

QUANTITY SURVEYING

Delivering Digital Transformation
to the AEC Industry

QUANTITY TAKEOFF AND COST ESTIMATION COURSE

By Samim Ahmed Laskar



**QUANTITY
SURVEYING**

Be a cost management professional in
the AEC Industry



**BIM BASED QTO
TAS C PRO**

Intelligent interactive BIM based 5D Quantity
Takeoff



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About The Trainer

Samim Ahmed Laskar is an associate member of RICS (AssocRICS), holding B Tech in Civil Engineer with more than six years of work experience in the AEC industry. He has worked in India, UAE and Bahrain; established himself as a Quantity Surveying Trainer. The Trainer has a diploma in Quantity Surveying and multiple BIM QS Trainer certification from Glodon Company Limited and Global eTraining. He has experience in training professionals at prominent organizations in ME including The Ministry of Works, Bahrain. With a motive of bringing digital transformation of construction companies to bring efficiencies and developing innovative solutions for clients, the trainer's focus is always on identifying and implementing innovative approaches to well equip professionals and students in their Quantity Surveying career. With a wealth of experience, the trainer is fully equipped to assist you in 5D Building Information Modeling (BIM), tackling your technology and professional challenges.

The cost management is an important part in construction project. The role of Quantity Surveyor is to ensure that the resources of the construction industry are utilized to the best advantage of society by providing the financial management of the project and cost consultancy to the client and designer, during the whole construction process. The quantification of construction works are conducted at various points during the planning and design phase, not just during construction document development phase. Primary activities of quantity surveying starts with preparing bill of quantities of the various project elements. For different type of construction contracts, a bill of quantities is prepared by quantifying the elements of the structure at different phases of construction. The practice of developing bill of quantities differs based on type of project. The Quantity Surveyor has the responsibility for generating these quantities through material take-offs by elemental method.



Benefits

- The ability to perform quantity surveying tasks with confidence.
- Achieve self-learning attitude in your profession as a Quantity Surveyor.
- Capable and confident to handle large scale projects.
- Knowledge of current industry practice in construction cost management.

Cubicost Quantity Takeoff Software allows users to create 3D BIM models from 2D drawings and calculates quantities for Architecture & Structure, MEP and Rebar works, as well as handling cost estimation and BOQ. These 3D BIM models contain detailed engineering data; leading to a faster, more efficient and accurate quantity takeoff. Built specifically for the Construction Industry, Cubicost was developed by Glodon Company LTD in conjunction with the Royal Institute of Chartered Surveyors (RICS) and has R&D partnerships with Autodesk, Microsoft and many more.

There are four software in the Cubicost range:



Cubicost Takeoff for Architecture & Structure (TAS) is a BIM-Based quantity takeoff software that helps AEC professionals calculate and check quantities rapidly and accurately. It works intuitively and collaboratively in the full life cycle of construction projects; thus improving the work efficiency and cost management of enterprises.



Cubicost Takeoff for Rebar (TRB) is a BIM-Based quantity takeoff software that focuses specifically on rebar. Its 3D visualization of rebar, quantity extraction via various reports and collaborative integration makes rebar takeoff precise, intelligent and efficient.



Cubicost Takeoff for Mechanical & Electrical (TME) is a BIM-based quantity takeoff software for MEP. It identifies devices with numerous types and specifications in all discipline, on all floors, in one click and works together with Cubicost TAS, TRB and TBQ.



Cubicost Tender Management Software (TBQ) is the perfect digital solution for cost estimation and management. TBQ is a server-based collaborative platform that seamlessly integrates with Cubicost TAS and TRB, allowing different teams to work together; forming an efficient construction cost solution, taking the lead in the era of BIM.



E-Tender is an easy-to-use web-based system that allows tenderers to submit price information during the tendering period. An invitation to tender will be sent to all qualified participants via email, to participate in the bid. Tender are compared and analysed automatically online.

Cubicost Benefits

- 4 times faster than traditional takeoff methods (Excel + CAD). Manage cost, efficiency, and time.
- Take-off complex and intricate construction projects.
- Transforms 2D drawings into 3D BIM Model easily.
- Ability to verify calculations – “Reversely-Check” function allows users to trace the origin of quantities in BIM models, making it easy to check and modify quantities.
- Improved accuracy – Methods of Measurements are built into the system (e.g., POMI, SMM7, NRM).
- “View Expressions function” allows users to easily check calculation breakdown of elements, e.g., length, area etc.
- It generates a detailed breakdown of quantities, e.g., by floor, element type, entire structure, and other conditions.
- Improve communication and teamwork - Supports rapid adjustments and reuse of BIM models, to reduce the working intensity and greatly increase the efficiency of team collaboration.
- Cubicost considers deductions automatically, ensuring accurate calculations.
- Compare quantity variance between original and tendered quantities.
- Efficient tendering, cost analysis, supplier management and data management.
- Software interoperability – Cubicost takes IFC files, CAD, JPEG, PDF, Scan PDF, and Vector PDF.

Certification and Partnerships

Cubicost has obtained IFC2x3 Coordination View 2.0 Export Certificate from BuildingSMART; the international standardization body that aims to improve the exchange of information between software applications used in the Construction industry. They have also formed partnerships with the following organisations:

Industry Partner:



R&D partner:



IFC Certification:



Notable Users:

AECOM

Amity University

Godrej Properties

NEYO Group

Prestige Group

Sheltera Consultants

L&T Realty

Aikya Engineering

Gammon

Samsung C&T

Prithu Homes

Saakaar Constructions

Vijay Raja Homes

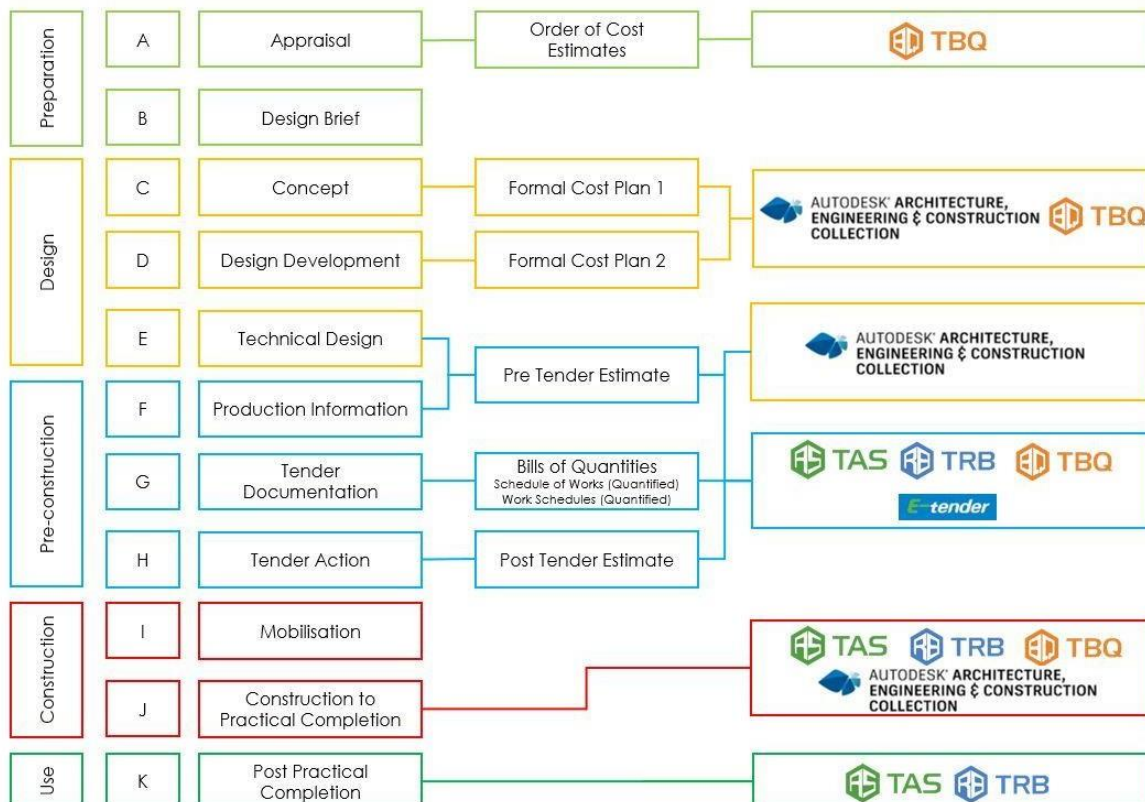
Gleeds Consulting

UASCO Consulting

5D BIM in a Project

The role of the quantity surveyor within the BIM environment is quite vital. In a project, the largest difference can be seen from the volume of detailed measurement by hand, that is no longer required and can be replaced by automatic quantity take off. Cubicost has the ability of automatic quantity takeoff, produce and link quantities to cost documents within the same suite. It covers the entire Construction-Cycle, from Design to Pre-Construction and Construction Work Stages, as shown below.

Figure 1. Cost Estimating, Element Cost Planning & Tender Document Work Stages

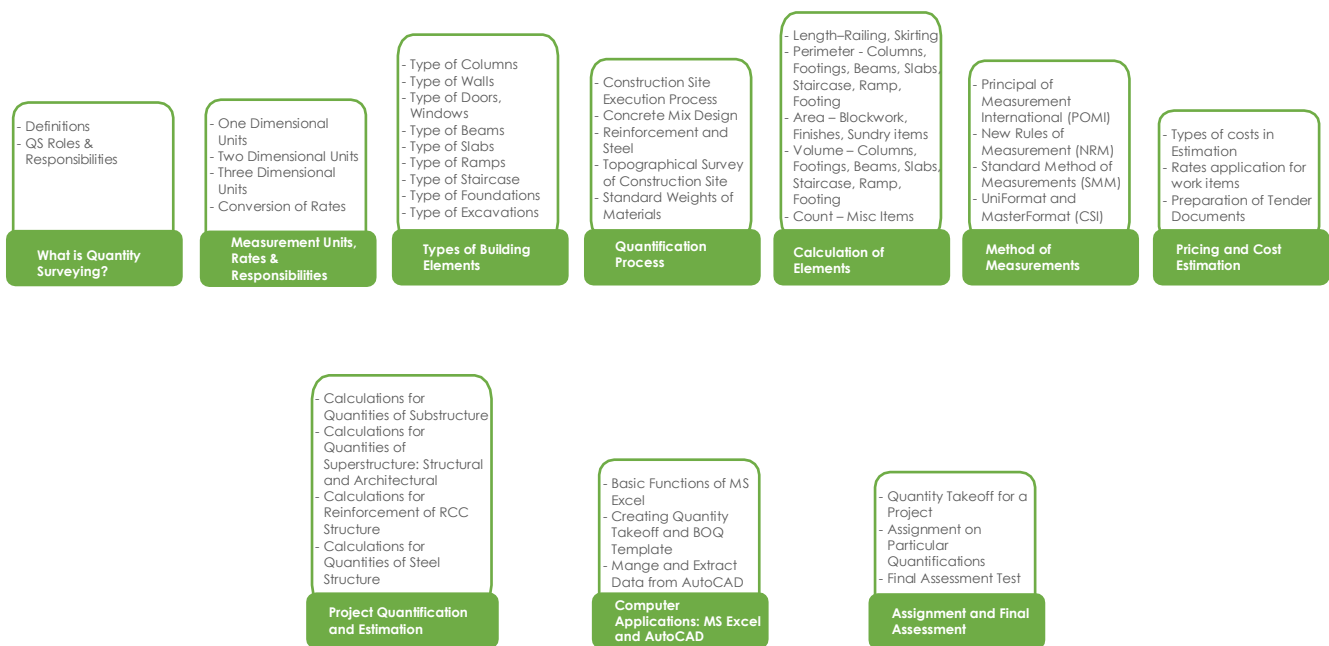


The trainer has trained and developed AEC professionals in the Kingdom of Bahrain and the MENA Region for years. There is always a continuous strive to improve courses based on innovation within the construction industry, as well as from the feedback of professionals in the industry.

Course Schedule

Level-1: Fundamentals of Quantity Surveying

This training workshop will consist of 10 chapters and 40 units taught over a time period of 12 days (3 hours per day). This course is specifically designed for quantity surveying students, professionals and BIM enthusiasts to enhance their knowledge with latest trends. This training will cover topics related to construction quantity takeoff, cost estimation and cost control. The full course outline is shown in the diagram below.





Level-2: BIM QS Mastery Course

This training workshop will consist of 7 modules and 33 units taught over a span of 3 days (8 hours per day). The full course outlines is shown in the diagram below. The course starts with the basics of BIM and it follows the workflows of Quantity Surveyors. This course covers from basic functions of software to all shortcuts and advance functional keys. This course covers all Architectural & Structural elements modelling and quantity take off.



Course Details

Level-1: Fundamentals of Quantity Surveying

Who should attend: Civil Engineering Students, Fresh Graduates in Civil Engineering, Quantity Surveying Students.

Number of participants: 12 per class

Venue: Online Training

Course Fee: Rs. 10,000

Total course duration: 60 Hour (20 Days)

Training material: We will provide all training lectures, notes and other materials.

Certification: From iWorkstation

Level-2: BIM QS Mastery Course

Who should attend: Quantity Surveyors, Consultants, Estimators, Contract Managers.

Number of participants: 12 per class

Venue: Online Training

Course Fee: Rs. 10,000

Total course duration: 30 Hour (10 Days)

Training material: We will provide all training lectures, CAD drawings and materials, as well as a "Training Library" containing video tutorials. A temporary software license will be provided.

Hardware for software: Participants can use their personal laptop/desktop. The software operates very well in Windows operating systems. The running speed of software varies with the RAM which is recommended as 8GB or above.

Certification: From iWorkstation

Summary: This course is designed for university students from Civil Engineering or Quantity Surveying background or AEC professionals who are BIM enthusiastic. The course covers topics related to different rules of measurement. Upon completion of this course the participant will have the ability of determining quantities of building materials based of different takeoff practices.

Prerequisites: Basic level knowledge of building construction. Knowledge of construction materials is an added value.

Course Outline:

A. Introduction

B. Quantity Surveying

1. What is Quantity Surveying
 - Definitions
 - QS Roles & Responsibilities
2. Measurement Units, Rates & Conversions
 - One Dimensional Units
 - Two Dimensional Units
 - Three Dimensional Units
 - Conversion of Rates
3. Types of Building Elements
 - Type of Walls
 - Type of Doors, Windows
 - Type of Beams
 - Type of Slabs
 - Type of Ramps
 - Type of Staircase
 - Type of Foundations
 - Type of Excavations

C. Quantification Process

1. Construction Site Execution Process
 - Earthwork and Excavation
 - Foundation Work
 - Grade & Type of Materials
2. Concrete Mix Design
 - Concrete Mix Calculation
 - Ready Mix Concrete
 - Compressive Strength
3. Reinforcement and Steel
 - Types of Steel
 - Bar Bending Schedule (BBS)
 - Types of Rebar Mesh
4. Topographical survey of construction site
 - Development Planning
 - Global Coordinates
5. Standard Weights of Materials
 - Cement
 - Sand
 - Water
 - Aggregate
6. Calculation of Elements
 - Length – Railing, Skirting
 - Perimeter - Columns, Footings, Beams, Slabs, Staircase, Ramp, Footing
 - Area – Blockwork, Finishes, Sundry items
 - Volume – Columns, Footings, Beams, Slabs, Staircase, Ramp, Footing
 - Count – Misc Items
7. Method of Measurements
 - Principal of Measurement International (POMI)
 - New Rules of Measurement (NRM)
 - Standard Method of Measurements (SMM)
 - Construction Specifications Institute - UniFormat and MasterFormat (CSI)

8. Pricing and Cost Estimation

- Types of costs in Estimation
- Rates application for work items
- Preparation of Tender Documents
- Rate Conversion

D. Project Quantification and Estimation

1. Calculations for Quantities of Sub-structure

- Earthwork and Excavation
- Foundation Work
- Neck Column
- Waterproofing and Protection
- Ground Slab and Ground Beam
- Retaining Wall
- Sump Pit, Holding Tank and Lift Pit

2. Calculations for Quantities of Super-structure

- Structural Elements
 - a. Column
 - b. Beam
 - c. Slab
 - d. Staircase
 - e. Misc Items
- Architectural Elements
 - a. Blockwork
 - b. Doors and Windows Opening
 - c. Waterproofing
 - d. Skirting, Wall, Floor and Ceiling Finishes
 - e. Roofing

3. Calculations for Reinforcement of RCC structure

- Calculation of Rebars in Footing
- Calculation of Rebars in Column
- Calculation of Rebars in Tie Beam
- Calculation of Rebars in Plinth Beam
- Calculation of Rebars in Grade Slab
- Calculation of Rebars in RCC Wall
- Calculation of Rebars in Sump Pit
- Calculation of Rebars in Misc Items

4. Calculations for Quantities of Steel Structure

- Calculations for Standard Steel Sections
 - a. Beam
 - b. Column
- Calculations for Standard Steel Deck
- Calculations for Steel Frames

E. Computer Applications

1. MS Excel and AutoCAD

- Basic Functions of MS Excel
- Creating Quantity Takeoff and BOQ Template
- Mange and Extract Data from AutoCAD

F. Assignment and Final Assessment

- Quantity Takeoff for a Project
- Assignment on Particular Quantifications
- Final Assessment Test



Summary: This course is designed for AEC professionals for BIM based Quantity takeoff using TAS C. The user can draw & edit drawings freely, making the process CAD friendly, efficient, intuitive and easy.

Prerequisites: Basic computer skills are required. Knowledge of CAD software is an added value.

Assessment: Each of the following course section has an assessment test. A participant is only eligible to continue to the next section by passing the assessment test.

Course Outline:

Quantity Takeoff Basic Tools

This section consists of video tutorials for a brief overview of the frequently used tools in quantity surveying practices. This section also covers the workflow of quantity surveyors in BIM environment.

BIM Based Quantity Takeoff

A. Introduction

1. Software Interface, Settings, Units of Measurements
2. Software Interoperability & BIM Model Import & Export

B. Create a New Project using a Built-in Measurement Method

1. Creating a New Project: Project Information, BQ Rule & Measurement System
2. Project Settings Interface: Floor Setting and Grade Setting

C. Create a BIM Model of a Structure from a 2D Drawing

1. Drawing Input Interface: Terminologies (Element, Entity, Public & Private Attributes)
2. Importing & Scaling of 2D Drawings: Drawing Management Tab (Add, Split Drawing)
3. Scale CAD Drawing Function
4. Create an Axis Grid:
 - Auto-Identify Axis Grid using Select by Layer or Colour Function
 - Define Axis Grid: Orthogonal, Arc & Diagonal Axis Grid
 - Draw Axis Grid: Draw using Point, Parallel, Point Angle Method
5. Drawing Relocate Function
6. Identify, Define & Draw Column
 - Auto-Identify Column using Select by Layer or Colour Function
 - Define Column: Rectangular, Round, Parameterized & Steel Column
 - Draw Column: Draw using Point, 2-Point Method
 - Rotate, Modify Elevation, Shape of Column
7. Identify, Define & Draw Wall
 - Auto-Identify Wall using Select by Layer or Colour Function
 - Define Wall: Concrete, Precast, Block, Brick, Drywall & Glass Wall
 - Draw Wall: Draw using Line, Three-Point Arc & Rectangle Method
8. Identify, Define & Draw Door/Window/Wall Opening
 - Auto Identify Schedule of Doors & Windows
 - Auto-Identify Door/Window/Wall Opening using Select by Layer or Colour
 - Define Door/Window/Wall Opening: Metal, Wood, Glass, Plastic
 - Draw Door/Window/Wall Opening: Draw using Point, Line, 3-Point Arc Method

9. Identify, Define & Draw Beam

- Auto-Identify Schedule of Beams
- Auto-Identify Beam using Select by Layer or Colour Function
- Define Beam: Rectangular, Arbitrary, Parametric Beam
- Draw Beam: Draw using Line, 3-Point Arc, Rectangle Method

10. Identify, Define & Draw Slab

- Auto-Identify Slab using Select by Layer or Colour Function
- Define Slab: In-situ Slab, Precast, Spiral Slab & Drop Panel
- Draw Slab: Draw using Point, Line, 3-Point Arc, Rectangle Method
- Draw Oblique Slab (3-Point, Lifting Point or Slope Coefficient Method)

11. Define & Draw Ramp

- Define Ramp: Draw Ramp and provide elevations
- Align Ramp with other elements

12. Define & Auto Layout, Draw Lintel

- Define Lintel: Rectangular, Arbitrary Lintel
- Auto Arrange Lintels over the Door, Windows, Openings
- Draw Lintel: Draw using Point, Line, 3-Point Arc Method

13. Define & Draw Staircase

- Define Staircase: Parameterized, Customized Staircase
- Draw Staircase: Draw using Point, 2-Point Method

14. Identify, Define & Draw Finishes, Waterproofing

- Auto Identify Schedule of Finishes
- Auto-Identify Room Finish using Select by Layer or Colour Function
- Define Finishes: Flooring, Skirting, Wall Finish, Ceiling, Suspended Ceiling
- Draw Finishes: Draw using Point, Line, 3-Point Arc, and Rectangle Method
- Define & Draw Vertical and Horizontal Waterproofing

15. Identify, Define & Draw Foundation

- Auto-Identify Pile Cap & Pad Foundation using Select by Layer or Colour Function
- Define Foundation: Pile, Raft Foundation, Strip Foundation, Pad Foundation
- Draw Foundation: Draw using Point, 2-Point Method
- Define & Draw Ground Beam, Sump Pit, Pier, Ditch
- Define Area Blinding & Auto Arrange below Foundations with Extensions
- Set Variable Cross-Section or Side Slopes for Raft Foundation

16. Auto-Generate Earthworks: Heavy, Trench, Pit Excavations

17. BIM Model Segmentation

- Determine and separate quantities as per conditions
- Produce quantity reports of Subcontractors, Progress Claims, Construction Zones

18. Define & Draw Roof

- Define Roof
- Draw Roof: Offset, Split Function
- Batch Define Oblique Slab by Elevation/Slope & Align with Roof Function

19. Define & Draw Steel Structures

20. Custom Quantity (2D Takeoff)

- Define Column, Beam, Slab and other steel structures

21. Batch Select & Copy Element, Entity Function

18. BIM Model Management

- IFC/RVT model import
- Match elements and materials
- Find model errors and solve
- Calculate, check 3D measures and produce quantity reports

18. Project Revisions and Variations

- Find drawing changes and allow changes in the model
- Calculate and produce change quantity reports

18. Cubicost Cloud

- Share BIM model with others
- Preview quantities of elements
- Comment on changes of elements

D. Calculation and Generation of Reports

1. Calculate Function for Quantity Take off

2. View Quantity Function for a Selected Entity: Set Classification & Export to Excel

3. View Expression Function for Quantity Checking

- View Measurement Settings & Measurement Rules
- View 3D Deduction, 3D Measurements & Calculation Expressions

4. View Quantity by Category for Detailed Quantities: Set Classification & Export to Excel

5. Report Preview Interface: Process, Summary, Indicator Analysis Reports

- Process, Summary, Indicator Analysis Reports
- Customize Report and Export to Excel

Estimation and Costing in BIM Environment

A. BQ Management

1. Create BQ
2. Link project to TBQ Tender Management software
3. Set BQ and Link Quantities
4. Manage Project data in TAS and TBQ

B. E-tender Platform

1. Publish Tender and send enquiries
2. Evaluate tenders with PTE
3. Perform Cost Analysis

Terms of Participation

- Only students or professionals from AEC background are eligible to participate in this training program.
- Basic computer skills are required in order to participate.
- Each participant should work independently on their own laptop/desktop during the training with access to a webcam.

System Requirements

| | BASIC CONFIGURATION | RECOMMENDED CONFIGURATION |
|------------------------|---|---|
| Operating System | Windows 7 64-bit Windows 8/8.1 64-bit Windows 10 64-bit | Windows 7 64-bit Windows 8/8.1 64-bit Windows 10 64-bit |
| Processor | Intel® Core™ i5 or higher | Intel® Core™ i5 or higher |
| Installed Memory (RAM) | 8 G | 16 G |
| Hard Disk Drive | Desktop: 20GB or more Laptop: 20GB or more | Desktop: 20GB or more Laptop: 20GB or more |
| Graphics Card | Independent Graphics Card: 1 GB or more | Independent Graphics Card: 2 GB or more |
| Display | Colour Display: 32-bit colour or higher The dual-screen mode is recommended for high efficiency Resolution: 1920x1280 | Colour Display: 32-bit colour or higher The dual-screen mode is recommended for high efficiency Resolution: 1920x1280 |

Learn More

1. Cubicost Overview: Click [HERE](#) to watch a video
2. Cubicost TAS and TRB integrated platform: Click [HERE](#) to watch a video
3. Developer Glodon introduction: Click [HERE](#) to watch a video

CONTACT DETAILS



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