitigate risk and qualify for larger projects opportunities.

Subcontractors can incorporate their Q Score into their business development efforts to highlight their strengths and capacity, giving them a competitive advantage over their peers during the selection process.

# **Lender and Insurance Applications**

COMPASS offers significant value to lenders and insurers of construction entities, who rely on the Q Score to evaluate financial risks. By integrating the COMPASS Q Score into underwriting processes, these stakeholders can make informed decisions on more robust data, reducing liability and optimizing risk management strategies.

The Q Score's versatility in addressing the needs of diverse users highlights its effectiveness as an industry benchmark for comprehensive risk evaluation.



# 6. Independence and Transparency

### **Impartial Evaluation**

COMPASS operates as an independent third party, ensuring that all risk evaluations are unbiased and based on objective data. The standardized methodology ensures a consistent and rigorous process. Subcontractors are evaluated using the same comprehensive methodology, ensuring no preferential treatment.

This impartial approach is critical in maintaining trust across all parties involved. Subcontractors, General Contractors, and Insurers can be confident that evaluations are based on a balanced methodology that combines data-driven insights with informed judgment. While objective metrics provide the foundation, COMPASS integrates consistent and transparent subjectivity to address unique circumstances or complex scenarios. By maintaining independence from all parties and adhering to a comprehensive methodology, COMPASS ensures that assessments remain fair, accurate, and reliable for all stakeholders.

### **Data Privacy and Security**

COMPASS data is securely stored on a cloud-based platform with strict access controls to ensure confidentiality. COMPASS is SOC 2 compliant and undergoes regular audits to ensure compliance with stringent security, availability, confidentiality, and privacy standards. This certification highlights COMPASS's commitment to protecting user data and maintaining transparency across its operations.



# 7. Updates, Revisions, and Adjustments over Time

COMPASS is committed to maintaining a Q Score calculation methodology that evolves to accommodate industry changes and user needs. To ensure the Q Score remains relevant, COMPASS continuously assesses its accuracy, monitors industry benchmarks, and incorporates emerging best practices, making methodology updates as needed.

COMPASS conducts a comprehensive review of the Q Score methodology annually to ensure the Q Score remains aligned with the latest market conditions. While revisions may occur, COMPASS is committed to full transparency. Any updates or changes will be communicated to all stakeholders in advance, ensuring that all parties are informed and can adapt accordingly.

Modifications to the methodology may include, but are not limited to:

- Amending, adding, or removing Ratios.
- Changing the value allocated to each Ratio.
- Changing the performance threshold for each Ratio.
- Changing the overall weight of Business, Finance, and Health & Safety.
- Adding or removing sections to the Q Score.
- Amending the method to translate Ratio results into a Q Score.
- Amending, adding, or removing the reasons to cap the Q Score.
- Applying any of the above on a trade-by-trade or geographic basis.



# 8. Limitations and Scope

#### **Reliance on Data**

The Q Score is inherently dependent on the quality and accuracy of the data provided. To ensure this is maintained, COMPASS has implemented a rigorous data collection and verification process. Ultimately, Subcontractors are responsible for maintaining up-to-date, accurate submissions. Any discrepancies, such as missing, expired, or unverified data, may negatively impact the Q Score and will be clearly indicated in the Q Score output for transparency. To support this, COMPASS regularly communicates with subcontractors to review and update their information, ensuring the continued reliability of their assessments.

### **Guidance, Not Determination**

While the Q Score is a valuable tool for risk evaluation, it is important to note that it is not a substitute for the sole decision-making authority of General Contractors, lenders, or insurers. The Q Score provides an overall risk assessment, highlights areas of concern, and offers a tool to quantify and compare subcontractor risk. However, it should be used as one part of a broader decision-making process rather than the sole determinant in hiring, financing, or insurance decisions.

# **Scoring Boundaries**

The Q Score evaluates a subcontractor's risk profile based on available data, with a focus on financial stability, business performance, and safety records. However, it does not account for all variables that may influence outcomes, such as unforeseen events (e.g., natural disasters or supply chain disruptions), undisclosed or illegal practices, or external factors like economic downturns or changes in industry regulations. As such, the Q Score should be considered a supplementary tool in the decision-making process, not the sole determinant of subcontractor risk.



# 9. Disclaimer

The information upon which COMPASS Q Scores are based is obtained by COMPASS from sources COMPASS believes to be reliable.

The Q Score, or any other analysis and research issued or published by COMPASS are, and must be construed solely as, statements of opinion and not statements of fact as to creditworthiness, risk level, or execution ability.

The data supporting the COMPASS model is considered to be accurate, reliable, complete, and timely, however, COMPASS cannot validate the accuracy, reliability, completeness, or timeliness of the data. In no circumstances should the owners and employees of COMPASS, or Bespoke Metrics be liable for any direct, indirect, or incidental damages, or expenses of any kind, or losses arising from any use of COMPASS Q Score or outputs. The Q Score is an empirical model-driven evaluation of execution ability and is not a statement of fact or recommendation to engage with subcontractors, general contractors, or other stakeholders. The information and data included are protected by copyright and other applicable laws. All COMPASS content, including Q Scores or any derived output, shall not be modified, reverse-engineered, reproduced, or distributed without written consent from COMPASS Holdings Inc. or Bespoke Metrics Inc.



# 10. Appendices

# **Appendix A: Detailed Q Score Calculation Steps**

#### A1. Section Scoring

#### Step 1: Ratio Calculation

Based on collaboration with General Contractors and surety providers, and advanced analytical models, COMPASS combines ratios and trend analysis to assess Subcontractor Risk in the Q Score. Data points that are considered include:

#### Business:

- o Employee Turnover
- o Revenue Diversification
- Executive Tenure and Experience
- o Legal History
- Growth Rate
- o Years in Business
- o Company Size (Employees and Revenue)
- Backlog Relative to Revenue
- Subcontracted Work Volume
- o Revenue Stream Diversification (Geography and Customers)

#### • Finance:

- o Liquidity ratios (Current Ratio, Cash Ratio etc.)
- Leverage ratios (Debt to equity, interest coverage etc.)
- o Turnover ratios (Asset Turnover, Working Capital Turnover etc.)
- Profitability ratios (Return on Assets, Net Margin etc.)

#### Health & Safety:

- Dedicated Health & Safety lead with certifications
- Health & Safety policy details
- o Incident rate
- o Insurance premium/surcharge
- Experience Modification Rate (US)
- Recordable Incident Rate (US)
- WCB Rate (CA)



#### Step 2: Ratio Scoring

Each ratio is scored against a custom benchmark and categorized as Strong, Average, or Weak, based on predefined thresholds. Once categorized, each ratio contributes a specific weight to the overall Q Score, with more significant ratios having a greater impact on the final result. These benchmarks and weightings are determined using advanced analytics, historical industry data, and insights from surety providers and General Contractors, ensuring consistency with industry standards.

Ratios that cannot be calculated due to expired or missing data, or that are based on unverified information or supported documentation, are classified as Weak.

To maintain consistency in the Q Score, all Subcontractors are assessed against the same ratio thresholds, regardless of factors such as trade, geographic location, or size. This simplistic approach of the Q Score is an intentional choice, backed by insights from stakeholders and supported by various analytical modelling results to ensure accuracy. This testing also extends to ensuring groups such as small subcontractors and minority-owned businesses are not negatively impacted by the Q Score's standardized thresholds. However, the Q Score is designed with flexibility, allowing COMPASS to enable different thresholds and benchmarks tailored to specific trades, regions, or sizes if needed.

#### Step 3: Initial Q Score Calculation

The results from the three Q Score sections — Business, Finance, and Health & Safety — are aggregated to calculate the initial Q Score based on the following weightings:

- 50% from the Business Section
- 40% from the Finance Section
- 10% from the Health & Safety Section

#### A2. Adjusting for Significant Risk Indicators (Q Score Caps)

After the initial Q Score is calculated based on the section scoring, the initial Q Score is then adjusted to account for any significant risk indicators that were triggered.

If any significant risk indicators are triggered—such as legal issues, insolvency concerns, expired or missing data, or severe financial weaknesses—the Q Score is capped to reflect the heightened risk. This ensures that all aspects of subcontractor risk are fully captured, even if the ratios themselves suggest an otherwise strong performance. Any caps applied will be clearly displayed in the Q Score output for transparency to all COMPASS users.



	Risk Level	Section Scoring	Significant Risk Indicators (caps)
Qī	Very Low Risk	Strong ratio results across all 3 sections.	<ul> <li>Recently changed business registration details</li> <li>Slightly elevated debt-to-equity ratio</li> <li>Minimal liquidity pressure</li> <li>Isolated non-serious health &amp; safety concerns</li> <li>Relatively new company with limited operating history</li> </ul>
Q2	Low Risk	Strong section scoring overall, but there are ratios or certain parts of a section that may be weak.	<ul> <li>Limited diversification in customer base or project portfolio</li> <li>Marginal profitability over recent reporting periods</li> <li>Minor gaps in financial documentation</li> <li>Occasional minor legal disputes resolved without penalties</li> <li>Short-term increases in employee turnover</li> </ul>
Q3			<ul> <li>Mismatch in company names on legal or financial documents</li> <li>2+ critical ratios below thresholds (e.g., current ratio, incident frequency)</li> <li>History of legal disputes or contract defaults</li> <li>Incomplete verification of financial information</li> <li>Reliance on a parent or cross-company guarantee for financial stability</li> </ul>
Q4	Moderate Risk	Average across most ratios or a mix of stong and below average ratios leading to an average section score.	<ul> <li>Weak cash flow or high dependency on a single revenue source</li> <li>Persistent negative profitability</li> <li>More than four critical financial ratios below acceptable thresholds</li> <li>Gaps in key compliance certifications</li> <li>Financial records older than 18 months, but under 24 months</li> </ul>
Q5			<ul> <li>Insolvency proceedings or evidence of financial distress</li> <li>Multiple serious health &amp; safety violations</li> <li>Financial records older than 24 months</li> <li>Highly concentrated customer base with over-reliance on a single contract</li> <li>Frequent penalties for regulatory or safety infractions</li> </ul>
Q6	High Risk		<ul> <li>Bankruptcy filings or active insolvency processes</li> <li>Extensive history of unresolved legal disputes</li> <li>Multiple fraudulent activities or contract breaches</li> </ul>
Q7		Finance, Business, and Health & Safety	<ul> <li>Mising verified financial information and/or supporting documents</li> <li>Persistent inability to meet contractual or regulatory obligations</li> <li>Critical health &amp; safety deficiencies with ongoing incidents</li> </ul>



# **Appendix B: Glossary of Terms**

**1Form:** The standardized form created by COMPASS to collect

Subcontractor information. Increases efficiency for Subcontractors as it satisfies the information requirements of all of the General

Contractors participating in the COMPASS platform

**Authorization:** The express permission granted by a Subcontractor for another

COMPASS user (General Contractors, Insurance Entities, project owners etc.) to access their Financial Information via COMPASS

**COMPASS Performance** 

**Review:** 

A tool available to General Contractors as part of the COMPASS platform allowing them to review Subcontractor performance

across multiple categories including quality of work

**COMPASS Verification:** A COMPASS process to review specific data variables and

supporting documentation for accuracy, completeness and

timeliness

**Expired Financial Data:** Data is deemed to expire on the date that is six (6) months after

fiscal year end. Expired Data is treated in the same manner as

Missing Data

**Insurance Entities:** Insurance brokers or carriers

Missing Data: Fields on the 1Form that have been left blank or filled out with

unusable data (e.g. revenue value of less than 0)

**Prequalification:** An evaluation of a Subcontractor by a General Contractor to

determine whether a Subcontractor is eligible to work with them. Often driven by the requirements of an insurance carrier or

insurance program

**Primary Trade:** The specific Division a subcontractor identifies as their primary area

of work (by majority of revenue) based on the Construction Specifications Institute (CSI) and Construction Specifications

Canada (CSC) MasterFormat 2016 Edition

**Primary Trade Rank:** The rank of a Subcontractor relative to other Subcontractors within

the same Primary Trade and same country. A Subcontractor's

Primary Trade Rank will be displayed with the Q Score

**Q Scale:** A numeric scale ranging from the lowest level of Subcontractor

Risk (Q1) to the highest level of Subcontractor Risk (Q7)

**Q Score:** COMPASS' assessment of Subcontractor Risk based on information

collected from the Q Score Sections on the 1Form. A numerical score between Q1 and Q7 is assigned based on the Q Score

methodology as described in this document



**Q Score Color:** The Q Score is divided into three colors; Green, Yellow, and Red to

help distinguish between levels of Subcontractor Risk. Green is Q1-

Q3, Yellow is Q4-Q5, and Red is Q6-Q7

**Q Score Sections:** The Q Score is assigned based on information from three (3) areas -

Business, Finance, and Health & Safety

**Q Score Caps:** The initial Q Score may be adjusted to a weaker score if Significant

Risk Indicators are identified during the evaluation

Ratio: A calculated variable or single value used as part of the risk

assessment of a Subcontractor. Different Ratios are assigned

different weights

**Significant Risk Indicator:** Identified risks that are considered extremely severe. These risks

trigger the implementation of Q Score caps.

**Subcontractor:** A company that is hired to perform a specific task or scope of work

as part of an overall project

**Subcontractor Information:** All information related to a Subcontractor's Business and Health &

Safety profile including, but not limited to, experience, previous

work performed, safety records, and insurance details

**Subcontractor Financial** 

Information:

Balance Sheet, Cash Flow Statement, Income Statement, and other

financial documents provided by a Subcontractor

**Subcontractor Risk:** An assessment of a Subcontractor's risk level based on Business,

Finance, and Health & Safety information

**Thresholds:** The border between Strong/Medium and Medium/Weak – used to

categorize the result of each ratio. These are periodically adjusted

Valid Data: Data provided within the 1Form that is not defined as Missing Data

or Expired Data



# **About DBRS**

Offering multi-language concierge service for both subcontractors and general contractors, COMPASS by Bespoke Metrics is a leading prequalification platform that supports industry-wide data collection, verification, and analytics. Through the COMPASS 1Form, subcontractor data is collected using a unique standardized approach, while giving subcontractors full control of their data. General contractors benefit from the analytics derived from standardized data, enabling them to effectively manage project and default risks.

To learn more about Bespoke Metrics visit compass.bespokemetrics.com, follow us on Facebook, LinkedIn, and Instagram or contact us at info@compass-app.com or 1-800-689-6819 to schedule a demo.