

PHILIPPINE BIDDING DOCUMENTS
(As Harmonized with Development Partners)

**Procurement of
INFRASTRUCTURE
PROJECTS**

Government of the Republic of the Philippines

**RECONSTRUCTION AND RETROFITTING OF SAN
AGUSTIN CHURCH SAN NICOLAS 1ST, LUBAO
PAMPANGA**

**Sixth Edition
July 2020**

Preface

These Philippine Bidding Documents (PBDs) for the procurement of Infrastructure Projects (hereinafter referred to also as the “Works”) through Competitive Bidding have been prepared by the Government of the Philippines for use by all branches, agencies, departments, bureaus, offices, or instrumentalities of the government, including government-owned and/or -controlled corporations, government financial institutions, state universities and colleges, local government units, and autonomous regional government. The procedures and practices presented in this document have been developed through broad experience, and are for mandatory use in projects that are financed in whole or in part by the Government of the Philippines or any foreign government/foreign or international financing institution in accordance with the provisions of the 2016 revised Implementing Rules and Regulations (IRR) of Republic Act (RA) No. 9184.

The PBDs are intended as a model for admeasurements (unit prices or unit rates in a bill of quantities) types of contract, which are the most common in Works contracting.

The Bidding Documents shall clearly and adequately define, among others: (i) the objectives, scope, and expected outputs and/or results of the proposed contract; (ii) the eligibility requirements of Bidders; (iii) the expected contract duration; and (iv) the obligations, duties, and/or functions of the winning Bidder.

Care should be taken to check the relevance of the provisions of the PBDs against the requirements of the specific Works to be procured. If duplication of a subject is inevitable in other sections of the document prepared by the Procuring Entity, care must be exercised to avoid contradictions between clauses dealing with the same matter.

Moreover, each section is prepared with notes intended only as information for the Procuring Entity or the person drafting the Bidding Documents. They shall not be included in the final documents. The following general directions should be observed when using the documents:

- a. All the documents listed in the Table of Contents are normally required for the procurement of Infrastructure Projects. However, they should be adapted as necessary to the circumstances of the particular Project.
- b. Specific details, such as the “*name of the Procuring Entity*” and “*address for bid submission*,” should be furnished in the Instructions to Bidders, Bid Data Sheet, and Special Conditions of Contract. The final documents should contain neither blank spaces nor options.
- c. This Preface and the footnotes or notes in italics included in the Invitation to Bid, BDS, General Conditions of Contract, Special Conditions of Contract, Specifications, Drawings, and Bill of Quantities are not part of the text of the final document, although they contain instructions that the Procuring Entity should strictly follow.
- d. The cover should be modified as required to identify the Bidding Documents as to the names of the Project, Contract, and Procuring Entity, in addition to date of issue.

- e. Modifications for specific Procurement Project details should be provided in the Special Conditions of Contract as amendments to the Conditions of Contract. For easy completion, whenever reference has to be made to specific clauses in the Bid Data Sheet or Special Conditions of Contract, these terms shall be printed in bold typeface on Sections I (Instructions to Bidders) and III (General Conditions of Contract), respectively.
- f. For guidelines on the use of Bidding Forms and the procurement of Foreign-Assisted Projects, these will be covered by a separate issuance of the Government Procurement Policy Board.

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Glossary of Terms, Abbreviations, and Acronyms

ABC – Approved Budget for the Contract.

ARCC – Allowable Range of Contract Cost.

BAC – Bids and Awards Committee.

Bid – A signed offer or proposal to undertake a contract submitted by a bidder in response to and in consonance with the requirements of the bidding documents. Also referred to as *Proposal* and *Tender*. (2016 revised IRR, Section 5[c])

Bidder – Refers to a contractor, manufacturer, supplier, distributor and/or consultant who submits a bid in response to the requirements of the Bidding Documents. (2016 revised IRR, Section 5[d])

Bidding Documents – The documents issued by the Procuring Entity as the bases for bids, furnishing all information necessary for a prospective bidder to prepare a bid for the Goods, Infrastructure Projects, and/or Consulting Services required by the Procuring Entity. (2016 revised IRR, Section 5[e])

BIR – Bureau of Internal Revenue.

BSP – Bangko Sentral ng Pilipinas.

CDA – Cooperative Development Authority.

Consulting Services – Refer to services for Infrastructure Projects and other types of projects or activities of the GOP requiring adequate external technical and professional expertise that are beyond the capability and/or capacity of the GOP to undertake such as, but not limited to: (i) advisory and review services; (ii) pre-investment or feasibility studies; (iii) design; (iv) construction supervision; (v) management and related services; and (vi) other technical services or special studies. (2016 revised IRR, Section 5[i])

Contract – Refers to the agreement entered into between the Procuring Entity and the Supplier or Manufacturer or Distributor or Service Provider for procurement of Goods and Services; Contractor for Procurement of Infrastructure Projects; or Consultant or Consulting Firm for Procurement of Consulting Services; as the case may be, as recorded in the Contract Form signed by the parties, including all attachments and appendices thereto and all documents incorporated by reference therein.

Contractor – is a natural or juridical entity whose proposal was accepted by the Procuring Entity and to whom the Contract to execute the Work was awarded. Contractor as used in these Bidding Documents may likewise refer to a supplier, distributor, manufacturer, or consultant.

CPI – Consumer Price Index.

DOLE – Department of Labor and Employment.

DTI – Department of Trade and Industry.

Foreign-funded Procurement or Foreign-Assisted Project – Refers to procurement whose funding source is from a foreign government, foreign or international financing institution as specified in the Treaty or International or Executive Agreement. (2016 revised IRR, Section 5[b]).

GFI – Government Financial Institution.

GOCC – Government-owned and/or –controlled corporation.

Goods – Refer to all items, supplies, materials and general support services, except Consulting Services and Infrastructure Projects, which may be needed in the transaction of public businesses or in the pursuit of any government undertaking, project or activity, whether in the nature of equipment, furniture, stationery, materials for construction, or personal property of any kind, including non-personal or contractual services such as the repair and maintenance of equipment and furniture, as well as trucking, hauling, janitorial, security, and related or analogous services, as well as procurement of materials and supplies provided by the Procuring Entity for such services. The term “related” or “analogous services” shall include, but is not limited to, lease or purchase of office space, media advertisements, health maintenance services, and other services essential to the operation of the Procuring Entity. (2016 revised IRR, Section 5[r])

GOP – Government of the Philippines.

Infrastructure Projects – Include the construction, improvement, rehabilitation, demolition, repair, restoration or maintenance of roads and bridges, railways, airports, seaports, communication facilities, civil works components of information technology projects, irrigation, flood control and drainage, water supply, sanitation, sewerage and solid waste management systems, shore protection, energy/power and electrification facilities, national buildings, school buildings, hospital buildings, and other related construction projects of the government. Also referred to as *civil works or works*. (2016 revised IRR, Section 5[u])

LGUs – Local Government Units.

NFCC – Net Financial Contracting Capacity.

NGA – National Government Agency.

PCAB – Philippine Contractors Accreditation Board.

PhilGEPS - Philippine Government Electronic Procurement System.

Procurement Project – refers to a specific or identified procurement covering goods, infrastructure project or consulting services. A Procurement Project shall be described, detailed, and scheduled in the Project Procurement Management Plan prepared by the agency which shall be consolidated in the procuring entity's Annual Procurement Plan. (GPPB Circular No. 06-2019 dated 17 July 2019)

PSA – Philippine Statistics Authority.

SEC – Securities and Exchange Commission.

SLCC – Single Largest Completed Contract.

UN – United Nations.

Section I. Invitation to Bid

Notes on the Invitation to Bid

The Invitation to Bid (IB) provides information that enables potential Bidders to decide whether to participate in the procurement at hand. The IB shall be posted in accordance with Section 21.2 of the 2016 revised IRR of RA No. 9184.

Apart from the essential items listed in the Bidding Documents, the IB should also indicate the following:

- a. The date of availability of the Bidding Documents, which shall be from the time the IB is first advertised/posted until the deadline for the submission and receipt of bids;
- b. The place where the Bidding Documents may be acquired or the website where it may be downloaded;
- c. The deadline for the submission and receipt of bids; and
- d. Any important bid evaluation criteria.

The IB should be incorporated into the Bidding Documents. The information contained in the IB must conform to the Bidding Documents and in particular to the relevant information in the Bid Data Sheet.



Republic of the Philippines

Tourism Infrastructure & Enterprise Zone Authority

Invitation to Bid

RECONSTRUCTION AND RETROFITTING OF SAN AGUSTIN CHURCH SAN NICOLAS 1ST, LUBAO PAMPANGA.

Project Identification/Invitation to Bid No. **24-05-0015**

1. The Tourism Infrastructure and Enterprise Zone Authority, through the Approved Corporate Budget, intends to apply the sum of **Twenty Nine Million Nine Hundred Fifty One Thousand One Hundred Ten Pesos and Twenty Two Centavos Only (P 29,951,110.22)** being the Approved Budget for the Contract (ABC), as payment contract for the **RECONSTRUCTION AND RETROFITTING OF SAN AGUSTIN CHURCH SAN NICOLAS 1ST, LUBAO PAMPANGA**. Bids received in excess of the ABC shall be automatically rejected at Bid Opening.
2. The Tourism Infrastructure and Enterprise Zone Authority now invites bids for the above procurement project. Completion of the works is required within One Hundred Eighty (180) calendar days. Bidders should have completed, within five (5) years period from the date of submission and receipt of bids, a contract similar to the Project. The description of an eligible bidder is contained in the Bidding Documents, particularly, in Section II. Instructions to Bidders.
3. Bidding will be conducted through open competitive bidding procedures using non-discretionary pass/fail criteria as specified in the Implementing Rules and Regulations (IRR) of Republic Act 9184 (R.A. 9184), otherwise known as the "Government Procurement Reform Act".
4. Bidding is restricted to Filipino citizens/sole proprietorships, partnership, or organizations with at least seventy-five percent (75%) interest or outstanding capital stock belonging to citizens of the Philippines.
5. Interested bidders may obtain further information from the TIEZA BAC Secretariat (**please see contact details below**) and inspect the Bidding Documents on our website and at the posting on the Philippine Government Electronic Procurement Service (PhilGEPS) website.
6. A complete set of bidding documents may be acquire by interested Bidders through the following modes:

ON-PREMISE:

The prospective bidders shall accomplish the issued Authority to Accept Payment (ATAP) form for payment at the Treasurer's Office.

The bidding documents will be issued to the prospective bidder upon settlement of the Order of Payment.



6th & 7th Floors, Tower 1, Double Dragon Plaza, Double Dragon Meridian Park
Macapagal Avenue corner EDSA Extension Bay Area, Pasay City 1302, Philippines
(+632) 8249-5900 to 79 www.tieza.gov.ph



ONLINE:

The Authority to Accept Payment (ATAP) is available at TIEZA's website. Interested bidders can download the ATAP, completely fill out the form and send the scanned copy to the BAC Secretariat's email. An instruction to settle thru bank deposit will be given thereafter.

Bidders who will buy the bidding documents shall deposit the amount in either one of the following TIEZA bank accounts:

Account Name: TIEZA

Development Bank of the Philippines (DBP) Account #: 0405-018676-030 (Makati Branch)

Land Bank of the Philippines (LBP) Account #: 1782-1046-47 (Pasong Tamo Branch) The deposit slip shall be kept and a scanned copy shall be sent to tieza.bacsecretariat@gmail.com.

Please note further that purchase of the bidding documents are available on **May 28, 2024 to June 18, 2024 at 8:00 am to 5:00 pm**, except Fridays, Saturdays, Sundays and Holidays and on **June 19, 2024 from 8:00 to 9:00 a.m.** Please note the payment for the bid documents is a non-refundable fee in the amount of **Twenty Five Thousand Pesos Only (PhP 25,000.00)**.


It may also be downloaded free of charge from the website of the Philippine Government Electronic Procurement System (PhilGEPS) and the website of the Procuring Entity, provided that bidders shall pay the applicable fee for the Bidding Documents not later than the submission of their bids. **Bidders must submit to the BAC Secretariat a copy of the official receipt as proof of the purchase of bidding documents on or before 5:00 p.m. on the day of bidding.**

7. The Tourism Infrastructure and Enterprise Zone Authority will hold face to face Pre-Bid Conference on **June 5, 2024 @ 10:00 A.M.** at 7th Floor TIEZA TEZ Conference Room Double Dragon Plaza Pasay City
8. Bids (Technical and Financial) in hard copies (one original and two duplicates, sealed in their respective envelopes) enclosed in one outer envelope must be submitted face to face and duly received by the BAC Secretariat at the address below on or before **June 19, 2024 @ 9: 30 A.M.** **Proper tabbing of every requirement is encouraged.**

Bidder shall submit its bid in one (1) outer envelope containing three (3) envelopes (Original bid, Copy 1, and Copy 2). Each of the three (3) envelopes shall contain two envelopes corresponding to Technical and Financial Proposal. Failure to comply with this requirement shall render the bidder disqualified from the bidding.

9. All bids must be accompanied by a bid security in any of the acceptable forms and in the amount stated in **ITB** Clause 16.

10. Bid opening shall be done face to face on **June 19, 2024 @10: 00 A.M.** at the TEZ Conference Room on the 7th Floor, Tower 1 Double Dragon Plaza Double Dragon Meridian Park Macapagal Avenue corner EDSA Extension Bay Area Pasay City. Bids will be opened in the presence of the bidders' representatives who choose to attend the activity. Late bids shall not be accepted.
11. The Tourism Infrastructure and Enterprise Zone Authority reserves the right to reject any and all bids, declare a failure of bidding or not award the contract in accordance with the applicable provision of the 2016 Revised IRR of R.A. 9184.
For further information, please refer to:
BAC Secretariat
7th Floor, Tower 1 Double Dragon Plaza Double Dragon Meridian Park Macapagal Avenue corner EDSA Extension Bay Area Pasay City
(+632) 249-5986 loc. 713 or 714
bacsecretariat@tieza.gov.ph
<http://www.tieza.gov.ph>
12. You may visit the following websites:
For downloading of Bidding Documents:
<https://notices.philgeps.gov.ph/stieza.gov.ph>
For inquiries/concerns: bacsecretariat@tieza.gov.ph
For purchase of bidding documents: tieza.bacsecretariat@gmail.com


ATTY. NIÑO RUPERTO F. AQUINO
Chairperson, Bids and Awards Committee

Section II. Instructions to Bidders

Notes on the Instructions to Bidders

This Section on the Instruction to Bidders (ITB) provides the information necessary for bidders to prepare responsive bids, in accordance with the requirements of the Procuring Entity. It also provides information on bid submission, eligibility check, opening and evaluation of bids, post-qualification, and on the award of contract.

1. Scope of Bid

The Procuring Entity, *[Tourism Infrastructure and Enterprise Zone Authority]* invites Bids for the **RECONSTRUCTION AND RETROFITTING OF SAN AGUSTIN CHURCH SAN NICOLAS 1ST, LUBAO PAMPANGA**, with Project Identification Number *[Invitation to Bid no. **24-05-0015**.*

[Note: The Project Identification Number is assigned by the Procuring Entity based on its own coding scheme and is not the same as the PhilGEPS reference number, which is generated after the posting of the bid opportunity on the PhilGEPS website.]

The Procurement Project (referred to herein as “Project”) is for the construction of Works, as described in Section VI (Specifications).

2. Funding Information

2.1. The GOP through the source of funding as indicated below for *[2024]* in the amount of **Twenty Nine Million Nine Hundred Fifty One Thousand One Hundred Ten Pesos and Twenty Two Centavos Only (P 29,951,110.22)**

2.2. The source of funding is:

a. the Corporate Operating Budget.

3. Bidding Requirements

The Bidding for the Project shall be governed by all the provisions of RA No. 9184 and its 2016 revised IRR, including its Generic Procurement Manual and associated policies, rules and regulations as the primary source thereof, while the herein clauses shall serve as the secondary source thereof.

Any amendments made to the IRR and other GPPB issuances shall be applicable only to the ongoing posting, advertisement, or invitation to bid by the BAC through the issuance of a supplemental or bid bulletin.

The Bidder, by the act of submitting its Bid, shall be deemed to have inspected the site, determined the general characteristics of the contracted Works and the conditions for this Project, such as the location and the nature of the work; (b) climatic conditions; (c) transportation facilities; (c) nature and condition of the terrain, geological conditions at the site communication facilities, requirements, location and availability of construction aggregates and other materials, labor, water, electric power and access roads; and (d) other factors that may affect the cost, duration and execution or implementation of the contract, project, or work and examine all instructions, forms, terms, and project requirements in the Bidding Documents.

4. Corrupt, Fraudulent, Collusive, Coercive, and Obstructive Practices

The Procuring Entity, as well as the Bidders and Contractors, shall observe the highest standard of ethics during the procurement and execution of the contract. They or through an agent shall not engage in corrupt, fraudulent, collusive, coercive, and

obstructive practices defined under Annex “I” of the 2016 revised IRR of RA No. 9184 or other integrity violations in competing for the Project.

5. Eligible Bidders

- 5.1. Only Bids of Bidders found to be legally, technically, and financially capable will be evaluated.
- 5.2. The Bidder must have an experience of having completed a Single Largest Completed Contract (SLCC) that is similar to this Project, equivalent to at least fifty percent (50%) of the ABC adjusted, if necessary, by the Bidder to current prices using the PSA’s CPI, except under conditions provided for in Section 23.4.2.4 of the 2016 revised IRR of RA No. 9184.

A contract is considered to be “similar” to the contract to be bid if it has the major categories of work stated in the **BDS**.

- 5.3. For Foreign-funded Procurement, the Procuring Entity and the foreign government/foreign or international financing institution may agree on another track record requirement, as specified in the Bidding Document prepared for this purpose.
- 5.4. The Bidders shall comply with the eligibility criteria under Section 23.4.2 of the 2016 IRR of RA No. 9184.

6. Origin of Associated Goods

There is no restriction on the origin of Goods other than those prohibited by a decision of the UN Security Council taken under Chapter VII of the Charter of the UN.

7. Subcontracts

- a. Subcontracting is not allowed

8. Pre-Bid Conference

The Procuring Entity will hold face to face Pre-Bid Conference on **June 5, 2024 @ 10:00 A.M.** at its physical address at **7th Floor TIEZA TEZ Conference Room Double Dragon Plaza Pasay City** as indicated in paragraph 6 of the **IB**.

9. Clarification and Amendment of Bidding Documents

Prospective bidders may request for clarification on and/or interpretation of any part of the Bidding Documents. Such requests must be in writing and received by the Procuring Entity, either at its given address or through electronic mail indicated in the **IB**, at least ten (10) calendar days before the deadline set for the submission and receipt of Bids.

10. Documents Comprising the Bid: Eligibility and Technical Components

- 10.1. The first envelope shall contain the eligibility and technical documents of the Bid as specified in **Section IX. Checklist of Technical and Financial Documents**.
- 10.2. If the eligibility requirements or statements, the bids, and all other documents for submission to the BAC are in foreign language other than English, it must be accompanied by a translation in English, which shall be authenticated by the appropriate Philippine foreign service establishment, post, or the equivalent office having jurisdiction over the foreign bidder's affairs in the Philippines. For Contracting Parties to the Apostille Convention, only the translated documents shall be authenticated through an apostille pursuant to GPPB Resolution No. 13-2019 dated 23 May 2019. The English translation shall govern, for purposes of interpretation of the bid.
- 10.3. A valid PCAB License is required, and in case of joint ventures, a valid special PCAB License, and registration for the type and cost of the contract for this Project. Any additional type of Contractor license or permit shall be indicated in the **BDS**.
- 10.4. A List of Contractor's key personnel (e.g., Project Manager, Project Engineers, Materials Engineers, and Foremen) assigned to the contract to be bid, with their complete qualification and experience data shall be provided. These key personnel must meet the required minimum years of experience set in the **BDS**.
- 10.5. A List of Contractor's major equipment units, which are owned, leased, and/or under purchase agreements, supported by proof of ownership, certification of availability of equipment from the equipment lessor/vendor for the duration of the project, as the case may be, must meet the minimum requirements for the contract set in the **BDS**.

11. Documents Comprising the Bid: Financial Component

- 11.1. The second bid envelope shall contain the financial documents for the Bid as specified in **Section IX. Checklist of Technical and Financial Documents**.
- 11.2. Any bid exceeding the ABC indicated in paragraph 1 of the **IB** shall not be accepted.
- 11.3. For Foreign-funded procurement, a ceiling may be applied to bid prices provided the conditions are met under Section 31.2 of the 2016 revised IRR of RA No. 9184.

12. Alternative Bids

Bidders shall submit offers that comply with the requirements of the Bidding Documents, including the basic technical design as indicated in the drawings and

specifications. Unless there is a value engineering clause in the **BDS**, alternative Bids shall not be accepted.

13. Bid Prices

All bid prices for the given scope of work in the Project as awarded shall be considered as fixed prices, and therefore not subject to price escalation during contract implementation, except under extraordinary circumstances as determined by the NEDA and approved by the GPPB pursuant to the revised Guidelines for Contract Price Escalation guidelines.

14. Bid and Payment Currencies

14.1. Bid prices may be quoted in the local currency or tradeable currency accepted by the BSP at the discretion of the Bidder. However, for purposes of bid evaluation, Bids denominated in foreign currencies shall be converted to Philippine currency based on the exchange rate as published in the BSP reference rate bulletin on the day of the bid opening.

14.2. *Payment of the contract price shall be made in:*

- a. Philippine Pesos.

15. Bid Security

15.1. The Bidder shall submit a Bid Securing Declaration or any form of Bid Security in the amount indicated in the **BDS**, which shall be not less than the percentage of the ABC in accordance with the schedule in the **BDS**.

15.2. The Bid and bid security shall be valid until *[120 Calendar Days]*. Any bid not accompanied by an acceptable bid security shall be rejected by the Procuring Entity as non-responsive.

16. Sealing and Marking of Bids

Each Bidder shall submit one copy of the first and second components of its Bid.

The Procuring Entity may request additional hard copies and/or electronic copies of the Bid. However, failure of the Bidders to comply with the said request shall not be a ground for disqualification.

If the Procuring Entity allows the submission of bids through online submission to the given website or any other electronic means, the Bidder shall submit an electronic copy of its Bid, which must be digitally signed. An electronic copy that cannot be opened or is corrupted shall be considered non-responsive and, thus, automatically disqualified.

17. Deadline for Submission of Bids

The Bidders shall submit on the specified date and time and either at its physical address or through online submission as indicated in paragraph 7 of the **IB**.

18. Opening and Preliminary Examination of Bids

18.1. The BAC shall open the Bids in public at the time, on the date, and at the place specified in paragraph 9 of the **IB**. The Bidders' representatives who are present shall sign a register evidencing their attendance. In case videoconferencing, webcasting or other similar technologies will be used, attendance of participants shall likewise be recorded by the BAC Secretariat.

In case the Bids cannot be opened as scheduled due to justifiable reasons, the rescheduling requirements under Section 29 of the 2016 revised IRR of RA No. 9184 shall prevail.

18.2. The preliminary examination of Bids shall be governed by Section 30 of the 2016 revised IRR of RA No. 9184.

19. Detailed Evaluation and Comparison of Bids

19.1. The Procuring Entity's BAC shall immediately conduct a detailed evaluation of all Bids rated "*passed*" using non-discretionary pass/fail criteria. The BAC shall consider the conditions in the evaluation of Bids under Section 32.2 of 2016 revised IRR of RA No. 9184.

19.2. If the Project allows partial bids, all Bids and combinations of Bids as indicated in the **BDS** shall be received by the same deadline and opened and evaluated simultaneously so as to determine the Bid or combination of Bids offering the lowest calculated cost to the Procuring Entity. Bid Security as required by **ITB** Clause 16 shall be submitted for each contract (lot) separately.

19.3. In all cases, the NFCC computation pursuant to Section 23.4.2.6 of the 2016 revised IRR of RA No. 9184 must be sufficient for the total of the ABCs for all the lots participated in by the prospective Bidder.

20. Post Qualification

Within a non-extendible period of five (5) calendar days from receipt by the Bidder of the notice from the BAC that it submitted the Lowest Calculated Bid, the Bidder shall submit its latest income and business tax returns filed and paid through the BIR Electronic Filing and Payment System (eFPS), and other appropriate licenses and permits required by law and stated in the **BDS**.

21. Signing of the Contract

The documents required in Section 37.2 of the 2016 revised IRR of RA No. 9184 shall form part of the Contract. Additional Contract documents are indicated in the **BDS**.

Section III. Bid Data Sheet

Notes on the Bid Data Sheet (BDS)

The Bid Data Sheet (BDS) consists of provisions that supplement, amend, or specify in detail, information, or requirements included in the ITB found in Section II, which are specific to each procurement.

This Section is intended to assist the Procuring Entity in providing the specific information in relation to corresponding clauses in the ITB and has to be prepared for each specific procurement.

The Procuring Entity should specify in the BDS information and requirements specific to the circumstances of the Procuring Entity, the processing of the procurement, and the bid evaluation criteria that will apply to the Bids. In preparing the BDS, the following aspects should be checked:

- a. Information that specifies and complements provisions of the ITB must be incorporated.
- b. Amendments and/or supplements, if any, to provisions of the ITB as necessitated by the circumstances of the specific procurement, must also be incorporated.

Bid Data Sheet

| ITB Clause | | | | | | | | | | |
|---|---|----------------------------|---------------------------|----------------------------|---|--|--|---|--|--|
| 5.2 | For this purpose, contracts similar to the Project refer to contracts which have the same major categories of work, which shall be: <i>Civil Works</i> | | | | | | | | | |
| 7.1 | <i>Subcontracting is not allowed.</i> | | | | | | | | | |
| 10.3 | <i>Preferred Contractors License Building – Small B</i> | | | | | | | | | |
| 10.4 | <p>The key personnel must meet the required minimum years of experience set below:</p> <table><tr><td><u>Key Personnel</u></td><td><u>General Experience</u></td><td><u>Relevant Experience</u></td></tr><tr><td colspan="3"><i>See attached end-user requirements</i></td></tr><tr><td colspan="3"><i>In addition the bidder must certify that the foregoing personnel shall perform work exclusively for the project until completion of the project. Please see the attached Form for the purpose.</i></td></tr></table> | <u>Key Personnel</u> | <u>General Experience</u> | <u>Relevant Experience</u> | <i>See attached end-user requirements</i> | | | <i>In addition the bidder must certify that the foregoing personnel shall perform work exclusively for the project until completion of the project. Please see the attached Form for the purpose.</i> | | |
| <u>Key Personnel</u> | <u>General Experience</u> | <u>Relevant Experience</u> | | | | | | | | |
| <i>See attached end-user requirements</i> | | | | | | | | | | |
| <i>In addition the bidder must certify that the foregoing personnel shall perform work exclusively for the project until completion of the project. Please see the attached Form for the purpose.</i> | | | | | | | | | | |
| 10.5 | <p>The minimum major equipment requirements are the following:</p> <table><tr><td><u>Equipment</u></td><td><u>Capacity</u></td><td><u>Number of Units</u></td></tr><tr><td colspan="3"><i>See attached end-user requirements</i></td></tr><tr><td colspan="3"><i>In addition the bidder must certify under oath that the equipment shall be exclusively used for the project until completion of the project. Please see attached Form for the purpose</i></td></tr></table> | <u>Equipment</u> | <u>Capacity</u> | <u>Number of Units</u> | <i>See attached end-user requirements</i> | | | <i>In addition the bidder must certify under oath that the equipment shall be exclusively used for the project until completion of the project. Please see attached Form for the purpose</i> | | |
| <u>Equipment</u> | <u>Capacity</u> | <u>Number of Units</u> | | | | | | | | |
| <i>See attached end-user requirements</i> | | | | | | | | | | |
| <i>In addition the bidder must certify under oath that the equipment shall be exclusively used for the project until completion of the project. Please see attached Form for the purpose</i> | | | | | | | | | | |
| | <i>Not Applicable</i> | | | | | | | | | |
| 15.1 | <p>The bid security shall be in the form of a Bid Securing Declaration or any of the following forms and amounts:</p> <p>a. The amount of not less than 2% if bid security is in cash, cashier’s/manager’s check, bank draft/guarantee or irrevocable letter of credit;</p> <p>b. The amount of not less than 5% if bid security is in Surety Bond.</p> | | | | | | | | | |
| 19.2 | <p>Partial bids are allowed, as follows: <i>[Insert grouping of lots by specifying the items and the quantity for every identified lot.]</i></p> | | | | | | | | | |
| 20 | <i>Not Applicable</i> | | | | | | | | | |
| 21 | Additional contract documents relevant to the Project as required by existing laws and/or the Procuring Entity, such as construction schedule and S-curve, manpower schedule, construction methods, equipment utilization schedule, and PERT/CPM, and a copy Construction Safety and Health Program shall be included in the submission of Technical Proposal. | | | | | | | | | |

| | |
|--|--|
| | Construction Safety and Health Program approved by the Department of Labor and Employment or proof of application with DOLE shall be submitted as part of the contract with winning bidder. |
|--|--|

Section IV. General Conditions of Contract

Notes on the General Conditions of Contract

The General Conditions of Contract (GCC) in this Section, read in conjunction with the Special Conditions of Contract in Section V and other documents listed therein, should be a complete document expressing all the rights and obligations of the parties.

Matters governing performance of the Contractor, payments under the contract, or matters affecting the risks, rights, and obligations of the parties under the contract are included in the GCC and Special Conditions of Contract.

Any complementary information, which may be needed, shall be introduced only through the Special Conditions of Contract.

1. Scope of Contract

This Contract shall include all such items, although not specifically mentioned, that can be reasonably inferred as being required for its completion as if such items were expressly mentioned herein. All the provisions of RA No. 9184 and its 2016 revised IRR, including the Generic Procurement Manual, and associated issuances, constitute the primary source for the terms and conditions of the Contract, and thus, applicable in contract implementation. Herein clauses shall serve as the secondary source for the terms and conditions of the Contract.

This is without prejudice to Sections 74.1 and 74.2 of the 2016 revised IRR of RA No. 9184 allowing the GPPB to amend the IRR, which shall be applied to all procurement activities, the advertisement, posting, or invitation of which were issued after the effectivity of the said amendment.

2. Sectional Completion of Works

If sectional completion is specified in the **Special Conditions of Contract (SCC)**, references in the Conditions of Contract to the Works, the Completion Date, and the Intended Completion Date shall apply to any Section of the Works (other than references to the Completion Date and Intended Completion Date for the whole of the Works).

3. Possession of Site

4.1. The Procuring Entity shall give possession of all or parts of the Site to the Contractor based on the schedule of delivery indicated in the **SCC**, which corresponds to the execution of the Works. If the Contractor suffers delay or incurs cost from failure on the part of the Procuring Entity to give possession in accordance with the terms of this clause, the Procuring Entity's Representative shall give the Contractor a Contract Time Extension and certify such sum as fair to cover the cost incurred, which sum shall be paid by Procuring Entity.

4.2. If possession of a portion is not given by the above date, the Procuring Entity will be deemed to have delayed the start of the relevant activities. The resulting adjustments in contract time to address such delay may be addressed through contract extension provided under Annex "E" of the 2016 revised IRR of RA No. 9184.

4. The Contractor's Obligations

The Contractor shall employ the key personnel named in the Schedule of Key Personnel indicating their designation, in accordance with **ITB** Clause 10.3 and specified in the **BDS**, to carry out the supervision of the Works.

The Procuring Entity will approve any proposed replacement of key personnel only if their relevant qualifications and abilities are equal to or better than those of the personnel listed in the Schedule.

5. Performance Security

- 5.1. Within ten (10) calendar days from receipt of the Notice of Award from the Procuring Entity but in no case later than the signing of the contract by both parties, the successful Bidder shall furnish the performance security in any of the forms prescribed in Section 39 of the 2016 revised IRR.
- 5.2. The Contractor, by entering into the Contract with the Procuring Entity, acknowledges the right of the Procuring Entity to institute action pursuant to RA No. 3688 against any subcontractor be they an individual, firm, partnership, corporation, or association supplying the Contractor with labor, materials and/or equipment for the performance of this Contract.

6. Site Investigation Reports

The Contractor, in preparing the Bid, shall rely on any Site Investigation Reports referred to in the SCC supplemented by any information obtained by the Contractor.

7. Warranty

- 7.1. In case the Contractor fails to undertake the repair works under Section 62.2.2 of the 2016 revised IRR, the Procuring Entity shall forfeit its performance security, subject its property(ies) to attachment or garnishment proceedings, and perpetually disqualify it from participating in any public bidding. All payables of the GOP in his favor shall be offset to recover the costs.
- 7.2. The warranty against Structural Defects/Failures, except that occasioned-on force majeure, shall cover the period from the date of issuance of the Certificate of Final Acceptance by the Procuring Entity. Specific duration of the warranty is found in the SCC.

8. Liability of the Contractor

Subject to additional provisions, if any, set forth in the SCC, the Contractor's liability under this Contract shall be as provided by the laws of the Republic of the Philippines.

If the Contractor is a joint venture, all partners to the joint venture shall be jointly and severally liable to the Procuring Entity.

9. Termination for Other Causes

Contract termination shall be initiated in case it is determined *prima facie* by the Procuring Entity that the Contractor has engaged, before, or during the implementation of the contract, in unlawful deeds and behaviors relative to contract acquisition and implementation, such as, but not limited to corrupt, fraudulent, collusive, coercive, and obstructive practices as stated in ITB Clause 4.

10. Dayworks

Subject to the guidelines on Variation Order in Annex “E” of the 2016 revised IRR of RA No. 9184, and if applicable as indicated in the SCC, the Dayworks rates in the Contractor’s Bid shall be used for small additional amounts of work only when the Procuring Entity’s Representative has given written instructions in advance for additional work to be paid for in that way.

11. Program of Work

- 11.1. The Contractor shall submit to the Procuring Entity’s Representative for approval the said Program of Work showing the general methods, arrangements, order, and timing for all the activities in the Works. The submissions of the Program of Work are indicated in the SCC.
- 11.2. The Contractor shall submit to the Procuring Entity’s Representative for approval an updated Program of Work at intervals no longer than the period stated in the SCC. If the Contractor does not submit an updated Program of Work within this period, the Procuring Entity’s Representative may withhold the amount stated in the SCC from the next payment certificate and continue to withhold this amount until the next payment after the date on which the overdue Program of Work has been submitted.

12. Instructions, Inspections and Audits

The Contractor shall permit the GOP or the Procuring Entity to inspect the Contractor’s accounts and records relating to the performance of the Contractor and to have them audited by auditors of the GOP or the Procuring Entity, as may be required.

13. Advance Payment

The Procuring Entity shall, upon a written request of the Contractor which shall be submitted as a Contract document, make an advance payment to the Contractor in an amount not exceeding fifteen percent (15%) of the total contract price, to be made in lump sum, or at the most two installments according to a schedule specified in the SCC, subject to the requirements in Annex “E” of the 2016 revised IRR of RA No. 9184.

14. Progress Payments

The Contractor may submit a request for payment for Work accomplished. Such requests for payment shall be verified and certified by the Procuring Entity’s Representative/Project Engineer. Except as otherwise stipulated in the SCC, materials and equipment delivered on the site but not completely put in place shall not be included for payment.

15. Operating and Maintenance Manuals

- 15.1. If required, the Contractor will provide “as built” Drawings and/or operating and maintenance manuals as specified in the SCC.

- 15.2. If the Contractor does not provide the Drawings and/or manuals by the dates stated above, or they do not receive the Procuring Entity's Representative's approval, the Procuring Entity's Representative may withhold the amount stated in the SCC from payments due to the Contractor.

Section V. Special Conditions of Contract

Notes on the Special Conditions of Contract

Similar to the BDS, the clauses in this Section are intended to assist the Procuring Entity in providing contract-specific information in relation to corresponding clauses in the GCC found in Section IV.

The Special Conditions of Contract (SCC) complement the GCC, specifying contractual requirements linked to the special circumstances of the Procuring Entity, the Procuring Entity's country, the sector, and the Works procured. In preparing this Section, the following aspects should be checked:

- a. Information that complements provisions of the GCC must be incorporated.
- b. Amendments and/or supplements to provisions of the GCC as necessitated by the circumstances of the specific purchase, must also be incorporated.

However, no special condition which defeats or negates the general intent and purpose of the provisions of the GCC should be incorporated herein.

Special Conditions of Contract

| GCC Clause | |
|------------|---|
| 2 | <i>Completion of work shall be within One Hundred Eighty (180) Calendar Days .</i> |
| 4.1 | The Procuring Entity shall give possession of all parts of the Site to the Contractor upon receipt of the Notice to Proceed. |
| 6 | The site investigation Report is: Technical Evaluation Report |
| 7.2 | <p><i>[Select one, delete the other.]</i></p> <p><i>[In case of permanent structures, such as buildings of types 4 and 5 as classified under the National Building Code of the Philippines and other structures made of steel, iron, or concrete which comply with relevant structural codes (e.g., DPWH Standard Specifications), such as, but not limited to, steel/concrete bridges, flyovers, aircraft movement areas, ports, dams, tunnels, filtration and treatment plants, sewerage systems, power plants, transmission and communication towers, railway system, and other similar permanent structures:] Fifteen (15) years.</i></p> <p><i>[In case of semi-permanent structures, such as buildings of types 1, 2, and 3 as classified under the National Building Code of the Philippines, concrete/asphalt roads, concrete river control, drainage, irrigation lined canals, river landing, deep wells, rock causeway, pedestrian overpass, and other similar semi-permanent structures:] Five (5) years.</i></p> <p><i>[In case of other structures, such as bailey and wooden bridges, shallow wells, spring developments, and other similar structures:] Two (2) years.</i></p> |
| 10 | Dayworks are applicable at the rate shown in the Contractor's original Bid. |
| 11.1 | The Contractor shall submit the Program of Work to the Procuring Entity's Representative within ten (10) calendar days after receipt of the Notice of Award. |
| 11.2 | The amount to be withheld for late submission of an updated Program of Work is one tenth (1/10) of one percent (1%) per day of delay chargeable against the current progress billing |
| 13 | The amount of the advance payment is no more that fifteen percent (15%) of the Contract Price subject to approval by the Authority and compliance with the conditions under RA 9184 and its IRR. |
| 14 | No further instructions. |
| 15.1 | <p>The date by which operating and maintenance manuals are required is thirty (30) days from the receipt of Notice to Proceed.</p> <p>The date by which "as built" drawings are required is required as part of final payment.</p> |
| 15.2 | The amount to be withheld for failing to produce "as built" drawings and/or operating and maintenance manuals by the date required is ten percent (10%) of the Contract Price. |

Section VI. Specifications

Notes on Specifications

A set of precise and clear specifications is a prerequisite for Bidders to respond realistically and competitively to the requirements of the Procuring Entity without qualifying or conditioning their Bids. In the context of international competitive bidding, the specifications must be drafted to permit the widest possible competition and, at the same time, present a clear statement of the required standards of workmanship, materials, and performance of the goods and services to be procured. Only if this is done will the objectives of economy, efficiency, and fairness in procurement be realized, responsiveness of Bids be ensured, and the subsequent task of bid evaluation facilitated. The specifications should require that all goods and materials to be incorporated in the Works be new, unused, of the most recent or current models, and incorporate all recent improvements in design and materials unless provided otherwise in the Contract.

Samples of specifications from previous similar projects are useful in this respect. The use of metric units is mandatory. Most specifications are normally written specially by the Procuring Entity or its representative to suit the Works at hand. There is no standard set of Specifications for universal application in all sectors in all regions, but there are established principles and practices, which are reflected in these PBDs.

There are considerable advantages in standardizing General Specifications for repetitive Works in recognized public sectors, such as highways, ports, railways, urban housing, irrigation, and water supply, in the same country or region where similar conditions prevail. The General Specifications should cover all classes of workmanship, materials, and equipment commonly involved in construction, although not necessarily to be used in a particular Works Contract. Deletions or addenda should then adapt the General Specifications to the particular Works.

Care must be taken in drafting specifications to ensure that they are not restrictive. In the specification of standards for goods, materials, and workmanship, recognized international standards should be used as much as possible. Where other particular standards are used, whether national standards or other standards, the specifications should state that goods, materials, and workmanship that meet other authoritative standards, and which ensure substantially equal or higher quality than the standards mentioned, will also be acceptable. The following clause may be inserted in the SCC.

Sample Clause: Equivalency of Standards and Codes

Wherever reference is made in the Contract to specific standards and codes to be met by the goods and materials to be furnished, and work performed or tested, the provisions of the latest current edition or revision of the relevant standards and codes in effect shall apply, unless otherwise expressly stated in the Contract. Where such standards and codes are national, or relate to a particular country or region, other authoritative standards that ensure

a substantially equal or higher quality than the standards and codes specified will be accepted subject to the Procuring Entity's Representative's prior review and written consent. Differences between the standards specified and the proposed alternative standards shall be fully described in writing by the Contractor and submitted to the Procuring Entity's Representative at least twenty-eight (28) days prior to the date when the Contractor desires the Procuring Entity's Representative's consent. In the event the Procuring Entity's Representative determines that such proposed deviations do not ensure substantially equal or higher quality, the Contractor shall comply with the standards specified in the documents.

These notes are intended only as information for the Procuring Entity or the person drafting the Bidding Documents. They should not be included in the final Bidding Documents.



Republic of the Philippines
Tourism Infrastructure & Enterprise Zone Authority

PROJECT SPECIFICATIONS

I. GENERAL CONDITIONS

The work to be undertaken shall include the furnishing of labor, materials, tools and equipment for the project **RECONSTRUCTION AND RETROFITTING OF SAN AGUSTIN CHURCH** located at **SAN NICOLAS, LUBAO, PAMPANGA.**

A. Scope of Work

The construction work must be executed strictly in accordance with the plans and specifications. The following principal items of work shall include but not limited to the following:

1. General Requirement
2. Surface Preparation and Cleaning Wall
3. Injection of Lime Water and Slurry Lime into Core of Walls
4. Chipping of Plaster Cement and Repointing of Joints
5. Repair and Restoration of Old Church Retablo
6. Concreting of Church Floor (Nave & Baptistry Only)
7. Installation of Tiles in Church
8. Repair and Restoration of Beltry
9. Repair and Repainting of Ceiling
10. Grouting of Joint and Lime Wash of all Masonry Walls
11. Systematic Dismantling of Loose Masonry Units for Replacement and Re-Installation
12. Scaffoldings
4. Other items or works as maybe required by plans and related contract documents necessary to satisfactorily complete the project

The construction procedures shall be done in accordance with the DPWH Standard Specifications, and in full compliance with the approved plans and specifications.

All items not specifically mentioned in the specifications or noted on the plans but which are obviously necessary for the completion of the work shall be included.

II. SITE WORKS

A. Scope of Work

Furnish all materials and equipment and perform labor required for the disposal of surplus excavated materials, rubbish and debris resulting from site clearing, stripping, site grading and trenching, demolition, removal and foundation excavation.

B. Clearing the Site

The building site shall be leveled according to the plans and cleared of rubbish, roots and other perishable and objectionable matters to a suitable sub-grade.

Surplus materials not required or suitable for fill or backfill and all debris and other materials resulting from demolition work shall be immediately removed from the site premises by the contractor and be disposed off in areas provided by the contractor. Debris and rubbish shall be removed and transported in a manner that will prevent spillage on streets or adjacent areas. In cases of spillage, clean up the streets and adjacent areas that were affected.

C. Staking out the Building Lines

The building lines shall be staked out and all the lines and grades shown in the drawing established before any excavation is started. Batter boards and reference marks shall be erected at place where they will not be disturbed during the excavation. Construct two permanent benchmarks of previously known elevations near the site of construction.

III. EARTHWORKS

A. Scope of Work

1. This item shall consist of the necessary excavation for foundation of building structures, and other structures not otherwise provided for in the Specifications. Except as otherwise provided for pipe culverts, the backfilling of completed structures and the disposal of all excavated surplus materials, shall be in accordance with these Specifications and in reasonably close conformity with the Plans or as established by the Engineer.

B. Excavation

1. Structural Excavation

- a. Structural excavation shall be to the grade, whichever, is lower. The indicated depth is the minimum requirement for excavation. In case suitable bearing materials are encountered at elevations other than those specified or shown on the drawings, the Engineer at his discretions may direct in writing the excavations above or below those indicated on the drawings.
- b. No extra excavations shall be done without the written approval of the Engineer. In no case shall footings rest on fill.
- c. All structural excavations shall be inspected and approved by the Engineer before pouring any concrete, laying underground services or placing backfill materials.
- d. All structural excavations shall extend to a sufficient distance from walls and footings to allow the proper erection and dismantling of forms, installation of service lines and for inspection.

- e. Control the grading in the vicinity of all excavated areas to prevent surface drainage running into excavations. Remove accumulated water in excavated area by pumping or by other approved methods.

2. Excavation for drainage structures

Excavation for drainage structure shall be made accurately to the lines, grades and elevations shown or as directed. Dimension and elevation of footings and foundation excavations shown are only approximate and may be changed if necessary to assure adequate foundation support. Trenches and foundation pits shall be of sufficient size to permit the placement and removal of forms for the full length width of structural footings and foundations as shown. Rock or other hard foundation material shall be cleaned of loose debris and cut to a firm surface, either level, stepped or serrated, as shown, or as direct loose disintegrated rock and thin strata shall be removed. When concrete is to be placed in an excavated area, special care shall be taken not to disturb the bottom of the excavation. Excavation to the final grade shall not be made until just before the concrete is to be placed.

3. Shoring

- a. Excavation shall be shored and braced by members of suitable sizes where necessary to prevent danger to persons, injury or erosions.
- b. Shoring, bracing and sheeting shall be removed as the excavations are backfilled in a manner such as to prevent injurious caving.

C. Backfilling

- a. All fillings shall be placed on layers not exceeding four (4) inches in thickness each layer being thoroughly wetted and compacted by approved machine or hand tamped to a density of optimum moisture as determined by the modified ASSHTO T 180, Method D. All compaction tests shall be at the expense of the Contractor.
- b. No footing shall rest on fill and the soil bearing capacity shall not be less than 3000 psf.
- c. After forms have been removed from the footings and piers, the materials from excavation shall be used for backfilling ground. All trash wood chips and other debris shall be removed from areas to be backfilled. The filling shall be made in layers not exceeding 4" thick, each layer thoroughly tamped.
- d. No backfill shall be placed against walls or other vertical surfaces until they have been inspected and backfilling is authorized.
- e. Any excess material resulting from the finish grading operations not required or unsuitable for fill or backfill, shall be disposed by the contractor at his expense.

IV. CONCRETE WORKS

A. Scope of Work

1. This includes all labor, materials, equipment and incidentals necessary for the construction of all concrete work including reinforcing steels, forms, water stops and miscellaneous related items such as walls, shelves, anchor bolts and embedded items. Placing and finishing of concrete shall be in accordance with this specification and conforming to the lines, grades and dimensions shown on the approved plans. Concrete shall consist of a mixture of Portland cement, fine aggregates, coarse aggregates, and water.

B. General Provisions

1. Minimum concrete strength f'_c is 3,000 psi.
2. No hand mixing shall be allowed, except in case of emergency such as mixer breakdown during pouring operations and shall stop at the first allowed construction joints. All concrete shall be machine mixed for at least 1-1/2 minutes after all materials including water are in the mixing drum.
3. The mixer shall be of an approved size and type which will ensure a uniform distribution of material throughout the mass. It shall be equipped with a DEVICE FOR ACCURATELY MEASURING AND CONTROLLING THE AMOUNT OF MIXING WATER IN EACH BATCH.
4. Placing of material in mixer shall be done in such a way that first batch of concrete materials placed in the mixer shall contain sufficient excess of cement, sand and water to coat the inside of the drum without reducing the cement content of the mix to be discharged.
5. Re-tempering of concrete shall not be allowed.
6. All testing shall comply with the latest applicable ASTM Test Methods (ASTM Standard). Samples of aggregate and concrete as placed will be subjected in the work shall conform to the approved samples.

C. Materials

1. Cement shall be Portland Cement of a brand approved by the Project Engineer and conforming to ASTM C150, Type I or Type II.
2. Aggregates

Fine aggregate shall be washed with natural sand conforming to ASTM Standard and shall range in size within the following limits of US Standard Sieve sizes.

| Sieve Designation | Percent (%) Passing |
|-------------------|---------------------|
| No. 4 | 95-100 |
| No. 8 | 80-100 |
| No. 16 | 45-70 |

Maximum Silt Content – 2%

Coarse Aggregate shall be well-graded, crushed stone or washed gravel conforming to ASTM Standard having the following maximum size:

25mm – for plain concrete

20mm – for reinforced concrete sections

19mm – for concrete piles

Maximum Silt Content – 1%

3. Water shall be potable, clean, and free from deleterious amounts of acids, alkalis, oils or organic matter. Seawater must not be used.
4. Admixtures for ready-mixed concrete

An approved water reducing aspect conforming to ASTM Standard, Type A or D, shall be used and shall entrain 3.0 to 5.0 percent air in the resultant concrete. Proportioning and mixing shall be as recommended by the manufacturer.

D. Quality of Concrete

1. The actual development of mix proportions composed of Portland cement, Admixtures Aggregates and water to produce concrete which conforms to the specific requirements shall be determined by means of prior laboratory tests performed by the contractor with the approved constituents to be used in the work.
2. Proportioning

Well in advance of placing any concrete the contractor shall discuss with the Project Engineer the source of materials and concrete mixture proposes to use. Representative samples of aggregate and cement and their test results shall be furnished to the Project Engineer. A pouring permit signed by the Project Engineer should be presented by the contractor prior to pouring of concrete.

The contractor shall allow ample time to develop a proposed design mix or to modify the proposed design mix within the limits of these specifications whenever in the opinion of the Engineer it becomes or desirable.

Consistency of the concrete as measured by the requirements of ASTM Standard shall be as shown in Table B below:

Table B

| TYPE OF STRUCTURE | SLUMP (mm) RECOMMENDED | RANGE |
|--|------------------------|--------|
| Pavement and slabs on ground | 50 | 28-75 |
| Heavy reinforced foundation walls & footing | 50-75 | 50-100 |
| Plain footings, gravity walls, slabs & beams | 50-75 | 25-100 |
| Thin reinforced walls & columns | 75 | 75-100 |

3. No excessive wet concrete will be permitted. Concrete delivered to the site having slump in excess of that specified in Table B will be rejected.
4. The temperature of the concrete at the time of placement shall normally be 30 degrees centigrade. The contractor will be responsible for employing whatever measures are necessary to comply with these temperature requirements.

5. Formworks

The contractor shall design, furnish and install all formworks and supports required to confine the concrete and shape it to the lines shown as the drawings. Form design shall conform to ACI 347. Forms shall have sufficient strength to withstand the pressure resulting from placement and vibration of the concrete and shall be sufficiently tight to prevent loss of mortar from the concrete.

Forms shall be made of either steel or new approved lumber and shall be free from roughness and imperfections.

6. Placing of Concrete

No concrete shall be placed until the forms, reinforcement steel, pipes, conduits, sleeves, anchors and other embedded items have been inspected and approved by the Project Engineer.

Pipes, conduits, dowels and other ferrous items required to be embedded in concrete construction shall be positioned and supported prior to placement of concrete such that there will be a minimum of 50mm clearance between said items and any part of the concrete reinforcement. Securing such items in position by wiring or welding it to reinforcement will not be permitted.

Before depositing any concrete, all debris, dirt and water shall be removed from the forms. The surfaces of previously placed concrete, such as horizontal or vertical construction joints, shall be roughened, cleaned from foreign matter and laitance to expose a fresh face and saturated with water at least two hours before and again shortly before the new concrete is placed. Immediately before the new concrete is placed, all hardened surfaces shall receive thorough coating of next cement slurry mixed to consistency of very thick paste at least 50mm thick which shall first be well scrubbed-in by means of stiff bristle brushes. The new concrete then shall be placed before the next cement sets up.

Concrete shall be uniformly placed as near as possible to its final location in the forms. The placing of concrete in forms shall not exceed 0.60m vertical rise per hour.

7. Curing and Protection

- a. It is the latest of those specifications to obtain properly cured concrete. The basic requirement of proper curing is to maintain continuous moist surface from the time of placing the concrete until the end of the curing period. The use of curing compounds may be acceptable but shall require prior approval in writing by the Project Engineer.

- b. All exposed surfaces including finished surfaces shall be treated immediately after concrete has been poured to provide continuous moist curing for at least 7 days. Walls and vertical surfaces may be covered with continuously saturated burlap or kept moist by other approved means.
- c. Formed surfaces shall be thoroughly soaked with water at least twice a day until the forms are removed.

8. Removal of Forms

- a. The contractor shall not remove any forms for at least 48 hours or until the concrete has attained a strength of at least 30% of the ultimate strength.
- b. Forms for beams and slabs shall not be stripped for at least 150-day degrees and supports shall not be removed until the concrete has attained at least 60% of the specified 28-day strength and is capable of safely supporting its own weight. Construction live loads shall not be placed until concrete has attained its specified 29-day strength – 3000 psi (20.68 MPa).
- c. Forms shall be stripped such that they will not damage the concrete.

E. Concrete Reinforcements

1. Scope of Work

This includes the furnishing, fabrication and installation of all steel bars and steel tie wires, clips, supports, chairs and spaces required for the reinforcement of concrete as shown on the drawings and/or specified herein.

2. Standard Specifications

- a. All reinforcing steel bars shall be 40,000 psi Intermediate Grade unless otherwise specified.
- b. The following standards are required to:

| | |
|------------|---|
| ASTM A 82 | Cold drawn steel wire fabric for concrete reinforcements |
| ASTM A 497 | Welded deformed steel wire fabric for concrete reinforcements |
| ASTM A 615 | Deformed billet steel bars for concrete reinforcements |
| ASTM A 315 | Manual of standard practice for detailing reinforce concrete structures |

3. Shop Drawings

- a. The contractor shall submit three (3) sets of completely detailed working drawings and schedules of all reinforcement for review to the Project Engineer. The bending diagrams and bar lists shall be detailed in accordance with ACI 315.
- b. Fabrication of steel reinforcement steel shall not proceed until the construction joint locations and the shop drawings have been reviewed by the Project Engineer.

4. Substitutions

- a. The following reinforcing steel bar sizes shall be used for reinforced concrete design:

| Nominal Diameter (mm) | Approx. Cross Section Area (sq. mm) | Approx. Unit Wt (kg/m) |
|-----------------------|-------------------------------------|------------------------|
| #10 | 78 | 0.616 |
| #12 | 113 | 0.888 |
| #16 | 201 | 1.579 |
| #20 | 314 | 2.466 |
| #25 | 492 | 3.854 |
| #28 | 615 | 4.833 |

- b. Should the contractor wish to use reinforcing steel bars having areas different from those shown, all proposed changes shall be submitted to the Project Engineer for approval.

5. Products

a. Materials

Reinforcement steel shall be deformed, new billet steel bars conforming to ASTM A 615, grade 40 for 10mm to 28mm diameter bars, substantially free from mill, scale, rust, grease or other foreign matters.

Rail steel bars will not be permitted in the work.

Reinforcement steel shall bear a mill identification symbol, and shall be tagged with the size and mark number so that different types may be identified and shall be stored off the ground to protect the steel moisture and dirt, until placed in final position.

Steel wire for tying reinforcing bars and water stops shall conform to ASTM A 82. Welded wire fabric for concrete reinforcement shall conform to 5ASTM A 497.

6. Fabrication of Reinforcement

- a. Reinforcement steel shall be accurately formed to the dimensions shown on the shop drawings and bar schedules.
- b. All reinforcing bars shall be bend cold around a pin with a free revolving collar having a diameter proportional to the diameter of the bar of not less than the following:

Two to stirrups

Six times for bars up to and including 25mm diameter

Eight times for bars over 25mm diameter

- c. Reinforcement steel shall not be straightened nor re-bent. Bars with kinks or bends not shown on the drawings will be accepted

7. Installation of Reinforcement

- a. Reinforcement bars shall be accurately placed as shown on the drawings, and in accordance with the shop drawings and schedules. The reinforcing bars shall be secured against displacement with annealed iron wire ties of minimum 1.5mm diameter or suitable clips at the intersection.

- b. Except as otherwise indicated on the drawings, reinforcement steel shall be installed with a clearance for concrete cover as follows:

| | |
|---|------|
| Concrete placed directly on earth | 75mm |
| Formed surfaces in contact with the soil, water or exposed to weather | 50mm |
| Concrete cover of main reinforcement for columns and beams | 50mm |
| All other slab surfaces | 25mm |

- c. No reinforcing bars shall be welded.

V. MASONRY WORKS

A. Scope of Work

1. This includes the furnishing of all labor, materials, equipment required to construct all concrete masonry unit walls as shown on the drawings and as specified herein.
2. The work under this section shall include but not be limited to the following:
 - a. Concrete hollow blocks
 - b. Masonry reinforcing bars for concrete blocks
 - c. Grouting
 - d. Connecting wall anchors, ties, bolts and related embedded items

B. Standard Specification

1. The following standards are referred to:

| | |
|-----------|--|
| ASTM C33 | Concrete Aggregates |
| ASTM C90 | Hollow Load-Bearing Concrete Masonry Units |
| ASTM C144 | Aggregate for Masonry Mortar |
| ASTM C150 | Portland Cement |
| SAO #15-2 | Standardization of Concrete Hollow Blocks |

C. Protection of Materials

1. All materials for the work of this section shall be delivered, stored and handled so as to preclude damage of any nature.

D. Materials

1. Cement

Portland cement shall conform to ASTM Specification C150, Type I.

2. Sand for Mortar

Sand shall be clean, durable particles, free from injurious amounts of organic matter. The sand shall conform to ASTM specification C144 or C33 as required.

3. Water

Water shall be free from injurious amounts of oils, acids, alkalis, organic matter, and shall be clean and fresh.

4. Concrete Hollow Blocks (CHB)

Concrete block shall conform to ASTM C90, Grade N, and/or to the Phil. Bureau of Standards SAD No. 15-2.

E. Mortar Mixes

1. Masonry mortar for setting blocks shall be in the proportion of one part cement to 3 parts sand or as otherwise approved by the Project Engineer. Mortars shall be mixed with water in an amount compatible with workability.
2. Mixing shall be done immediately before usage.

F. Execution

1. All masonry shall be laid plumb and true to lines and built to the thickness and bond required with courses level and joints and bond uniform. Masonry shall be carried up in a uniform manner.
2. Concrete blocks shall be laid in running bond, unless otherwise indicated with joints not exceeding 10mm and uniform throughout and finished slightly concave and smooth. All blocks shall be laid in a full bed of mortar applied to shell and webs.
3. All necessary block cutting shall be neatly done by saws.
4. Control joints shall be installed at the locations noted and detailed on the drawings.

G. Lintels, Ties and Miscellaneous Items

1. The contractor shall build in all miscellaneous items specified in other sections to be set in masonry including frames, lintels, reinforcing steel, electrical boxes and fixtures, sleeves, grilles, anchors and other miscellaneous items. All anchorage, attachments, and bonding devices shall be set so as to prevent slippage and shall be completely covered with mortar.

VI. CARPENTRY WORKS

A. Scope of Work

1. Furnish materials and equipment and perform labor required to complete wooden framings and related rough carpentry works as indicated in the plans and/or specified herein.
2. Include in the works nailing strips, scaffoldings, plates, straps, joists, hangers, rods, dowels, rough hardware, fasteners, and other miscellaneous iron and steel items pertinent to rough carpentry work.

B. Materials

1. Lumber shall be of approved quality of the respective kinds required for the various parts of the work, well seasoned, thoroughly dry, straight and free from large, loose or unsound knob, sap shakes or other imperfections impairing its strength, durability or appearance.
2. Framing lumber shall be of rough dimensions shown on drawings.
3. All exposed woodwork shall be smoothly dressed and well sand papered.
4. Moisture content shall not exceed 18% unless otherwise specified.
5. All lumber, excluding scaffoldings, are to be pressure treated, conforming to 67% stress grade lumber in accordance to the requirements of the Phil. National Building Code, latest edition.
6. Fastening shall be common nails, glue as specified flat head wood screws, round head wood screws, bolts or lag screws where specifically called for.
7. Conceal fastenings as far as possible, where not possible, locate them in inconspicuous place, where nailing is permitted through woodwork face conceal nail heads.

C. Substitution of Lumber

1. Any lumber equally good for the purpose intended may be substituted for kinds specified provided however, that the substitution be authorized in writing by the Project Engineer.

D. Rough Hardware and Metal Fasteners

1. Plates, straps, nails, spikes, bolts, joists, hangers, rods, dowels, fasteners and miscellaneous iron and steel items shall be of sizes and types to rigidly secure member in place.

VII. STEEL WORKS

A. Scope of Work

1. Furnish all materials and equipment and perform labor and services required to complete fabrication and erection of all structural steel and other miscellaneous steel in accordance with the plans.

B. Materials

1. Structural steel shall conform to American Society of Testing Materials (ASTM) A-36, with F_y of 248 MPa.
2. Electrodes for welding shall conform to the latest requirements of the American Welding Society (AWS).
3. Use only approved brand of red lead paint and linseed oil for all shop painting for structural steel.

C. Execution

1. Tighten all bolts to a bolt tension not less than the proof load given in the applicable ASTM Specifications for the type of bolt used.
2. Never let compression members deviate from straightness by more than 1/100 of the axial length between points which are to be laterally supported.
3. Let completed members free from twists, bends, and open joints. Sharp kinks or bends shall be the cause of rejection of materials.
4. Give all steelwork, except those to be encased in concrete, one coat of shop paint.
5. Make all work well formed to shape and size shown and assemble as detailed in the plans.
6. Weld or bolt connections as indicated in the plans. Make all details of assembly strong with sufficient stiffness. Form joints exposed to weather in a manner that excludes water.
7. Provide all work with proper clearances. Fabricate and install in a manner to provide for expansion and contraction but will ensure rigidity and provide close fitting of sections.
8. Provide a protective coating which is resistant to alkaline, mortar and plaster to be applied to all sections after fabrication.

**GENERAL METHODS AND TECHNICAL SPECIFICATIONS FOR THE
REHABILITATION AND RESTORATION OF SAN AGUSTIN CHURCH IN
LUBAO, PAMPANGA**

I. GENERAL PRINCIPLES, CONSIDERATIONS AND REQUIREMENTS

1. In order to be most effective, the contractor should have an overview of: the heritage structure and site's historical, cultural, architectural, engineering, social, political and other values; the building, its architecture, its structure, its materials and construction (timeline), and its site and the environment; the types and extent of damage/failure and causes of damage/failure, defining its present physical condition; and, of what we need to do to save, rehabilitate and restore this important heritage property for its continued use.
2. The Contractor shall be directly responsible to the Church Authorities and the National Government Agency (TIEZA) that implement the Project. Two-way communication flow shall be established between the Contractor and these Authorities. All outside orders and communications to the Contractor from parties different from these Authorities, shall be officially subject to coordinative discussion and mutual agreement/decision by the parties involved. In case of an outside party ordering the stoppage of work activity due to alleged wrong procedure and substandard materials or workmanship, the contractor shall immediately stop only the specific activity in question, and right away call the attention of the other parties to intervene. The Resolution of the issues and problems shall also through mutual discussion and decision by the parties involved. However, the individual complainant may be advised to follow the established communication flow, so much the better.
3. Basically, all building laws and local ordinances shall be complied with, except for some historic preservation requirements that would conflict with some provisions. Therefore, these technical specifications shall govern in this project. These technical specifications adhere to international and national principles, methods and best practices for Historic preservation.
4. **STANDARDS FOR THE TREATMENT OF HISTORIC PROPERTIES –**
These standards are recommended to be adopted in the case of Spanish colonial Pampanga churches in their order of priority
 - PRESERVATION
 - REPAIR/REHABILITATION
 - RESTORATION
 - RECONSTRUCTION
5. Principle: "It is better to preserve than repair, better to repair than to restore, better to restore than reconstruct."
A.N. Didron, Bulletin archeologique, vol. 1, 1839

6. Principle: "The minimum effective intervention is always the best."
Conservation of Historic Buildings, Bernard Fielden, Butterworths, 1982
7. Principle: "We do not restore the monument, but we restore the materials of the monument."
Dir. Prof. Francesco Gurrieri, 1983

8. This heritage structure was built using traditional materials and manner of construction that are generally practiced during the time/period of its construction. It was also refurbished a few times using the respective period technologies available. As much as possible, all repair, rehabilitation and restoration must exhaust all efforts to employ the same traditional materials and manners of construction. The use of modern and current materials and construction technologies must be resorted to if traditional materials and construction proved inadequate and for other valid reasons. However, modern reinforced concrete structural standards must not be used as bases for structural analyses and computations for the old unreinforced heritage structures. These are two different sets of standards. In the case of this particular building, there are mixed construction methods and materials used, ranging from typical Vigan masonry ground floor construction, and timber Second Floor walls and roof construction that is typical of the late American colonial period. There are also reinforced concrete replacements during the previous repair and renovation works for this heritage building.
9. When there is a need to introduce or integrate reinforced structures standards or modern technologies in the rehabilitation of unreinforced structures, the proposed new structures must be structurally compatible with the old existing structures, and must not inflict any further damage to the old one. In some cases, the use of combination of old and new technologies may be resorted to. In other words, combining the old and the new structures together as one, should be the better approach to rehabilitating heritage structures.
10. If the use and introduction of new materials and construction technologies in the strengthening/restructuring/rehabilitating old heritage structures is preferred, it will require corresponding structural analyses and computations prior to application.
11. Many Vigan heritage buildings were damaged by the recent earthquakes that hit the Ilocos region. The common weakness of Vigan buildings is the failure of their masonry (brick and mortar walls) due to moisture and material decay. The resulting damage can be attributed to the appearances of cracks and watermarks on walls. Hence, the core consolidation should be the most practical method for rehabilitating the old masonry walls.
12. Core Consolidation means to make a fragmented unreinforced wall structure a single solid structure as it was after its original construction. The wall consolidation and/or crack grouting repair method may be adequate measure to restore and rehabilitate this building.

13. When integrating or introducing new materials into the old structure, the strength of the new must be equal or slightly less than the old. If otherwise, the
 14. new may cause damage to the old. In other words, the new must adjust to the old, and not vice versa.
 15. Oftentimes, a new reinforced concrete or steel supporting structural system, including its new foundation system, may be added or integrated to the existing structural system, if there would be roof and roof framing system total rehabilitation or changes from timber to steel construction, plus a new ceiling and framing system construction. The new additional loads and stresses should be absorbed by the new supporting structural system, not by the old wall structure.

II. GUIDELINES AND REQUIREMENTS FOR REPAIRING, CONSOLIDATING, REHABILITATING, RESTORING AND RECONSTRUCTING

1. Before any intervention work, **SAFETY FIRST POLICY** must be observed at all times at the jobsite. Provide new and adequate shoring, decking, safety nets and temporary fencing and signage at the work areas. Also provide safe access to the work areas for inspection and monitoring;
2. We must be guided by the fact that the structural and physical failure and damage in this particular heritage building are material decomposition due to age, exposure to elements, structural fragmentation, water seepage and the lack of proper maintenance.
3. It is quite important that the recommended repair, consolidation, rehabilitation, restoration and reconstruction methods and corresponding procedures be discussed, understood and agreed upon and undertaken by the project contractor.
4. The project contractor shall not undertake any other methods, procedures or variations without first consulting or notifying the engineering consultant/s and the PEO. Prior discussions, consultations and approval for variation works shall be required.
5. The project contractor shall prepare and submit as-built plans and details to the PEO, in case of variation works
6. This document covers photo-documentation, identification of damage and deterioration of materials and structures, identification of the causes of damage and deterioration, and discussions, analyses and recommendations for engineering tests, repair and restoration methods and procedures, technical specifications and other necessary preparations such as quantity and cost estimates, project site safety, project management, and environmental concerns.

7. The use of modern technologies may be needed for detailed engineering studies as necessary or as required, in order to simplify the rehabilitation and restoration processes.

8. DETAILED ENGINEERING STUDIES WHICH MAY BE IDEALLY UNDERTAKEN:

- **Hammer Test.** Normally, this type of test is applied on reinforced concrete building construction. It may not produce satisfactory results on heritage structures application.
- **Soil boring test in the Philippines** is required for buildings 3 floors and up. Or in lots with slope of more than 30%. Average price in Manila is P25,000 to P35,000, per hole excluding mobilization/demobilization. To be supervised by a Geotechnical Engineer.
- **Soil Analysis (Soil Bearing Capacity Test)** Cost is from P18,000 to P25,000. To be prepared, signed and sealed by a Geotechnical Engineer, with recommendations.
- **Foundation probe.** Excavate adjacent ground to building wall at selected location of the Structural Engineer, in order to determine the material, the depth and the shape configuration of the building footing/foundation.
- **Wall core drilling test** is undertaken to extract core sample for laboratory testing. Data derived from tests shall be used by the structural engineer for recommending repair and reconstruction measures. In old stone and masonry buildings, the core is the basic structural part, and the facing stone or brick is the architectural part.

9. Measured Drawings from field measurements

- **Laser Scanner Imaging System.** Digital imaging equipment to produce precise image details in 3D of a subject building/structure for in-depth scientific study and analysis. CADD files can be generated from the scanned image data. The most important output of this application is to document precisely the actual condition of the subject building/structure or ruins as found, employing non-invasive method.
- **Laser Distance Measure.** A portable manual laser distance measuring tool that can be used conveniently during the initial survey and documentation of the subject building/structure.

III. Technical Specifications

- A. Visual observation of the building/structure.** During the first survey and inspection of a subject heritage building/structure, observe and record the following:
1. Materials used and their present condition
 2. Building construction; determine transformations in time
 3. Changes/additions (positive/valid changes or negative changes)
 4. Defects and deteriorations such as cracks, biological growths, materials separation, material losses, etc.
 5. Ground and building floor indications
 6. Vertical building alignment
 7. Pest infestation

B. Photo-Documentation - shall include all or selected procedures as may be determined necessary for the scientific documentation and recording of stone and masonry structures/materials and applied interventions

1. **Before photo-documentation** – Upon mobilization at the site, the contractor shall photo-document the existing condition of the structure and the site. Use good quality digital camera with 24mm wide to 5X zoom capability to record the building. All parts of the building (exterior and interior) and the site/vicinity shall be documented. Record or remember all the points where the photographs are taken. These points of view shall be reused as points of view for **during** and **after** photo-documentation sessions.
2. **During photo-documentation** – All activities during the restoration and rehabilitation works shall be periodically photo-documented using the same points of view of the previous sessions. New points of view shall also be recorded for reuse in the succeeding sessions. For progress billing purposes, only inclusively-dated and selected photographs shall be included in the billing statement and accomplishment report.
3. **After photo-documentation** – At the completion of the project and the site cleaning and clearing works, all finished works shall be photo-documented.
4. All photograph files accumulated for the project shall be stored in a USB portable harddisk drive or SSD (Solid State Drive) for submission to the OWNER.

C. SCAFFOLDINGS AND TEMPORARY STRUCTURES, AND SAFETY AND HEALTH REQUIREMENTS

Scaffolding systems allowed

1. Use G. I. Pipe and swivel clamp system of scaffolding for most of the works specified
2. Use H-frame modular scaffolding system for finishing and low elevation tasks.
3. Bamboo and nylon rope ties
4. Wood shoring and bracings

Safety and Health Program

1. **Management Commitment** – It is the duty and responsibility of the Contractor to ensure the safety and protection of its workers, the worksite and properties, and of the public.

Worksite Analysis – The worksite is part of a public park, and therefore, required safety and security measures shall be well addressed and provided. The workers will be exposed to height and health hazards. The Company shall implement maximum

safety policies and monitoring of these safety measures at all times during the construction period. The Company shall also subject its

2. scaffolds system and installation for checking and certification of a licensed Structural Engineer to ensure the safety of its workers and properties.
3. Hazard Prevention and Control – The Company shall field qualified Safety and Security Officers during the Construction period.
4. Safety and Health Orientation and Training – All workers shall undergo orientation and training on construction safety.

Duties of the Company

1. Keep the workplace free from hazards.
2. Inform employees of how to protect themselves against hazards
3. Conduct regular jobsite safety inspections.
4. Safety and Health Training
5. Reprimand those who will violate the Safety and Security Program.

Duties of the Employee

1. Follow all safety rules.
2. Wear and take care of personal protective equipment.
3. Make sure all safety features for tools and equipment are functioning properly.
4. Make sure all scaffolds, temporary structures and installations are securely fastened or in proper places (properly installed)
5. Don't let your work put another worker in danger.
6. Replace damaged or dull hand tools immediately.
7. Avoid horseplay, practical jokes, or other activities that create a hazard
8. Do not use drugs or alcohol on the job.
9. Report any unsafe work practice and any injury or accident to your supervisor.

Duties of the Safety Officer - Control of Hazards

1. Eliminate significant hazards
2. If impractical, isolate hazards
3. If impractical, minimize hazards

General Safety Requirements of a Construction Site

1. Every construction site shall be organized under a safety committee
2. Structural soundness of the construction site is warranted.
3. Electrical hazards are checked.
4. Fire protection must be ascertained. Ample water supply should be available in case of fire.
5. Every work area should be provided with adequate lighting.
6. Proper ventilation is provided.

7. Public safety must be observed in every construction activity.
8. Workers are provided with appropriate protective equipment
9. Safe means of access is provided in every work place.
10. Safety storage of materials and equipment are observed.
11. Hazard gases are accurately protected

Temporary Structures – shall include the construction of:

1. Field office and barracks and toilet and bathroom facilities.
2. Stone cutting and processing work shed
3. Wood working shed
4. Materials storage
5. Jobsite mixing and materials storage

D. CLEANING OF MASONRY WALLS

Cleaning of stone and masonry work is one of the measures undertaken in active conservation work. Cleaning results in physical change for a historic building where accumulated dirt and other materials are removed. Also, the stone surface is relieved of materials that may be harmful to the stone itself. Although cleaning may not be welcomed by those who would rather see the sense and evidence of history and patina of age on the stonework, cleaning does assist in preventive conservation work.

Cleaning of historical structures should be scrupulously done so that the stone receives the least possible harm or damage. Over-cleaning may result in partial loss of the stone material and diminished physical properties. Staining, vulnerability to pollutants or biological growths and deposition of soluble salts may occur (Price 1996). In this sense, it is necessary to have a basic understanding of the levels of cleaning to guide active conservation work.

Careful and prior testing and use of cleaning applications on test areas on the stone surface is necessary. This is to allow the conservator to gauge the effectiveness of the application or intervention over a period of time.

Among stone and masonry cleaning techniques are mechanical cleaning, water cleaning, application of poultices, and special cleaning techniques like laser cleaning.

Cleaning is usually undertaken when there are manifestations of biological growth, surface depositions like salts, soiling and black crusts, and staining.

Soiling and Surface deposits

A common problem in stone and masonry work is the amount of external soiling by dirt or surface deposits that need to be removed. These deposits may include

the following: atmospheric particulates, mortar splashes and runs, encrustation, salt formations, bird deposits, paint, graffiti, iron or cuprous stains, and biological growth, which may include algae, lichens and higher plants (BS 8221-1:2000).

Salts

Crystallization of salts in stone or masonry work is one cause of deterioration. Salts that crystallize in the stone surface are known as efflorescence and those within the stone are known as *cryptoflorescence*. Efflorescence is unsightly but relatively harmless. However, *cryptoflorescence* attacks the stone from within and exerts pressure, affecting the stone's strength. Prolonged cycles of crystallization within the stone may eventually cause damage to the extent of causing pulverization or powdering. Salts also affect the stone's physical properties and may even enhance other causes of decay. Soluble salts attract by osmosis liquid water or water vapor, thus, increasing the critical moisture level of the stone and prevent drying of the masonry (Torraca 1988).

Common salts that are known to damage stone and masonry are sodium sulfate, sodium carbonate, magnesium sulfate, potassium carbonate, potassium sulfate, sodium chloride (common salt), potassium chloride, calcium sulfate, sodium nitrate and potassium nitrate (Honeyborne 1999).

Sources for the salts mentioned include among others washing powder for clothes, washing soda for domestic cleaning, epsom salt, fresh concrete and cement-based mortar, seawater, saltpeter in meat preservatives, fertilizers and gunpowder (Honeyborne 1999).

Mechanical Cleaning

Mechanical cleaning usually involves dry brushing. Dry brushing removes loosely bound materials, dirt, and organic growth on the stone and masonry surface. It is preferable to use a soft nylon brush or an organically based one, e.g. coconut husk brush, over a steel brush, working from top to bottom of the walls. Dry brushing is effective for dry walls. For wet or damp walls, eliminate the source of wetness or dampness first before brushing; then, expose to sunlight or air to dry. If not possible, ultra-violet lamps, similar to those used in hospitals, may be used instead to dry the wet walls.

Cleaning by air abrasion or blasting uses aggregates and grits to remove surface dirt. The abrasives are projected through a nozzle using compressed air. Aggregate or grit type and size though should be determined by the nature and type of the stone surface and the toughness of dirt or crust formation. Ideally, the grits or aggregates used should be of softer material than the stone to be cleaned to avoid material loss to the stone structure.

Commonly used abrasives or grits include sand, carborundum, iron slag, and even egg and nut shells for fragile surfaces (Ashurst 1999). Water may sometimes be used to cushion the impact of the abrasives on the stone. Cleaning

by blasting is not especially advisable for cleaning local adobe or volcanic tuff stones.

This method may emit harmful dust and therefore operators should be especially protected with helmets and masks. Dust accumulated in the work site during blasting should always be collected and disposed at the end of the day.

Common mechanical cleaning tools and materials:

- Nylon bristled brush
- Wire brush
- Grit sandpaper
- Scraper
- Chisel
- Pick ax
- Fabricated hand tools

Cleaning by Washing

Washing dirt from stone walls or masonry units is beneficial because it cleans away accumulated dirt. One natural source is rain water. Other good methods of washing include using water and brush, sprays, water lances and wet packs or water with dishwashing liquid soap (with surfactant)

Ideally, water mist is sprayed from fine nozzles on the soiled face of the wall or building from a convenient distance, at regulated water pressures and at a time period that will prevent over saturation of the building. Water spray mists may be used to soften soiling in stone or masonry work. Cleaning with water lances is another washing method that uses low volume but higher pressure than the water spray mist method. This method uses tap water which is sprayed using a portable sprayer with nozzles.

For these water spray methods, the appropriate water pressure, which is determined through tests, should be used with the least possible damage to the stone so that weak jointing and parts of the stone material are not removed.

This method of washing may be used alternately with mechanical and chemical cleaning (Ashurst 1999). Manual brushing of soiling and dirt through the use of

bristle brushes may be alternately done. Avoid removing soiling, debris or detritus by use of steel brushes.

Materials and tools needed: a) Jetwasher (with air compressor), Backpack sprayer; atomizer, or bottle sprayer; b) nylon-bristled brush; special raking and scraping tool; c) scaffolding system; d) safety and health wear for workers; e) dishwashing or toilet bowl detergent with non-ionic surfactant

Chemical Cleaning This type of cleaning uses chemicals to clean stonework. Hydrofluoric acid is used to clean sandstone and unpolished granite (Ashurst 1999). Other chemical agents can be used for cleaning stones like acid or alkali cleaning agents, although there is a risk of leaving some soluble salt residues in the stone. The use of other special cleaning methods, like sepiolite (clay) poultice on the stone, may assist harmful residues to dry out into the clay.

Application of biocides to kill biological growth, e.g. plants, prior to their removal may be resorted to. These may be sprayed directly on the plants, or injected by

Prepared By:

means of a horse syringe on smaller plant growths. For higher plants with bigger stems and thicker barks, it may be necessary to directly cut off the plants from the stone and masonry work.

Time is given for the biocides to take effect on the plant growths, after which, the appropriate method of clearing away the biological growths may be done, e.g. careful manual removal using knife blades, non-ferrous spatulas or soft wire bristles, or cutting them from the stonework.

Biological growths like mosses, lichens and algae may enhance the appearance of stonework but these may harm the stonework, especially acid-secreting lichens. Algal slimes may be potentially harmful especially if found to create slippery pavements. Stones with this type of biological growth are cleaned manually and later applied with suitable chemical solutions or biocides.

Nonetheless, the environment is one factor for their repeated occurrence or repeated cycles of growth, in which case, regular cleaning and perhaps treatment, as may be determined, should be undertaken to prevent cycles of stone bio-deterioration.

Cleaning and de-weeding of stone and masonry walls

Methods of cleaning

1. Liquid dishwashing detergent/toilet bowl cleaning solution, (basic cleaning and washing formula A)

Procedure:

- a) Jetwash wall surface to be cleaned with tap water at medium pressure to remove loose particles, and dust; allow 30 minutes to 1 hour before applying the next step
- b) Mix 3 bottle cap full of dishwashing detergent to a pail of tap water, and jetwash the wall area to be cleaned with low pressure, followed by brushing with nylon bristled brush to separate the dirt, stain and dark deposit from the wall surface; or, pour 1 liter dishwashing liquid into a 200 liter drum of tap water
- c) Immediately jetwash with tap water to rinse and remove the dirt and stain from the wall surface and stop the chemical action of the cleaning agents
- d) Repeat the above steps to remove residual dirt and stain

2. Limewater

3. Hydrogen peroxide 20 vols. (biocide: removal of moss, lichens, bacteria and dirt/sooth)

Procedure:

- a) Working solution = 1 part Hydrogen Peroxide 20 vols to 3 parts tap water
- b) Pour Hydrogen Peroxide solution into a bottle atomizer
- c) Spray solution on the wall surface to be cleaned
- d) Brush surface area with nylon bristled brush in a circular motion, and allow 15 minutes for the solution to dissolve the dirt and moss/lichen
- e) Thoroughly rinse with tap water using a knapsack sprayer
- f) Repeat the above steps on other areas to be cleaned

Note: Try both the Hydrogen Peroxide 20 vols and the Benzalkonium chloride 50% cleaning procedures, and choose the better one based on the tests result. Formula: 1 part Hydrogen Peroxide: 2 parts tap water

4. Zonrox (bleach/sodium hypochlorite NaClO) for stains cleaning and disinfecting.

5. Materials and tools needed:

Long hand gloves (rubber)
mask
Safety goggles
Plastic apron
Safety helmet and body harness
Safety warning signage (site safety)
Pruner (cutter)
Bolo
Cross-cut handsaw
Horse syringe (killing and removal of plants and wood growths)
Measuring cups

Plastic sheets and plastic ties (killing and removal of plants and wood growths)
 Nylon-bristled brush
 Jetwash sprayer with air compressor (basic cleaning and washing)
 Backpack Chemical sprayer (basic cleaning and washing)
 Atomiser (spray bottle)
 Scaffolds and decking/telescopic ladder
 Water hose
 Water pale
 Electrical extension cords
 Digital camera/videocam (photo-documentation)

Special Cleaning Methods

There are special methods that are used by conservators in cleaning stone and masonry works that involve the use of poultices, graffiti removal and laser cleaning.

Poultices

Black crust formations on stone surfaces may be removed using poultices with chemical solutions. Poultices are applied directly on the area and allowed to stand for a period of time.

C. LIME MORTAR SPECIFICATIONS:

1.0 DEFINITION OF TERMS:

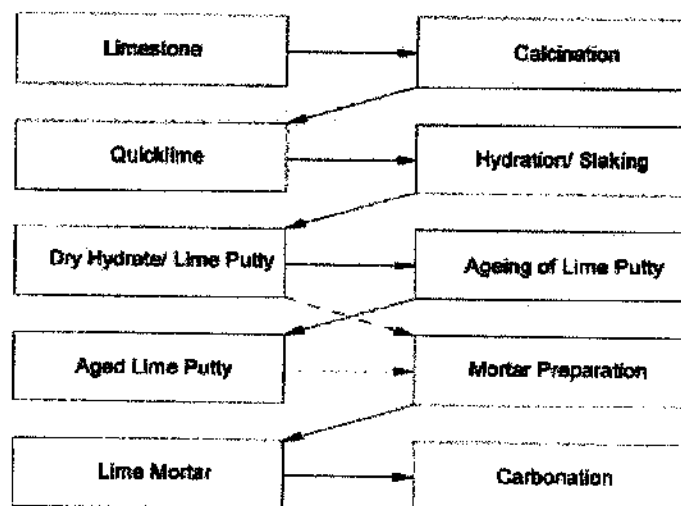
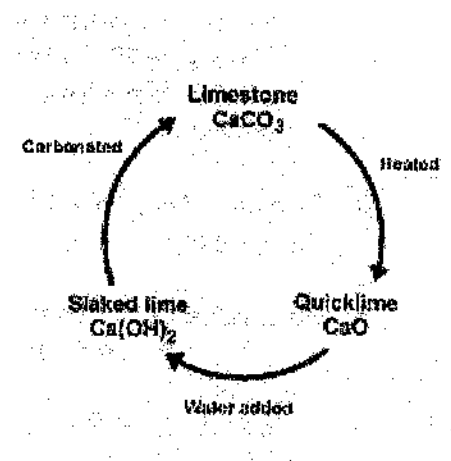


Figure 1 Schematic overview of lime processing and resulting materials.



Lime Cycle. The above illustrations show the lime cycle process, which can be our basic concept for restoring and consolidating our heritage structures of stone and masonry construction.

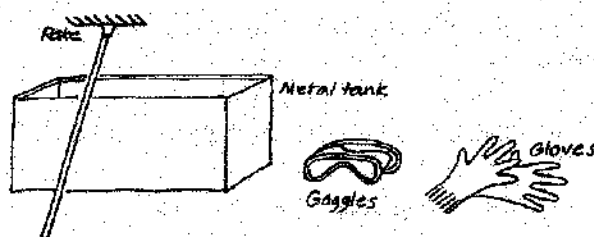
Limestone (CaCO_3) is the basic component material of the stone and masonry wall of most heritage buildings in the coastal towns. Limestone and lime mortar are basically the main ingredients of the rubble core.

Lime Mortar is the mixture of 1 part aged lime putty and 3 parts sharp sand, usually with 5% additive (gauging) containing pozzolanic materials such as brick dust, fly ash and shredded Manila hemp or shredded carpet fibers to improve the mortar performance. Lime mortar is used for: stone and masonry wall reconstruction; wall repair; grouting; pointing and repointing; plastering and re-plastering; ledge and wall cap sealing; limewashing and limewater consolidating.

Quicklime, or simply called **lime**, or more formally known as calcium oxide (CaO), is a caustic alkaline substance which is produced by heating limestone in specially designed kilns. There are a wide range of uses for quicklime, ranging from mortar to flux, and the substance has been used by humans for centuries. Many companies produce and sell quicklime, sometimes with specific chemical impurities which make it especially suitable to certain applications. Two types of quicklime: hydraulic and non-hydraulic; hydraulic quicklime has clay impurities, and sets under water; non-hydraulic is slow setting, and does not harden under water.

Slaked Lime/hydrated lime (Non-hydraulic Lime Putty) is produced by slaking (adding right amount of water to) Quicklime (CaO) (product in powder form) to produce Hydrated Lime Putty [$\text{Ca}(\text{OH})_2$]. Putty can be used immediately after mixing with aggregate/filler or sand, but the process of carbonation and setting is quite slow. Therefore, it is preferred to store the lime putty produced in air-tight containers (drums with cover, tubs with cover or sealed heavy-gauged plastic bags) for a period of at least 2 months. Lime putty is the binder ingredient of lime mortar. Mortar setting takes place when lime mortar has been applied, and carbonation follows as the mortar has been exposed to the environment. Hydrated lime is available in Pampanga, and is recommended for use in this conservation project.

EQUIPMENT FOR SLAKING



Aggregate is the filler ingredient of lime mortar. Fine sharp sand (product of crushing stone/gravel, and passed through sieve) is the aggregate material of the lime mortar

Lime wash is pure slaked lime in water. It produces a unique surface glow due to refraction of calcite crystals.

Whitewash is a type of inexpensive paint made from slaked lime (calcium hydroxide) and chalk (whiting). Other additives have historically included water,

glass, glue, Portland cement, salt, soap, milk or flour. Whitewash cures through a reaction with carbon dioxide in the atmosphere to form calcium carbonate in the form of calcite, a reaction known as carbonation.

Pozzolanic additives are additions that may be added to achieve harder, faster sets to any sort of lime or cement. pozzolans when added produce similar chemical reactions to those found in hydraulic limes, so they reduce breathability and flexibility in exactly the same way. The disadvantage is that you will never know how strong, breathable or flexible a pozzolan lime is beforehand, unless you have considerable experience or knowledge. Adding some types of pozzolans or even the smallest amounts of cement can be very damaging or produce poor performing mortars we always recommend testing first.

Fly ash, also known as flue-ash, is one of the residues generated in combustion, and comprises the fine particles that rise with the flue gases. Ash which does not rise is termed bottom ash. In an industrial context, fly ash usually refers to ash produced during combustion of coal. Fly ash is generally captured by electrostatic precipitators or other particle filtration equipment before the flue gases reach the chimneys of coal-fired power plants, and together with bottom ash removed from the bottom of the furnace is in this case jointly known as **coal ash**. Depending upon the source and makeup of the coal being burned, the components of fly ash vary considerably, but all fly ash includes substantial amounts of silicon dioxide (SiO_2) (both amorphous and crystalline) and calcium oxide (CaO), both being endemic ingredients in many coal-bearing rock strata.

Masonry is the building of structures from individual units laid in and bound together by mortar; the term masonry can also refer to the units themselves. The common materials of masonry construction are brick, stone, marble, granite, travertine, limestone, cast stone, concrete block, glass block, stucco, tile, and cob. Masonry is generally a highly durable form of construction. However, the materials used, the quality of the mortar and workmanship, and the pattern in which the units are assembled can significantly affect the durability of the overall masonry construction.

Mortar is the basic binding material for stone and masonry construction

Plaster is fine and richer mortar mixture used as protective coating for exposed walls in buildings

Stucco is a very fine and plastic rendering material usually best for decorative design details

Brick. Tile or block unit manufactured in plant, either fired in kiln, in open-fire, or sun dried, used for floor paving, roof covering, wall capping, arch lining, and *wall facing*. Spanish colonial buildings in the Philippines, most specially in Northern Luzon, brick was commonly used in construction. However, in Manila and most of central and southern Luzon, brick was largely used in

combination of adobe ashlar as arch linings, and supplemental materials to improve the strength of adobe-cladded rubble walls. Brick was also used as garreting/galleting or spacers to keep the horizontal level and alignment of adobe facings.

2.0 RECOMMENDED LIME MORTAR MIXTURE:

Cementless mortar mix:

BINDER: HYDRATED LIME PUTTY (water added to non-hydraulic type quicklime to make lime putty and stored in airtight containers for at least 2 months before mortar mixing); can be added brick dust and carpet shredded fibers admixtures of maximum 5% vol., to enhance mortar performance

FILLER/aggregate: SHARP SAND or washed river sand

BINDER TO FILLER RATIO: 1:3

MIXING MORTAR - 1

1. add right amount of water to quicklime, and mix well to produce hydrated lime putty
2. store lime putty in airtight containers in a designated storage shack for a period of not less than 2 months or 60 days
3. gauge 1 part lime putty prior to application by adding brick dust and fly ash (5 % of the mortar volume)
4. add 3 parts sharp sand with crushed shells, manila hemp or carpet fibers
5. add right amount of water and mix well to produce the lime mortar ready for application
6. remove pulverized old mortar to receive new mortar
7. slightly wet surface areas to receive mortar, and allow water to penetrate to the old rubble core (limewater can be used instead)
8. apply mortar

Notes:

- a. *color adjustment of lime plaster, repointing or grout can be achieved by adding small amounts of yellow, red and/or black oxide powder;*
- b. *No problem with working temperature in Bohol and Cebu*
- c. *Do not apply mortar during heavy rainfall*
- d. *Add more water to make flowing mortar for gap/void filling; sand could be reduced to make better flowing mortar, or sand particles should be sieved to very fine particles as in powder form to make it pass through high pressure applicator*
- e. *all surfaces and spaces to receive lime mortar should be pre-cleaned before mortar application*

- f. As much as possible, retain facing stone alignment, color and texture to achieve good visual compatibility and continuity with the existing wall structure***
- g. For lime plaster, use very fine sand with the same 1:3 lime:sand mixing proportion of the lime mortar***

Mixing the Mortar - 2

A conventional cement mixer can be used, although for larger projects a roller-pan or paddle-mixer is preferable. Lime mortars mixed in drum mixers are prone to balling. However, the following mixing procedure can reduce this problem. It is vital to ensure that when measuring materials this is done by volume. A gauging box or bucket will be necessary for this task. Measuring by shovel is not acceptable since quantities will be inconsistent:

Start with an empty mixer

Add 1 part sand

Followed by 1 part lime

Followed by 2 parts sand

Mix dry for at least 5 minutes

After 5 minutes slowly add water until the desired consistency is reached, it is very important not to drown the mix by adding too much water.

Once the desired consistency is reached mix for a further 20 minutes

(The above example is based on a mix ratio of 1:3)

The mix, to begin with, will appear dry but as mixing time increases the mortar will become much 'fattier'. If too much water is added the risk of shrinkage will increase and the final strength reduced. Do not use any plasticizers.

Water Content

The addition of water should be considered carefully, as it will directly affect the ultimate strength and durability of a mortar. The more water introduced into the mortar mix, the weaker will be the final result. However too little water will prevent the chemical processes taking place and weaken the material. Generally, water should be added sparingly, until a useable consistency is achieved.

The masonry background may also affect mortar strength. Dry backgrounds can quickly 'suck' moisture from newly applied mortar. This should be controlled by dampening down the background prior to mortar application...

RANGE OF RECOMMENDED MORTAR MIXES FOR HISTORIC BUILDING FABRIC by: John Ashurst 1988

Note: Values marked red are highly recommended

A. LIME MORTAR

| | L | : | A |
|----|---|---|-------|
| A1 | 1 | : | 4 |
| A2 | 1 | : | 3 |
| A3 | 1 | : | 2-1/2 |
| A4 | 1 | : | 2 |
| A5 | 1 | : | 1 |

B. LIME MORTAR GAUGED WITH POZZOLANIC MATERIALS

| | L | : | A | : | BRICK DUST/HTI POWDER | : | PFA |
|----|---|---|-------|---|-----------------------|---|------|
| B1 | 1 | : | 4 | : | 1/2 | : | - |
| B2 | 1 | : | 3 | : | - | : | - |
| B3 | 1 | : | 3 | : | - | : | 1/10 |
| B4 | 1 | : | 2-1/2 | : | 1/4 | : | - |

C. HYDRAULIC LIME MORTAR

| | H-L | : | A |
|----|-----|---|-------|
| C1 | 1 | : | 4 |
| C2 | 1 | : | 3 |
| C3 | 1 | : | 2-1/2 |

D. LIME MORTAR GAUGED WITH PORTLAND CEMENT

| | Finished mix | Coarse stuff mix | Cement : coarse stuff |
|----|---------------|------------------|-----------------------|
| | C : L : A | L : A | C : Coarse stuff |
| D1 | 1 : 4 : 10 | 1 : 6 | 1 : 6 |
| D2 | 1 : 3 : 12 | 1 : 4 | 1 : 8 |
| D3 | 1 : 2 : 10 | 1 : 5 | 1 : 10 |
| D4 | 1 : 3 : 12 | 1 : 4 | 1 : 12 |
| D5 | 1/2 : 3 : 12 | 1 : 4 | 1 : 24 |
| D6 | 1/4 : 3 : 12 | 1 : 4 | 1 : 48 |
| D7 | 1/8 : 3 : 12 | 1 : 4 | 1 : 96 |
| D8 | 1/10 : 3 : 12 | 1 : 4 | 1 : 120 |

NOTES:

L = non-hydraulic lime

H-L = hydraulic lime in hydrated (dry powder) form

C = ordinary portland or white portland cement

A = graded sand, stone dust, etc.
HTI = high temperature insulation material
PFA = pulverized fly ash

CEMENT LIME AGGREGATE MIX PROPORTIONS RECOMMENDED BY NHCP PER PUBLISHED Technical Note On the Restoration of STONE and MASONRY In Historic Buildings, Historic Preservation Series, NATIONAL HISTORICAL INSTITUTE 2005:

The following mortar mix proportion uses hydraulic lime, cement and sand and are given from weak or very low to high strength (MCG 1982). This mortar mix proportion is stronger, quicker setting, less flexible, less porous and permeable and has higher salt content.

- a. For very low strength: (1:3 base of binder: filler ratio). This is good for plasters, renders or for low strength mortars.

1 part cement (Portland Type I, white Portland or Pozzolan) - binder
3 parts lime (hydraulic) - binder
12 parts sieved sand – filler

Q: How is the ratio 1:3 established in this proportion?

A: If we add the two binding components, which is 1 and 3, we get 4 parts binder. Therefore, the binder:filler proportion is 4:12 or 1:3.

- b. **HIGHLY RECOMMENDED MIXTURE FOR CEMENT:LIME:SAND optional conservation mortar**

For moderate strength: (1:3 base), which is the better alternative and widely used mortar mix

1 part cement (Portland Type 1 with Fly Ash or Pozzolan)
1 part lime (quick lime or hydrated lime)
6 parts sieved sand with fine adobe chips
5% additives (clay, brick powder)
Tile grout additive for color-matching

- c. For good strength: (1:3 base)

1 part cement (Portland Type I, White Portland or Pozzolan)
1 part lime (hydraulic)
6 parts sieved sand

- d. For ideal strength for bricks: (1:2 base)

1 part cement (Portland Type I, white Portland or Pozzolan)
1 part lime (hydraulic)
4 parts sieved sand

- e. For special applications

1 part cement (Portland Type I, white Portland or Pozzolan)
1 part lime (hydraulic)
½ part brick or adobe powder (grog or shrinkage reducer)
4 parts sieved sand

The above mortar proportions should be considered as trial mixtures and should be tested in situ on the specific structures where restoration is to be undertaken.

White Portland cement is weaker than Type I Portland cement, and the use of Pozzolan cement requires lesser water in the mix preparation. Rich cement mortar mix produces some bad results. Do not use mortars with cement component more than the above suggested standard mixes.

Care and caution is advised in the use of mortar mixtures that may harm and cause increased salt crystallization for decorative stonework or walls with frescos like reliefs or paintings.

Admixtures

It is advisable to minimize the use of admixtures, like waterproofing compounds, unless proven by tests, on old stone or masonry walls, as this may inhibit thermal and moisture movement causing the underlying stone or masonry work to suffer the effects of heat, damp and salt migration.

On the use of organic or more technologically advanced admixtures in mortar mixes, the conservator is faced with the question of whether to replicate the old mortar using traditional technologies and organic materials like blood, hair, eggs, or wood sap, or instead use available synthetic materials from present day's construction and building industry to meet the qualities of the old mortar yet meet the design standards and demands of the building industry today.

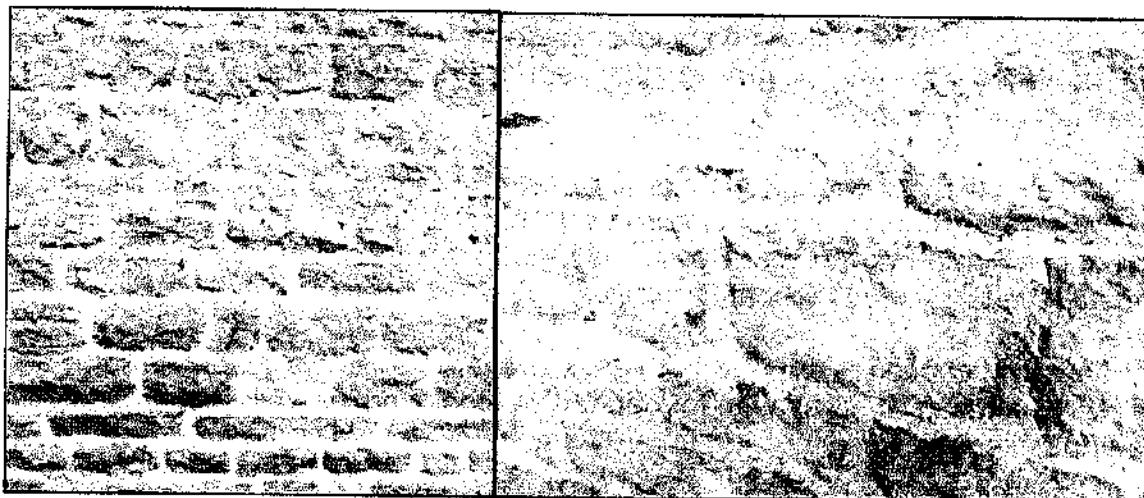
As cited before, the demands of economy and today's construction standards and requirements should be considered in opting for the use of traditional organic materials for mortars, in the same way that new materials produced this day may be perceived as more economical and logical if tested to be able to meet the qualities of the old mortar or old organic admixture. It would be worthwhile to also seek a synthetic or new equivalent to the organic admixtures or additives in old mortars (Sickels 1982).

Coloring

Coloring may be added to materials to achieve desired color of renders such as marble dust or white Portland cement for whitening; powdered and colored oxides, for tinting and toning, and powdered adobe or brick, for natural colors. Besides coloring renders and mortars, stone or brick powder or chips also serve as grog to minimize or compensate shrinkage upon setting of the new component.

Examples of Repointing of stone and masonry walls





LIME WATER CONSOLIDATION

by: Sten Peterson

Restorer and member of the Nordic Group of IIC

August 1981

SUMMARY

The article describes the method of consolidation with lime water. This traditional method has been used by restorers and craftsmen for centuries with good results.

The method works by replacing calcium in brittle or friable plaster or mortar, or in flaking or powdering paint layers. In other words, the binding medium in mortar, plaster or pigments is regenerated.

This consolidant is not an addition of a compound of a different character into the original materials. This means that the consolidated material retains its original properties and behavior.

HOW TO MAKE THE CONSOLIDANTS

Lime water

Lime water ($\text{Ca}(\text{OH})_2$) is a clear saturated solution, containing 1700 mg Ca per liter of H_2O at 20degC, the pH is about 9. In the atmosphere it will form calcium carbonate (CaCO_3), the reaction is slow. For the mixture, 1 part of lime putty and 6-8 parts of pure water (proportions by volume) are taken. The mixture must be well stirred and then left to rest for at least 24 hours. After this time the excess of lime will be deposited on the bottom of the vessel, with the clear lime water solution over it. On the top of the lime water a hard skin, a crust is formed. This crust is calcium carbonate, resulting from the reaction between the $\text{Ca}(\text{OH})_2$ and the CO_2 of the air.

For the consolidation treatment, the clear lime water must be carefully drawn out from the vessel in order to avoid mixing of the clear solution with the deposit of lime.

Before pouring the lime water into a pressure sprayer, used for the consolidation, the newly formed crust has to be filtered off.

Store limewater stock in plastic drums for ready use. Leave the water level to the level of the lime putty, and cover the container with lid or plastic sheet. The putty shall be stored for at least three months before using it to mix mortar or plaster.

NOTE:

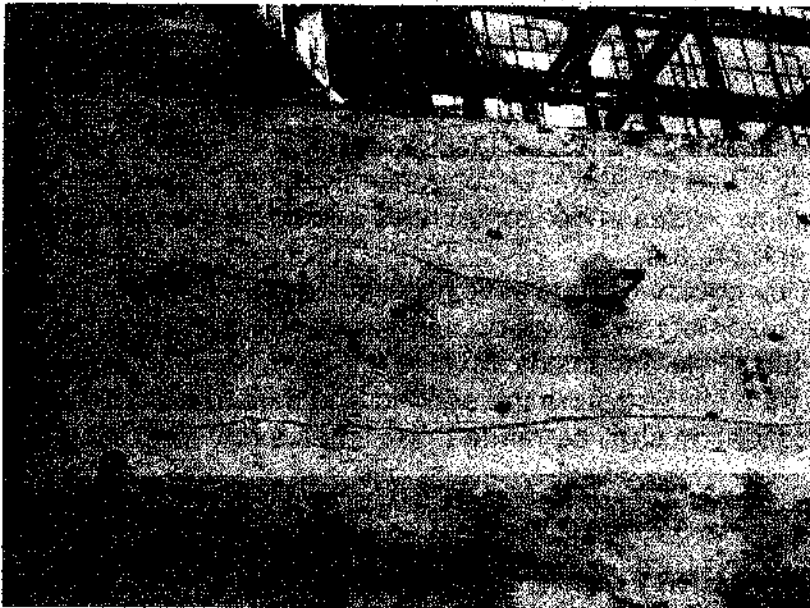
Lime water consolidation shall be applied to rubble wall core and gaps/voids between the coral facing blocks and the rubble core using manual/portable chemical sprayer or high-pressure injection equipment. Limewater can also be used for wetting the exposed rubble core and the coral blocks as pre-application of lime mortar, lime plaster, grout or repointing.

Procedure for limewater consolidation:

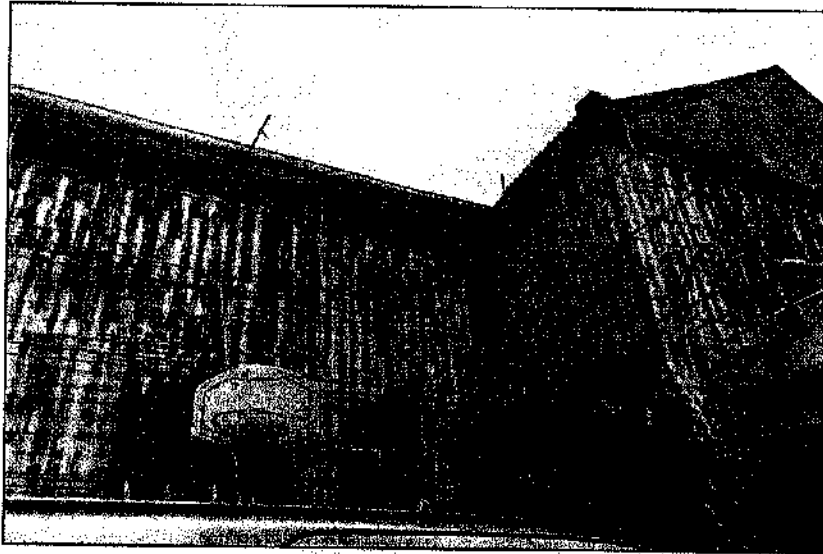
1. Use large hammer-drill with 16mm diameter x 40cm carbide tip masonry bit
2. Prepare all materials, tools, equipment, water supply, limewater and scaffolding system
3. Drill from the base of the wall at about 25 to 30 degrees downward inclination, at 50 centimeters horizontal spacing, or every 2 courses. Aim drill bit on stone joints to prevent breaking the adobe facings. Vertical drill holes spacing shall be approximately 50 centimeters, or conveniently every 2 courses of adobe stone at stone joints. Holes in horizontal rows should be staggered as shown on illustrations and photos.
4. Inject limewater by gravity using plastic hose and funnel into the bored holes, from the base horizontal row, going up. Limewater will overflow from the hole when that particular hole and inside cavities are filled up. Wait for limewater to settle and penetrate inside before the second and third injections.
5. Limewater consolidation shall be made three times a day for three days.

CEMENT: LIME: SAND SLURRY CORE CONSOLIDATION

1. Slurry mix proportions: C:L:S (1:1:6)
2. Inject CLS slurry by gravity using plastic hose and funnel into the bored holes, from the base horizontal row, going up. Limewater will overflow from the hole when that particular hole and inside cavities are filled up. Stop injection when slurry mix has overflowed from bored hole. Immediately clean overflow droppings on wall surface with clean water and clean foam pad
3. Seal filled holes with lime mortar.





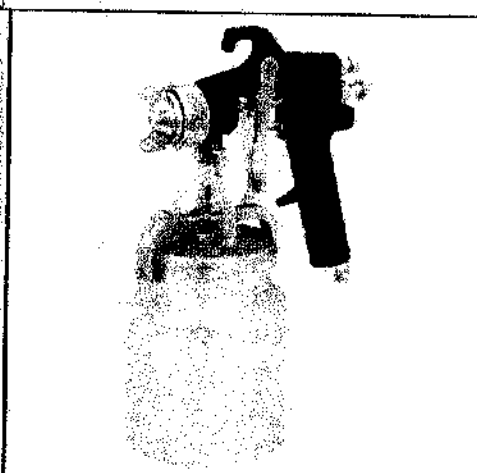
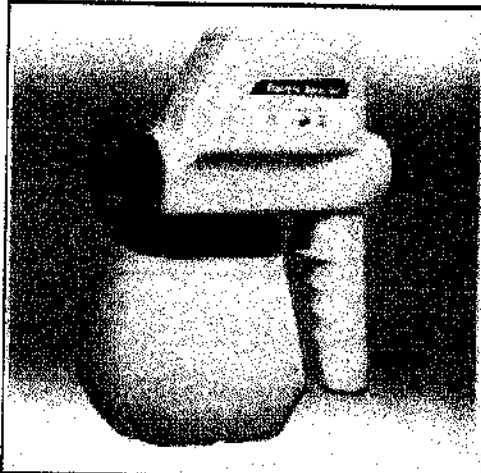
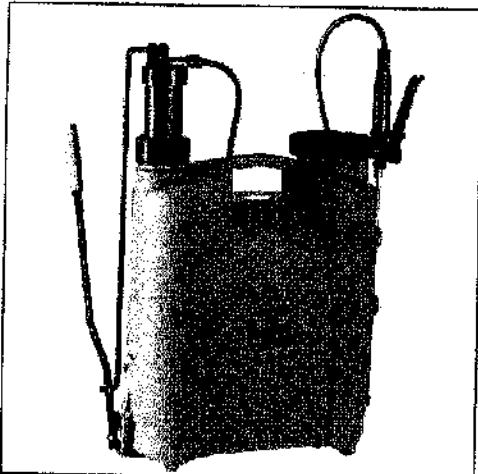


WALL CONSOLIDATION WITH LOW-VIZCOSITY LIQUID EPOXY





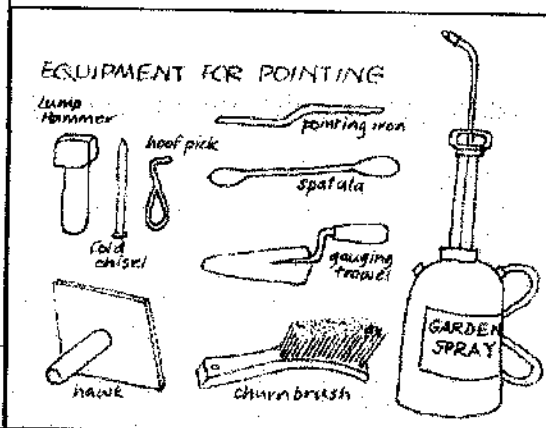
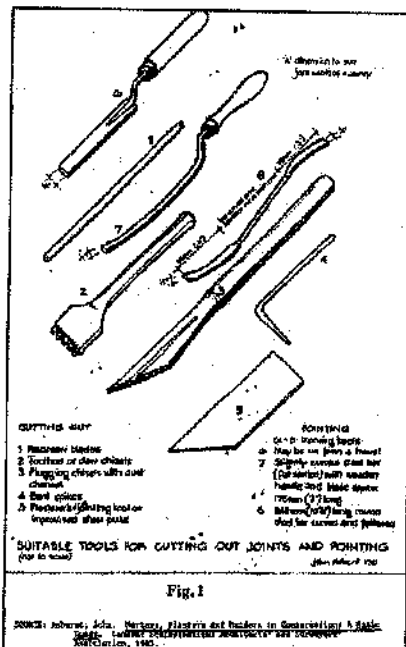
For Stone surface treatment (surface consolidation)



Air compressor; backpack manual sprayer; electric sprayer; compressed air sprayer: all used for the application of limewater and limewash consolidant for masonry wall restoration treatment

Special Tools:

9



4.0 TYPES OF STONE AND MASONRY REPAIR USING LIME MORTAR

| TYPE OF DAMAGE REPAIR | REPAIR TECHNIQUE/METHOD |
|---|---|
| CRACK REPAIR AND WALL DEFRAGMENTATION | MECHANICAL CLEANING; JETWASHING; LIMEWATER CONSOLIDANT INJECTION; GROUTING WITH LIME MORTAR WITH BRICK AND ADOBE INSERTS |
| ADOBE BLOCK REFACING | CLEAN AND REMOVE LOOSE RUBBLE WALL MATERIALS; LIMEWATER WETTING SERIES; INSTALL ADOBE STONE FACING BLOCKS BY MORTARING AND POINTING FROM DOWN GOING UP DIRECTION |
| REPOINTING OF BRICK JOINTS | REMOVE WEAK OLD POINTING AND LOOSE MORTAR; LIMEWATER CONSOLIDATION USING LOW PRESSURE INJECTION; REPOINTING STONE JOINTS FROM DOWN GOING UP DIRECTION |
| RUBBLE CORE LIMEWATER CONSOLIDATION (IF PRESENT) | DRILL ACCESS HOLES AT VARIOUS POINTS INTO THE WALL; INJECT LIMEWATER CONSOLIDANT BY GRAVITY WITH IMPROVISED PLASTIC HOSE AND FUNNEL 3X/day FOR 3 days |
| EXPOSED RUBBLE CORE MORTAR AND LIMESTONE CONSOLIDATION PLUS ADOBE BLOCK REPLACEMENT | REMOVE LOOSE MATERIALS AND CLEAN SURFACES OF EXPOSED RUBBLE CORE TO RECEIVE LIMEWATER CONSOLIDANT AND LIME MORTAR; SPRAY LIME WATER REPEATEDLY ON SURFACES TO RECEIVE LIME MORTAR; APPLY LIME MORTAR WITH ADOBE CHIPS, AND REPLACE ADOBE FACING BLOCKS FROM DOWN GOING UP DIRECTION |
| UNEXPOSED RUBBLE CORE CONSOLIDATION BY LIMEWATER CONSOLIDATION (REQUIRES LABORATORY TESTING OF CORE MATERIALS BEFORE AND AFTER CONSOLIDATION | DRILL THROUGH STONE FACING AND ABOUT HALFWAY THROUGH THE RUBBLE CORE, AT STONE JOINTS, SPACED AT 500MM ON CENTERS BOTHWAYS/STAGGERED; RAKE STONE JOINTS TO REMOVE LOOSE AND OLD POINTING. INSERT PLASTIC HOSE INTO DRILLED HOLES, AND INJECT LIMEWATER CONSOLIDANT CONTINUOUSLY WHILE SLOWLY PULLING OUT THE HOSE. REPEAT INJECTION AFTER 1 HOUR. STOP AFTER 10 REPETITIONS TO ALLOW CARBONATION TO TAKE PLACE. DO NOT SEAL THE DRILL HOLES YET, OR |

| | |
|---|--|
| | REPOINT WALL JOINTS. AFTER 30 DAYS, AND POSITIVE TEST RESULTS, REPOINTING AND INJECTING OF FLOWING MORTAR INTO DRILLED HOLES SHALL BE UNDERTAKEN. WALL SURFACE LIMEWASHING SHALL BE DONE LAST. |
| RE-PLASTERING OF STONE WALL SURFACE | REMOVE LOOSE SURFACE MATERIALS, DIRT AND BIOLOGICAL GROWTHS, AND CEMENT MORTAR AND RESIDUE; CLEAN EXPOSED STONE FACING WITH LIMEWASH CONSOLIDANT, IN CASE OF FAÇADE WALLS AND DECORATIVE BLOCKS, APPLY MORA POULTICE; APPLY LIME PLASTER OF AT LEAST ¾ INCH THICK EVENLY |
| WALL SURFACE TREATMENT BY APPLICATION OF BIOCIDES | CLEAN AND REMOVE LICHENS, SOIL, DIRT, GRIME AND GRAFFITI USING BENZALKONIUM CHLORIDE; OR CLEAN WITH SOAP AND SPRAYED WATER BY BRUSHING.; APPLY LIMEWASH BY MIST SPRAYING REPEATEDLY 30 TIMES; ADJUST TO DESIRED COLOR BY ADDING YELLOW, RED AND BLACK OXIDES OR ACRICOLOR TINT; LIME WASHING ALSO NEUTRALIZES SALT DEPOSITS ON WALL SURFACES EXPOSED TO SEA BREEZE AND ENVIRONMENT |
| WALL CAP AND LEDGE MORTAR SEAL APPLICATION | *PRIORITY WORK: MORTAR APPLICATION TO SEAL WALL CAP AND LEDGES |
| WALL WATER REPELLENT APPLICATION | ADD ABOUT 5% LARD TO LIME WATER AND MIST SPRAY REPEATEDLY FOR 40 TIMES; OR MIST SPRAY ACRYLIC EMULSION FOR 2 TIMES ON THE TARGET SURFACES |
| REBUILDING A WALL SECTION FROM GROUND UP | RECONSTRUCT WALL USING EITHER TRADITIONAL OR MODERN TECHNIQUES AS MAY BE APPROVED OR MOST APPROPRIATE |
| PARTIAL REBUILDING OF WALL AT MID SECTION | RECONSTRUCT WALL USING EITHER TRADITIONAL OR MODERN TECHNIQUES AS MAY BE APPROVED OR MOST APPROPRIATE |
| | |
| | |
| REPAIR AND RETROFIT OF | REPAIR/REPLACE DETERIORATED OR |

| | |
|--|---|
| DOOR/WINDOW OPENING/ARCHWAY | DAMAGED HARDWOOD HEADER; REPOINT STONE OR BRICK JOINTS; CORE CONSOLIDATION OF SURROUNDING MASONRY WALL |
| REHABILITATION OF STONE OR MASONRY FLOOR PAVEMENT | REPAIR DAMAGED PORTIONS USING LIKE MATERIALS |
| | |

5.0 SUPPLIERS:

The Contractor shall produce all materials, tools, equipment, and all necessary supplies and services required to implement and complete the rehabilitation work.

Materials, tools and equipment needed:

1. For preparing lime putty:

- For protecting the environment, lime putty production should be made in an outside plant, and not jobsite mixed. Storage shacks can be placed at the jobsite in containers like plastic drums with cover (should be airtight), or heavy-gauge sealable plastic bags) delivered to the site
- Electric drill with specially fabricated mixing paddle
- Safety wear (gloves, goggles and apron)
- Mixing tubs and trays
- Common mason's tools
- Potable water supply
- Water hoses

2. For mixing lime mortar at the jobsite. Lime mortar mixing can also be done in an outside plant for protection of the environment. However, batch delivery should be done immediately after mixing.

- Stock Lime putty
- River and sharp sand
- Metal screen for sand sieve
- Potable water
- Common mason's tools
- Spade
- Rake
- Pails and buckets
- **Mixing tray or tub**
- Wheelbarrow and buggy
- Safety wear

3. For applying lime mortar, plaster, repointing, grouting, limewash and limewater consolidation

- Lime mortar mix
- Pozzolanic additives
- Broken sea shells for inserts
- Limestone chips for inserts
- Mason's palette and other common tools
- Axe and pick
- Chisels
- Paint brushes
- Fish line and levelling hose
- Scaffolding system with safety nets and ladders; gondolas
- Common carpenter's tools
- Special tools for grouting, repointing
- Air compressor, hoses and nozzles for high-pressure injection
- Electric drill and angle grinder
- Jetwasher equipment
- Safety wear
- Other

F. CONSOLIDATION/REPAIR/RESTORATION

1. Before implementing any intervention, complete structural tests and analyses shall have been undertaken (soil tests; seismic analysis; wall coring tests and analyses; materials characterization, and laboratory tests).
2. The use of **lime:sand** mortar mix for conservation mortar, plaster, render, grouting and repointing is highly recommended for repair, rehabilitation, restoration, consolidation and reconstruction works in heritage buildings
3. The use of cement lime sand mortar mix may only be allowed if it shall be proven more appropriate for the intended application. Its use shall be subject for approval by CHURCH.
4. Lime water or mortar mixes for mortar, plaster repointing, rubble core repair, rubble core consolidation shall have corresponding water content proportion.

E. THINGS TO REMEMBER IN THE REHABILITATION OF STONE AND MASONRY STRUCTURES:

1. install appropriate temporary shoring, horsing and other supports; repair cracks, and structural damage before reconstructing stone and masonry walls
2. restore to original tight construction
3. restore, as much as possible, the vertical and horizontal alignment of structures

4. color match old pointing and plaster with the existing.
5. Choose a well-maintained/restored wall section or area as reference wall to follow for the rest of the wall areas to be restored to achieve a consistent restoration quality.
6. some coral blocks were originally constructed without pointing
7. fill in voids between the stone facing and the rubble core
8. as much as possible, use same materials for restoring and reconstructing stone and masonry walls
9. seal wall caps and ledges
10. provide sand beds for pre-installation of processed stone blocks
11. use elongated stone (limestone) for rubble core reconstruction
12. use brick tile and block for door, window and arch lining
13. use of brick dust, crushed shell, fly ash, carpet fiber and sharp sand in lime mortar mix for repair and reconstruction mortar
14. provision of workshops, fences, safety nets, construction ladders, stairs and ramps for easy access and construction safety
15. provision of electro-mechanical hoists for stone and masonry materials
16. provide site security
17. visual obstructions should be cleared or minimized

F. STRUCTURAL CONSOLIDATION, RESTRUCTURING AND RETROFITTING

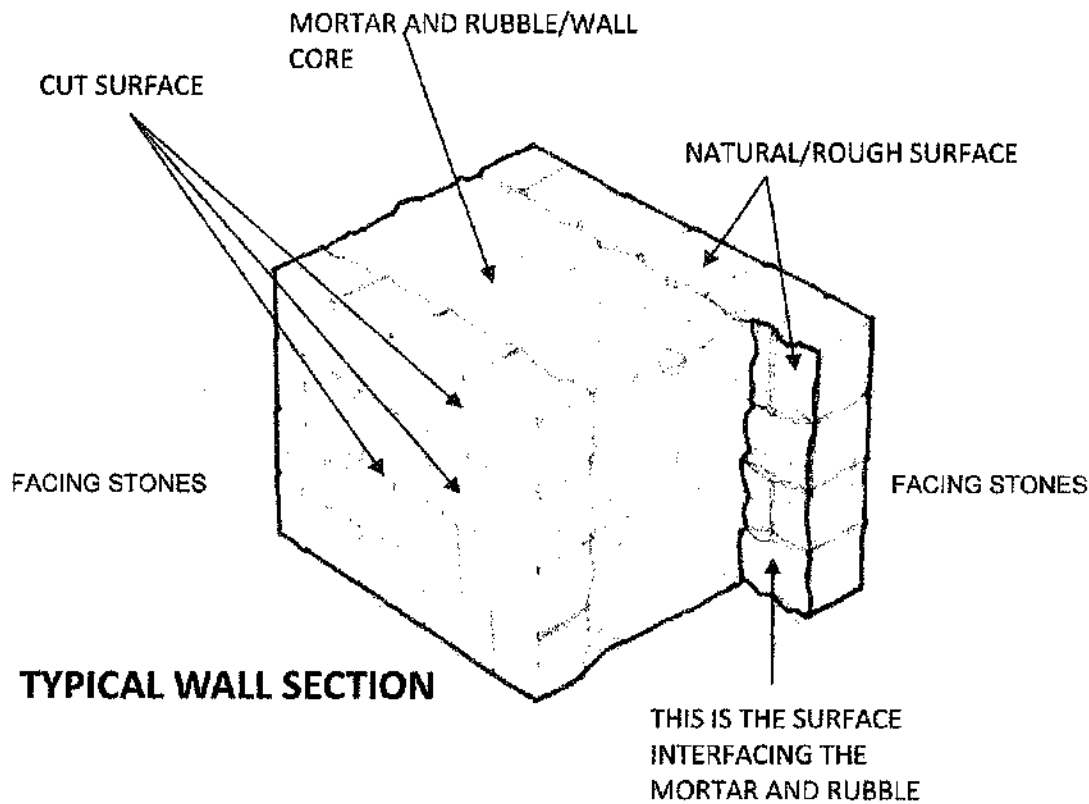
Structural consolidation, chemical consolidation; stabilization – these techniques shall be applied to the church and bell tower walls

Restructuring/retrofitting – these shall depend on the findings and recommendations of the structural engineer

Isolation of structure – separating a structure or making it independent from another structure, e.g.: new structure from old structure

Integration of modern structures – joining or connecting two or more structures or constructions together as one structural entity, e.g. new construction is connected with an existing old structure

METHODOLOGY FOR THE STRUCTURAL CONSOLIDATION OF STONE AND MASONRY WALLS



TYPICAL WALL SECTION

SCAFFOLDING SYSTEM INSTALLATION

- Install required scaffolding system;
- Observe safety and health provisions and requirements;

MECHANICAL AND CHEMICAL CLEANING

- Please refer to the technical specifications: C. CLEANING OF STONE AND MASONRY WALLS

CORE DRILLING FOR CORE CONSOLIDATION

- Core drilling is done in order to inject lime water consolidant material into the wall core, after which, carbonation will take effect to reconvert the loose rubble material to limestone again.
- Use fabricated (custom made) coring drill bit;
- Drill through stone joints to avoid drill holes through stones;
- Drill at every 2 or 3 stone blocks distance, at staggered array, at both sides of the wall, in order to effectively consolidate (impregnate) all sections of the wall;

WALL CONSOLIDATION (CORE CONSOLIDATION)

- Prepare all needed materials, tools and equipment for the consolidation process;

- Use jet washer to deliver the limewater consolidant into the wall section, but set the water stream to mist spray;
- Use plastic tubing extension to the nozzle;
- Start spraying with the extended nozzle at the end of the drilled hole, then slowly withdrawing back while continuously spraying into the hole;
- Upon completion of consolidant spraying, leave the holes open to allow for carbonation to take place in the rubble core;
- Fill up the holes with type 2 mortar from caulking gun or custom-made squeegee;
- Repoint stone joints

THE CONSOLIDATED WALL

- After consolidation, the wall surface is either applied with biocide (benzalkonium chloride), and/or Pioneer Bondcrete for water resistance;
- Another option for protective layer is by mist-spraying of limewater (color-matched) on the consolidated wall surface, 20 to 30 passes; the first spray should cover a certain area; allow to dry while spraying on another area; repeat these 2 actions at another couple of areas; the second spray follow the same procedures; the purpose of spray-dry-spray-dry sequence is to effectively allow for the consolidant to better penetrate the porous stone or masonry material, and to form a protective layer;
- The wall consolidation is now complete.

G. RISING DAMP AND RECOMMENDED SOLUTIONS

Rising Damp
Tim Hutton

Rising damp is widely misdiagnosed in existing buildings, based on the incorrect interpretation of visual evidence and the readings of moisture meters. Because of a highly successful sales campaign over the last 20 years by specialist remedial contractors installing injected 'chemical damp-proof courses', this misdiagnosis of rising damp has also become synonymous with a diagnosis of a lack of an 'injected chemical damp-proof course'. Although this has been very good for business, it has often resulted in a waste of the clients' money and resources; original plasters and finishes have been destroyed in the process of installation, and unnecessary damage has been caused to original structures by the drilling of irrigation holes. In addition, money that might have been spent on more cost-effective maintenance or repair works has been wasted.

Whilst injected chemical damp-proof courses may provide useful short to medium term protection for certain types of structure if properly specified, their general application is rarely the most cost-effective way of controlling damp problems in buildings, and may be wrongly specified and ineffective.

Cause and Effect

Rising damp actually describes the movement of moisture upward through permeable building materials by capillary action. It becomes a problem if the moisture penetrates vulnerable materials or finishes, particularly in the occupied parts of a building. This moisture will dissolve soluble salts from the building materials such as calcium sulfate, and may also carry soluble salts from its source. If the moisture evaporates through a permeable surface, these salts will be left behind and form deposits on or within the evaporative surface. Where there is a large evaporative surface, salt crystals are deposited as a harmless flour-like dusting on the surface. If evaporation is restricted to localized areas such as defects in an impermeable paint finish, then salt deposition is concentrated, forming thick crystalline deposits with the appearance of small flowers; hence the term 'efflorescence'. When evaporation occurs within the material, salts can be deposited within the pores. The expanding salt crystals in these locations may result in fractures forming in the material and spalling of the surface. This type of decay may be seen in porous brickwork or masonry.

When there has been a long-term problem with moisture penetration, evaporation at the edge of the damp area leads to a distinctive 'tide mark' as a result of salt deposition. Where this occurs at the base of a wall, the tide mark is often taken as a typical diagnostic feature of 'rising damp'. However, these salt accumulations may remain even when the water penetration that originally caused them has long gone. Similarly, water penetration may have occurred from causes other than 'rising damp'.

The most common source of moisture in the base of the walls of buildings is from defective ground and surface drainage. This is present to some degree in almost every building in the country, due to a combination of such factors as rising ground levels, the failure of ground drainage systems, and the increased use of concrete or finishes around buildings without consideration of drainage slopes.

The accumulation of 'moisture reservoirs' in the foundations may also arise as the result of chronic plumbing leaks or floods from catastrophic plumbing or drainage defects.

Damp conditions at the foot of walls may be greatly increased by condensation. This occurs when warm moisture-laden air cools to dew point (the temperature at which moisture condenses) against a cold surface. Such cold surfaces commonly occur when the insulation value of the external wall is reduced by water penetration, as described above. Intermittent occupancy with intermittent heating provides the conditions for condensation of further water on these cold damp surfaces, particularly in ground floor bedrooms. These phenomena are the main causes of damp in the base of walls rather than 'rising damp' alone.

Damp masonry at the base of walls may lead to a number of problems:

- The moisture content of the structure may rise to a level at which decay organisms may grow, or the materials themselves may be adversely affected.

For example, timber skirting boards or built-in bonding timbers along the base of walls may become infected and decayed by dry rot, wet rot, weevils or woodworm.

- In very damp conditions, the inorganic materials themselves may lose their structural strength. This occurs most spectacularly with walls made of cob (earth) soaked with water.
- Damp conditions on the surface of walls, particularly in conjunction with condensation, allow the growth of molds both on the surface and within porous or fibrous materials, such as wallpapers or carpets fitted against the base of the wall. Not only is this aesthetically unacceptable and damaging to finishes, but it can be a significant health hazard to occupants.
- Where evaporation takes place, the deposition of soluble salts on the surface or within the pores of materials can cause aesthetic and structural damage.

Treatment Options

As described above, 'rising damp' is only one of many mechanisms resulting in high moisture levels in the base of walls, and even when it is a significant factor, it is rarely the primary source of moisture. The management of problems due to high moisture levels requires the proper identification of the moisture source and the defect responsible, before the most cost-effective solution to the problem can be determined.

Damp and its effects may then be controlled by adopting one or more of the following measures:

- The provision of suitable moisture sinks to dissipate the moisture at its source without causing problems to the structure or occupants, and the repair of any contributing defects acting as moisture sources, such as broken pipes.
-
- The introduction of either physical barriers using damp-proof membranes or materials to form a 'damp-proof course' or hydrophobic (water-repellent) materials as in 'chemical damp proof courses'.
- The isolation of vulnerable materials such as timber and interior finishes from damp fabric.

Moisture Barriers

The control of moisture movement using either damp-proof or hydrophobic materials to create a relatively less permeable 'moisture barrier' is not necessarily a cost-effective option in controlling damp problems and may even be counter-productive. This is because use of relatively impermeable materials will restrict moisture movement and hence drying. As a result, moisture may be 'locked' into damp materials for many years causing chronic problems. Moisture may also be prevented from dissipating from permeable materials, resulting in the buildup of moisture or even damper conditions in localized areas. This may result in moisture moving into previously dry structures or evaporating from previously unaffected surfaces, causing further salt efflorescence. One reason why those injecting 'chemical damp-proof

courses' generally insist on re-plastering treated masonry with a salt-proof and waterproof mixture, is to cover up these potential problems.

A relatively common example of the effect of inserting a damp-proof material into a structure is the appearance of fresh 'rising damp' in walls following the laying of a new concrete floor with a damp-proof membrane. This is most often done when a suspended floor structure is replaced by a solid floor, or when a breathable stone slab floor is lifted and re-laid. Before the alteration of the original floor, moisture would have been able to evaporate off a large surface, without affecting internal finishes. However, a new impermeable membrane allows the water to accumulate beneath, forcing it to the sides of the room and into the base of the walls. This causes damp and decay problems unless appropriate ventilation has been provided at the floor/ wall junction. These damp problems are then often used as justification for the injection of a moisture-barrier and the removal and replacement of plaster with remedial mixes. In fact, the more cost-effective solution would have been to allow the floor structure to continue to breathe. This can be done with a suspended floor or by re-detailing the floor/wall junction in such a way as to allow moisture to dissipate, for example, with a vented skirting detail.

If it is decided that a moisture-barrier at the base of the wall is essential, the most reliable method is to introduce a physical barrier rather than a chemical one. This involves cutting in a layer of damp-proof material to form a barrier which is continuous with the damp-proof membrane under the floor. As the wall above this barrier will remain damp for some time, it is then necessary to isolate all vulnerable materials above as well as below the barrier, such as skirting boards, from the base of the wall with a damp-proof membrane or ventilated air gap.

However, a damp-proof barrier is always vulnerable to local failure and will tend to concentrate moisture and damp problems at these points. This is a general characteristic of all impermeable materials, including those used in tanking systems, which are generally found to fail at some point or at some time. This results in more 'concentrated' moisture at the points of failure, and hence more severe damp problems locally when they fail. Because of this, the more robust, fail-safe, and traditional building techniques rely on the use of permeable materials and ventilation systems in order to dissipate moisture and prevent it coming into contact with vulnerable materials or interiors.

'Chemical damp-proofing' may provide a useful barrier to damp in the short to medium term where the walls are of uniform construction such as sound brickwork laid with strong cement mortar, especially if they are combined with a ventilated dry lining system or other building detail which allows moisture to dissipate. However, any gaps which are left, or which appear over time as the material deteriorates, may lead to an accelerated rate of decay.

This method is most unreliable where walls are of natural stone, because the injected hydrophobic material will follow the lines of least resistance and may not accumulate in sufficient quantities where it is needed. This is particularly true when the wall is made up of materials of different permeability, as is

common in the thicker walls of older buildings where the bricks and mortar may be of variable consistency and the structure may include cavities, particularly when the wall consists of brickwork or masonry skins containing a rubble infill.

Surface Water Drainage

The most cost-effective way of preventing damp problems in buildings, including those resulting in damp masonry at the foot of walls, is to minimize moisture sources and provide adequate passive moisture sinks to dissipate any penetrative moisture so as to make the system fail-safe. This should start with the provision of adequate ground drainage around the building to minimize water penetration to the foundations, and the re-detailing of surface drainage so as to ensure surface water is drained clear of the foot of the walls. It has become fashionable to specify 'French drains' to help with this process. However, these are often poorly specified and soon become 'French ponds' in UK conditions. This may be because the base of the drain has been inadequately levelled or drained to keep water out of the foundations and the gravel infill has become contaminated with soil and debris, preventing proper moisture drainage and evaporation from the foot of the wall. In the UK, the more traditional and more effective detail is to use a ventilated and drained 'dry area' around the foot of the wall. These are commonly covered with York stone slabs in order to prevent debris accumulating in the drained dry area and to minimize maintenance.

Wall Construction

The use of impermeable finishes, such as sand/cement renders around the base of external walls is a common cause of damp problems. These prevent moisture evaporating from the foot of the wall, forcing it into the interiors. As with all impermeable materials, they eventually fail, generally due to cracking. This allows water to penetrate into the foot of the wall, but prevents drying. The use of more traditional breathable lime mortar renders, and the correct detailing of renders to shed water clear of the base of the wall and to prevent 'bridging' of any existing damp-proof course, would be the preferred solutions.

Cavity wall construction may provide a way of dissipating moisture and preventing it penetrating into the building, provided the cavity is through ventilated. This may be compromised by debris or the ill-advised injection of proprietary insulation foams. These defects may also bridge existing damp-proof courses, allowing water to penetrate to interior finishes. In some cases, the most cost-effective solution is to reinstate a through-ventilated cavity.

Generally, failures in existing damp-proof courses are the result of bridging by inappropriate repairs and alterations, by raised ground levels or by localized damage due to structural movement or poor building work. If a damp-proof course is an original design detail to control moisture movement in the structure, it may be necessary to carry out local repairs. This is best done by 'cutting in' a new layer of damp-proof material locally rather than by the

general injection of hydrophobic solutions into the masonry to create a 'moisture movement restricting barrier'.

Ventilation

Traditional buildings built in damp or potentially damp sites commonly included through-ventilated sub-floor cavities, cellars or basements. These act as sumps to allow the evaporation and dissipation of moisture from the structure before it reaches occupied areas or vulnerable finishes. Indeed, in some parts of the country it is not uncommon to find streams running through the cellars or basements in old farmhouses. These were presumably retained as a source of water for domestic use. However, if the ventilation of a basement, cellar or sub-floor cavity has been restricted, moisture can build up and penetrate vulnerable structures. This can occur, for example, by earth and plants clogging air bricks or by the ill-advised application of relatively impermeable materials. The solution to these problems if they develop, is to re-establish ventilation, not to start applying further damp-proof materials.

As described earlier, the reinstatement of a through-ventilated suspended floor is generally preferable to its replacement with a concrete slab. The requirement for the continued dissipation of moisture does not preclude the use of basements and cellars as occupied areas, but means that walls should be kept ventilated and not sealed. This can be achieved by using through-ventilated dry lining systems rather than impermeable finishes or tanking materials, which would only force moisture into adjacent structures above or to the side. Traditionally, dry lining has been produced by the use of timber paneling spaced from the masonry with battens or the use of lath and plaster. In all cases, the cavity behind should be ventilated at the top and at the bottom to allow through-ventilation to dissipate moisture, as otherwise moisture will accumulate to cause damp and decay problems. This commonly happens when insulation material or debris is allowed to block the cavity behind lath and plaster or when impermeable paint layers accumulate over timber paneling. These defects are easily solved and the traditional 'farmhouse' technique of timber paneling to dado level can be an attractive and cost-effective solution to problems of damp penetration or condensation affecting the foot of masonry walls. Modern materials and techniques may be used to achieve the same end, and many products are available on the market to allow the cost-effective provision of through-ventilated dry lining systems, including specialist plasterboard systems and plastic 'Platon' membranes.

Conclusion

Even with the loss of traditional skills and the complexities introduced into building by new materials and new styles of occupancy, the conditions resulting in damp to the base of walls can easily be avoided with a little thought and scientific understanding. Indeed, new materials and techniques can often be used to advantage if their properties are analyzed as potential

environmental controls. In contrast, the misdiagnosis of rising damp and the general application of particular products and techniques without considering the consequences leads to the unnecessary waste of the increasingly limited budgets available for maintenance and refurbishment. A more rational approach to the diagnosis and treatment of damp problems in buildings is only good building practice, which independent surveyors and their scientific consultants should promote in the interest of sound building and public health.

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Other Treatment Recommendations:

1. Provision of trench alongside wet walls (exterior side)
2. Provide good ventilation/air circulation in rooms, hallways or enclosures to promote normal breathing of old walls.
3. If it is safe to remove cement plaster on the wall with least damage to the stone or brick facing material, removal should be undertaken as a restorative treatment of the wall

MON TYPES OF PRESERVATIVE MATERIALS AND THEIR USES:

HERBICIDE

USE: REMOVAL OF PLANTS AND TREES AND ROOTS GROWING IN WALLS
BRAND: ROUNDUP OR EQUIVALENT
PREPARATION: NO DILUTION
APPLICATION METHOD: SYRINGE INJECTION THROUGH DRILLED HOLES IN ROOTS AND BRANCHES

DISHWASHING LIQUID

USE: STONE AND MASONRY CLEANING
BRAND: JOY DISHWASHING LIQUID
PREPARATION: 1L JOY: 55 GAL WATER IN PLASTIC DRUM CONTAINER; PRESSURE WASHER; LONG HOSE; NYLON BRISTLED BRUSH
APPLICATION METHOD: JETWASH

STONE AND MASONRY WALL CONSOLIDENT

USE: REVITALIZE STONE AND MASONRY WALL SURFACE MATERIAL
BRAND: PIONEER CONCRETE BOND 400; LIMEWATER
PREPARATION: LIMEWATER PRODUCTION

APPLICATION: PIONEER CONCRETE BOND 400 BY BRUSHING; LIMEWATER BY MIST SPRAYING (5 PASSES)

WATERPROOFING/TOPCOATING TREATMENT

USE: WEATHER PROTECTION AND PREVENTION/CONTROL OF SURFACE CONTAMINATION AND DETERIORATION OF STONE AND MASONRY WALLS

BRAND: NIPPON PAINTS; PIONEER CONCRETE BOND 400; BOYSEN CLEAR ACRYTEX; MORTAR WITH INTEGRAL WATERPROOFING ADMIXTURE

PREPARATION: CLEANING, REPAIR & REPLACEMENT WORKS MUST HAVE BEEN COMPLETED; SCAFFOLDINGS INSTALLED

APPLICATION: BY PAINTBRUSH/ROLLER

WATERPROOFING/WATER REPELLENT TREATMENT

USE: WEATHER PROTECTION AND PREVENTION/CONTROL OF SURFACE CONTAMINATION AND DETERIORATION OF STONE AND MASONRY WALLS

BRAND: PRIMERO MULTI-SEAL WATER BASED ELASTOMERIC WATERPROOFING

PREPARATION: CLEANING, REPAIR & REPLACEMENT WORKS MUST HAVE BEEN COMPLETED; SCAFFOLDINGS INSTALLED; 1:2; 1:3; OR 1:4 WATER DILUTION

APPLICATION: BY PAINTBRUSH/ROLLER

WATERPROOFING AND CAPPING MATERIALS

USE: REHABILITATION, CONSOLIDATION, WATERPROOFING, WEATHER SEALING OF WALL TOPS AND LEDGES

BRAND: CERAMIC TILES; TERRACOTTA TILES

PREPARATION: REHABILITATION WORKS MUST HAVE BEEN COMPLETED

APPLICATION: MORTAR CAPPING OR TILESETTING

BIOCIDE

USE: REMOVAL OF BIOLOGICAL GROWTH ON STONE

BRAND: BENZALKONIUM CHLORIDE (BKC) OR HYDROGEN PEROXIDE 20 VOLS.

PREPARATION: ZONROX: 1 PART ZONROX:2 PARTS WATER DILUTION
1 PART BKC:14 PARTS WATER; 1 PART HYDROGEN PEROXIDE: 1 PART WATER

APPLICATION METHOD: BKC BY BRUSHING; ZONROX BY BRUSHING; HYDROGEN PEROXIDE BY ATOMISER SPRAYING AND BRUSHING, WATER RINSING

TERMITICIDE

USE: TERMITE ERADICATION

BRAND: SOILGUARD OR EQUIVALENT; MAPECON F3 POWDER; MAPECON F3 LIQUID

PREPARATION: SOILGUARD: DRILL GROUND HOLES ALONG BUILDING PERIMETER; MAPECON F3 POWDER: FOLLOW MANUFACTURER'S

APPLICATION: INSTRUCTIONS; MAPECON F3 LIQUID: FOLLOW MANUFACTURER'S INSTRUCTIONS
FOLLOW MANUFACTURER'S INSTRUCTIONS OR LET MANUFACTURER'S OR AUTHORIZED APPLICATOR DO THE WORK BY CONTRACT

BLACK COAL TAR

USE: WOOD AND MASONRY INTERFACE COATING
BRAND: ANY BRAND
PREPARATION: CLEAN AND DRY WOOD TO STONE/MASONRY CONTACT AREAS
APPLICATION: BY PAINT BRUSH

WOOD PRESERVATIVE

USE: ANTI-TERMITE AND PRESERVATIVE TREATMENT; MOISTURE AND WEATHER PROTECTION; OLD WOOD FINISHING
BRAND: SOLIGNUM BROWN FOR CONSEALED WOOD; SOLIGNUM CLEAR FOR EXPOSED WOOD; FINISHING OIL AND LIQUID OR PASTE WAX; XYLADDECOR; SADOLIN
PREPARATION: SOLIGNUM BROWN AND CLEAR: NO DILUTION REQUIRED; FINISHING OIL AND WAX: MIX AND HEAT; CLEAN AND DRY SURFACES TO BE TREATED.
APPLICATION: PAINTBRUSH APPLICATION

H. RESTORATION OF STONE AND MASONRY DETAILS

1. Only highly skilled craftsmen, stone carvers and masons shall be allowed to work on architectural and artistic details on stone and masonry materials.
2. Principle: Important building features such as stone and masonry carvings and polychrome renderings must be treated as works of arts, and due respect for its original creators must always be accorded.
3. The use of material substitute must be justified (refer to Preservation Briefs No. 17 in the technical notes appendix).
4. Paper pulp poultice or limewater cleaning shall be allowed

I. RESTORATION WORK AND THE ENVIRONMENT

Measures and recommendations to enhance improvement of the heritage site environment and promote its protection shall include the following:

1. Improve or correct the site's area drainage system
2. Landscape improvement
3. Replenish trees and plants at the site
4. Remove unwanted structures, concrete pavements and visual obstructions such as makeshift structures, hazardous structures, commercial billboards, garbage and stalls
5. See-through fences and gates preferred
6. Provide perforated cover for open trenches/canals and manholes
7. Maintain cleanliness in the building and the site
8. Pest control treatment schedule
9. Do not use sandblasting technique for cleaning stone and masonry walls
10. Do not use highly toxic chemical solutions for conservation work in the open areas or inside the building
11. Provide properly protected workshops at the site for stone cutting, mortar mixing and storage
12. For jobsite mixes, provide proper mixing tray
13. Do not dispose waste materials into existing municipal drainage lines
14. Provide hygienic toilets at the site for the construction workers

K. ARCHITECTURAL RESTORATION

1. All valid contributions of different periods shall be considered for architectural restoration.
2. All other objects and features, which do not relate to relevant history and development, and which do not contribute to the correct interpretation of the building, shall be removed.
3. Time marks and evidences on the walls shall be respected and given preference over plastering or concealing the wall surfaces. However, if plastering shall be a necessary measure or treatment to ensure the preservation of the walls, then plastering shall be allowed.
4. The restoration process shall be true to the architectural style, scale, proportions, contrast and materials.

L. WOOD REPAIR AND RESTORATION

Common Specifications:

1. The nature and extent of deterioration of the original wood or structural system determines the selection of repair, conservation, and restoration techniques and materials. There are essential principles to follow in any such work:

2. The Golden Rule: First remove the source of the trouble! Reseal the leaking roof, gutter, eaves or downspout. Ventilate and drain the wet basement. Remove causes of overloading. Remove fungus-infested timbers and eradicate insect attacks.
3. Retain as much and disturb as little of the original work as is practically possible.
4. Repair in such a manner that the original aesthetic effect is not impaired. Do not make labored reproductions of the old.
5. When repairing roofs and floors, pay special attention to the effects of your work on the ceiling beneath, especially plaster ones.
6. Do not alter the balance of stresses—avoid overloading other parts of the structure when repairing.
7. Approach the straightening of deformed structures with great care. It is too easy to snap, shear, or deform joints, tenons, dowels, or pegs without knowing. Later troubles can easily be caused in this way. Securing or stabilizing may be all that is required.
8. Make sure the timbers you are leaving exposed were meant to be exposed. Many subsequent problems have been caused by the stripping of exterior boards, stucco, and paint from timbers. Often the stripping is done in the mistaken belief that this was how "the original was supposed to be seen."
9. Wood for building construction is quite limited. Therefore, it is recommended to practice prudence when dismantling and treating dismantled wood components as total waste material. Most old wood building materials used are of good hardwood quality. These wood components can still be reprocessed and reused for structural repairs and reconstruction. Other wood components which are partially damaged can be spliced or joined together using traditional wood joint techniques.
10. Wood joints shall be applied with resin wood glue, low viscosity liquid epoxy or non-sag epoxy.
11. Give priority on sourcing used/second hand wood components for replacements
12. Basically, the best and most practical methodology for wood restoration and rehabilitation shall be: **DISMANTLE – REPAIR – REINSTALL – REFINISH**, which is self-explanatory. The other methodology is: **REPAIR AND REPLACE**.
13. WOOD DOORS AND WINDOWS; AND, METAL GRILLWORK STANDARD

METHOD FOR REPAIR AND RESTORATION:

| | |
|---|---|
| REPAIR AND RETROFIT OF WOOD DOORS AND WINDOWS | <p>STANDARD PROCEDURE:</p> <p>1) UNINSTALL EXISTING WOODEN DOOR/WINDOW PANEL/PANELS; 2) PLACE OR TRANSFER OLD DOOR PANELS IN A TEMPORARY WORKSHOP; REPAIR ONLY DAMAGED PARTS OR COMPONENTS, INCLUDING JAMBS AND HARDWARES; REPLACE MISSING PARTS OR THOSE COMPONENTS THAT ARE BEYOND REPAIR; 2) USE TRADITIONAL WOOD JOINERY AND SPLICING TECHNIQUES; SAVE AS MUCH ORIGINAL WOOD COMPONENTS AS POSSIBLE; 3) CORRECT ANY DEFORMATIONS, ALIGNMENT OR INCOMPATIBLE PREVIOUS REPAIRS; 4) STRENGTHEN FRAME AS NEEDED; 5) REFINISH RESTORED DOORS AND WINDOWS; 6) REPAIR OR FABRICATE DOOR/WINDOW HINGES OR PIVOTS; 7) REINSTALL JAMBS AND PANELS, INCLUDING HARDWARES AND LOCK DEVICES</p> |
| REPAIR AND RETROFIT OF METAL GRILLS | <p>1) UNINSTALL/REMOVE ONLY ALL METAL GRILLS TO BE REPAIRED OR RESTORED, EXCEPT THOSE WITH ONLY MINOR PATCH REPAIR AND REFINISHING WORKS; 2) MECHANICAL CLEANING AND APPLICATION OF RUST CONVERTER; 3) REPAIR AND REPLACEMENT OF DAMAGED SECTIONS OR PARTS; 4) REFINISHING OF METAL GRILL; 5) REINSTALLATION OF METAL GRILL</p> |

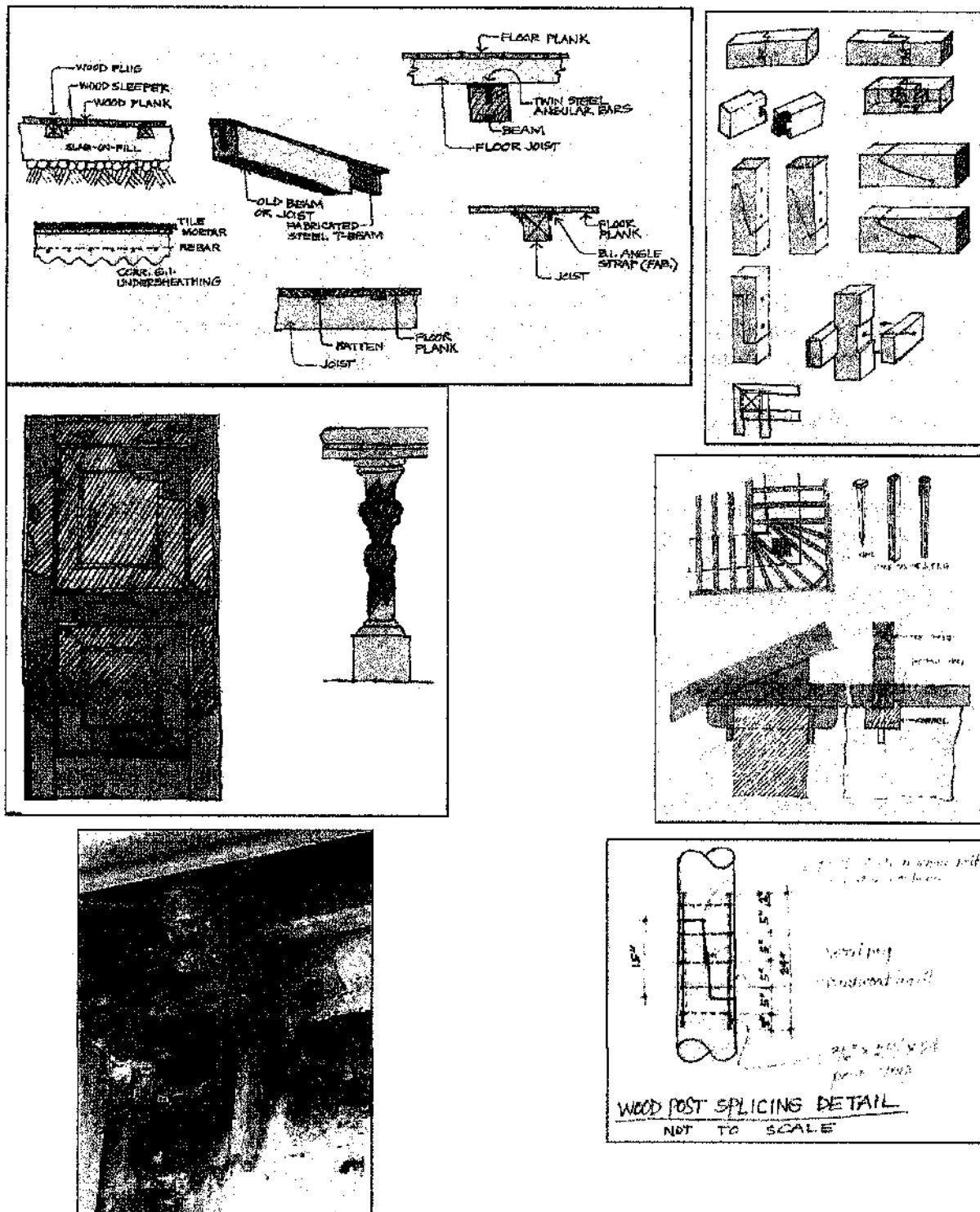
14. For roof trusses and roof frames: Inspect all trusses and purlins for damage, deterioration or termite/wood borer infestation; Repair or replace damaged wood components; apply termiticide (Mapecon F3 Powder and/or Liquid) and wood preservative (Brown Solignum) on all new and recycled wood surfaces; Roof trusses and frames rehabilitation may require to uninstall the roof cover or ceiling, which may incur additional costs in reinstallation.

15. All new and recycled wood components to be installed must be applied with wood preservative (Solignum, Brown for concealed wood, and Solignum, Clear for exposed wood); Additional treatment after wood construction shall use termiticide (either Solignum Soil Guard or Mapecon F3). All wood in contact with masonry shall be treated with black coal tar coating.

16. Water-logged or damaged wood shall be replaced.
17. Wood components with partially damaged surface shall be reprocessed and resized for other applications.
18. Dismantled wood components that are still reusable shall be properly sub-dried and treated before reinstallation.
19. Wood components that are termite infested, must be removed from the site. And disposed of properly.
20. Wood repair may involve splicing, and the use of lag screws, machine bolts, metal straps, stainless steel brackets and rods, liquid and non-sag epoxies.
21. Roof leaks must be repaired to prevent further wood decay and damage; Repaint roof for material protection and restore the building's physical appearance. If the damage has rendered the roof structure beyond repair, it would be practical to replace the entire roof cover.
22. Retrofitting/Re-structuring – retrofit (restore to original construction and working order; Re-structure (improve by revising the construction, or integrating new materials and construction method); It is fairly simple to mend or replace parts of timber structures. If needed, they can be supported by struts, or applying tension using metal strips, until such time a detailed plan and money are available to repair them thoroughly.
23. Rehabilitate electrical system – Replace electrical rough-ins and fixtures that comply with the latest National Electrical Code of the Philippines.
24. Replace fasteners – wood pegs, dowels, G.I./copper nails, lag screws, bolts and nuts, gang-nail, straps
25. Repairs – wood glue with sawdust, resin glue/epoxy, wood straps, splicing, doweling
26. For Cleaning Wood materials – Stoddard solution (white spirit), turpentine
27. For Wood finishing and refinishing – a) finishing oil and wax (microcrystalline wax and bees wax, or paraffin wax); boiled linseed oil and wax, liquid wax, oil-based paints; b) polyethylene glycol wax (400 grade, 10%) + varsol (solvent); c) Bee's wax + lanolin + castor oil + white spirit or benzene (for furniture)
28. Minimize or avoid wood post and partition implantation
29. Minimal wood replacement; Replacement wood – can be either kiln-dried, sun-dried or clamped before processing and installing; New Floor planks – are temporarily nailed onto joists, and adjusted to compensate the shrinkage of the new planks which is likely to occur several weeks after installation
30. Hybrid construction - Damaged wood components can still be reused and

reinstalled. Make sure that the damaged wood is not termite or wood borer infested. Next, the damaged wood shall be cleaned, treated and stabilized by resin varnish coating. Next is introducing steel inserts to act as the new load carrier, relieving the old wood from loads and stresses, but the wood would still appear as if it is a structural component.

WOOD REPAIR EXAMPLES:



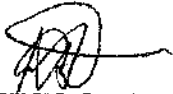
G. SITE DEVELOPMENT (IF INCLUDED IN THE WORK PROGRAM)

1. **Site Drainage** – Perimeter concrete trench with steel/G.I. grating along the interior side of walls shall be provided.
2. **Trees and Plants** – Trees and plants shall be planted at least 3.00 meters away from the fortress walls.
3. **Grass lawn** – Low-maintenance grass type shall be planted on the courtyard. The courtyard shall have a simple plain grass lawn with smaller perimeter trees, 3 meters off the wall line.
4. **Park Amenities** – All unwanted and historically irrelevant objects and structures shall be removed subject to prior inventory and photo-documentation; All park amenities shall be designed and installed properly for public safety and convenience.
5. **Garden Lighting** – The recommended garden lighting is classic style luminaire with short/low lampposts. Wall-mounted lamps and flood lamps shall be provided for special events purposes at the site venue. Outdoor monumental lighting shall be provided for the illumination of the front plaza elevation.
6. **PWD access** – Maintain garden and walkways flatness without abrupt steps and slopes. PWD facilities such as handrails, non-skid ramps wide landings and toilets shall be provided.
7. **Surface Treatment of existing Ramps** - The mechanical and chemical cleaning, and the repointing of the ramp stone joints shall be undertaken, using pozzolan **cement:lime:sharp sand grouting**. The objective of repointing is to provide a non-skid ramp and restore the ramp's surface.

I. RECOMMENDATIONS FOR PERMANENT MAINTENANCE PROGRAM

1. The owner/custodian of heritage structures/buildings should allot resources for periodic wall surface cleaning, treatment and minor repair works
2. Periodic checking and ocular inspection (with a program checklist)
3. Consult with an architect/engineer with proper expertise and knowledge on preservation and traditional technologies
4. Formulate maintenance schedule to include unforeseen and emergency works

5. If the property is listed among those declared or designated heritage or historic buildings, it is mandatory to inform or seek approval of any planned project or intervention from the appropriate cultural agencies/authorities.



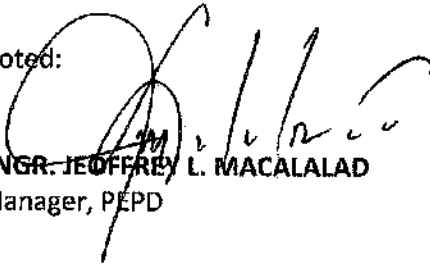
NEMENCIO G. DURAN
Estimator -- Civil

Checked By:



ENG'R. NOEL F. YAMBAO
OIC - Manager, PMD

Noted:



ENGR. JEOFFREY L. MACALALAD
Manager, PEPD

Section VII. Drawings

[Insert here a list of Drawings. The actual Drawings, including site plans, should be attached to this section, or annexed in a separate folder.]

DISTRICT / CITY / MUNICIPALITY

LAND USE & ZONING

LINE AND GRADE

ARCHITECTURAL

CIVIL/STRUCTURAL

ELECTRICAL

MECHANICAL

SANITARY

PLUMBING

ELECTRONICS

INTERIOR DESIGN

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| 10 | DETAIL OF MATT FOOTING |
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| 14 | TEMPORARY BARRACKS |
| 14 | TEMPORARY SIGNAGES |
| 14 | TEMPORARY FENCE |

CONFORME :

Rev. Fr. Emilian M. Dizon
Rev. Fr. EMILIANO M. DIZON

PARISH PRIEST
SAN AGUSTIN CHURCH

HON. DENNIS G. PINEDA

GOVERNOR
PROVINCE OF PAMPANGA

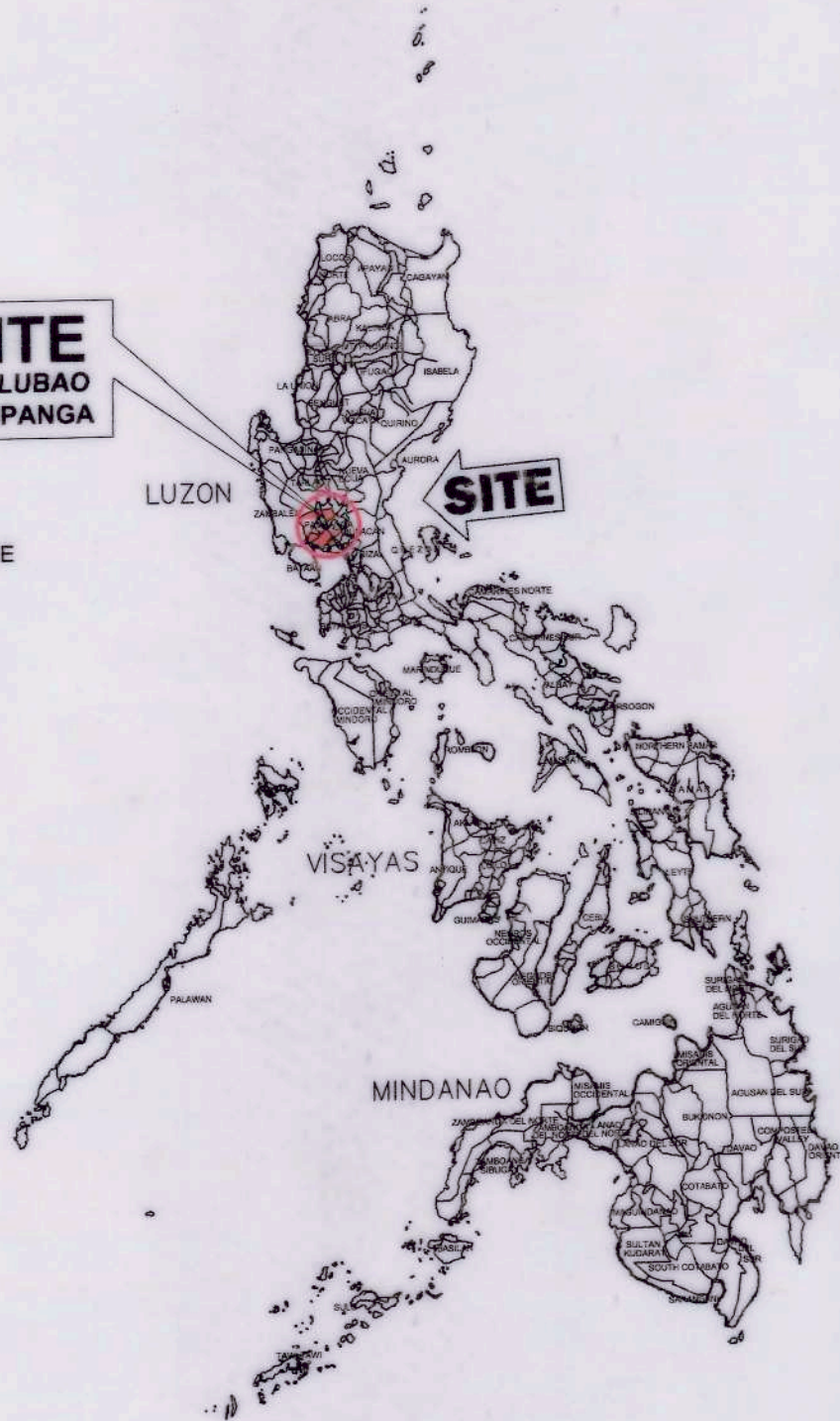
SCOPE OF WORKS :

- A. - GENERAL REQUIREMENTS.
 - A.1 - TEMPORARY BARRACKS
 - A.2 - HEALTH AND SAFETY
 - A.3 - PROJECT SIGNBOARD
 - A.4 - TEMPORARY ENCLOSURE
- B. - SURFACE PREPARATION / CLEANING OF WALL
- C. - INJECTION OF LIME WATER/SLURRY LIME INTO CORE OF WALLS
- D. - CHIPPING OF PLASTER CEMENT AND REPOINTING OF JOINTS (WALLS)
- E. - REPAIR AND RESTORATION OF OLD CHURCH RETABLO
- F. - CONCRETING OF CHURCH FLOOR.
- G. - INSTALLATION OF FLOOR TILES
- H. - REPAIR AND RESTORATION OF BELFRY FLOORING
- I. - REPAIR AND REPAINTING OF CEILING
- J. - GROUTING OF JOINTS AND LIME WASH OF ALL MASONRY WALLS
- K. - SYSTEMATIC DISMANTLING OF LOOSE MASONRY UNITS FOR REPLACEMENT AND RE-INSTALLATION
- L. - SCAFFOLDINGS



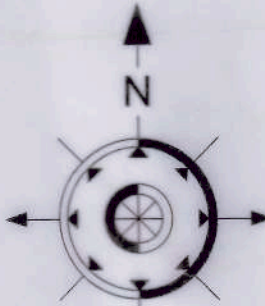
PERSPECTIVE

THIS SITE
MUNICIPALITY OF LUBAO
PROVINCE OF PAMPANGA



LOCATION PLAN

NOT DRAWN TO SCALE



PROVINCE OF
PAMPANGA

THIS SITE
SAN AGUSTIN CHURCH
LUBAO, PAMPANGA



VICINITY MAP

NOT DRAWN TO SCALE



TIEZA
TOURISM INFRASTRUCTURE
AND ENTERPRISE ZONE AUTHORITY
6th & 7th FLR. TOWER 1 DOUBLE DRAGON PLAZA
DOUBLE DRAGON MERIDIAN PARK, MACAPAGAL AVENUE
CORNER EDSA EXTENSION BAY AREA PASAY CITY 1308

PROJECT TITLE/ LOCATION:

RECONSTRUCTION AND RETROFITTING
OF SAN AGUSTIN CHURCH
IN LUBAO, PAMPANGA

LOCATION : LUBAO PAMPANGA

PROJECT EVALUATION AND PLANNING DEPARTMENT

PREPARED BY:

EFREN A. RESOSO

CHECKED BY:

RADY E. ADAME

REVIEWED BY:

JEFFREY L. MACALALAD

RECOMMENDING APPROVAL:

GREGORY A. OLLER

APPROVED BY:

MARK T. LAPID

SHEET CONTENTS:

PROPOSED SITE DEVT. PLAN

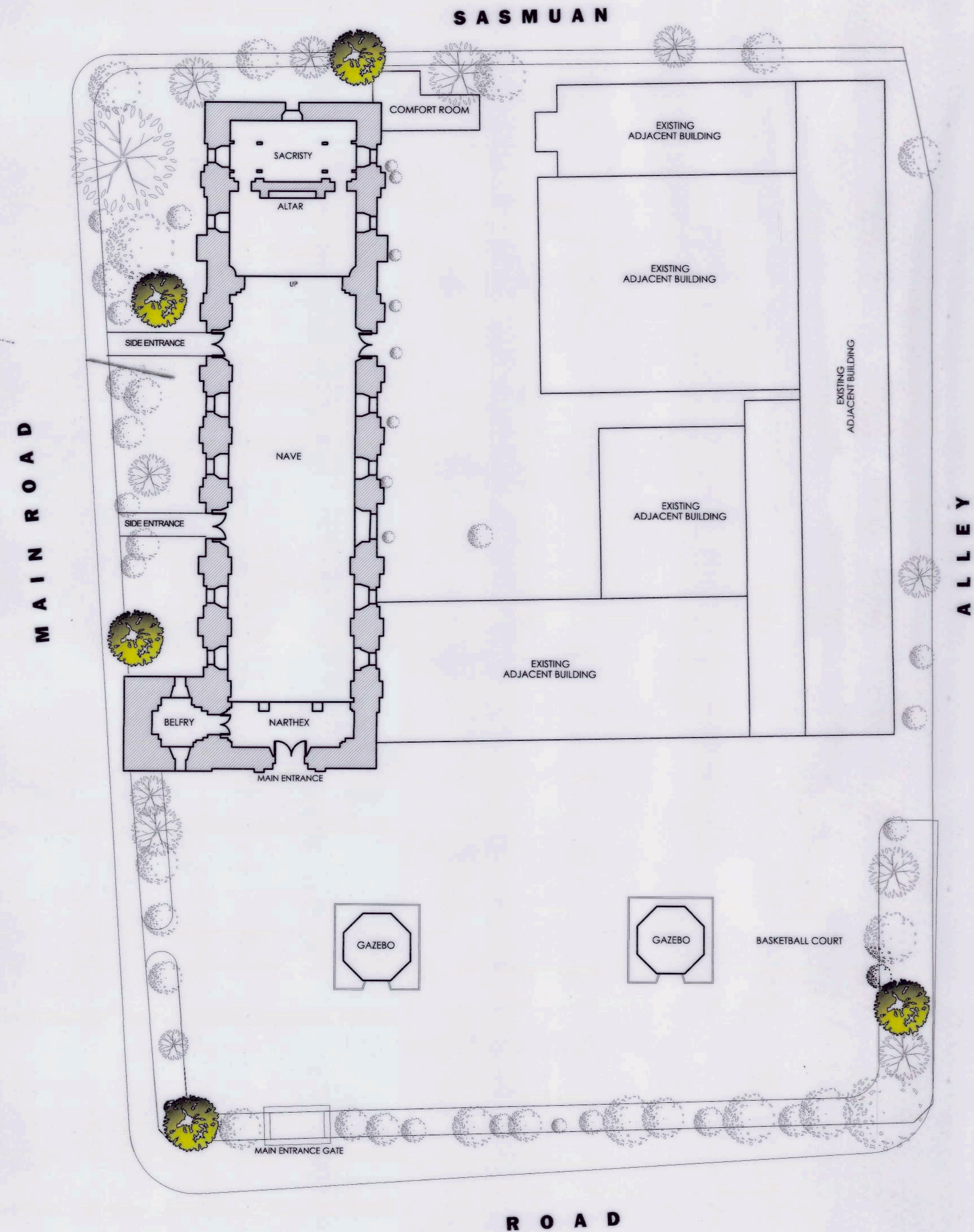
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TOURISM INFRASTRUCTURE
AND ENTERPRISE ZONE AUTHORITY
6th & 7th FLR. TOWER 1 DOUBLE DRAGON PLAZA
DOUBLE DRAGON MERIDIAN PARK, MACAPAGAL AVENUE
CORNER EDSA EXTENSION BAY AREA PASAY CITY 1306

PROJECT TITLE/ LOCATION:

RECONSTRUCTION AND RETROFITTING OF SAN AGUSTIN CHURCH IN LUBAO, PAMPANGA

LOCATION: LUBAO, PAMPANGA

| | |
|--------------|--|
| PREPARED BY: | |
|--------------|--|

EFREN A. RESOSO

| |
|-----------|
| DRAWN BY: |
| DATE: |

PROJECT EVALUATION AND PLANNING DEPARTMENT

CHECKED BY:

RADY E. ADAME

MANAGER
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REVIEWED BY:

JEOFFREY L. MACALALAD

MANAGER
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RECOMMENDING APPROVAL:

GREGORY A. OLLER

ASSISTANT CHIEF OPERATING OFFICER
ARCHITECTURAL & ENGINEERING SERVICES SECTOR

APPROVED BY:

MARK T. LAPID

CHIEF OPERATING OFFICER

SHEET CONTENTS:

SITE DEVELOPMENT PLAN

REVISIONS:

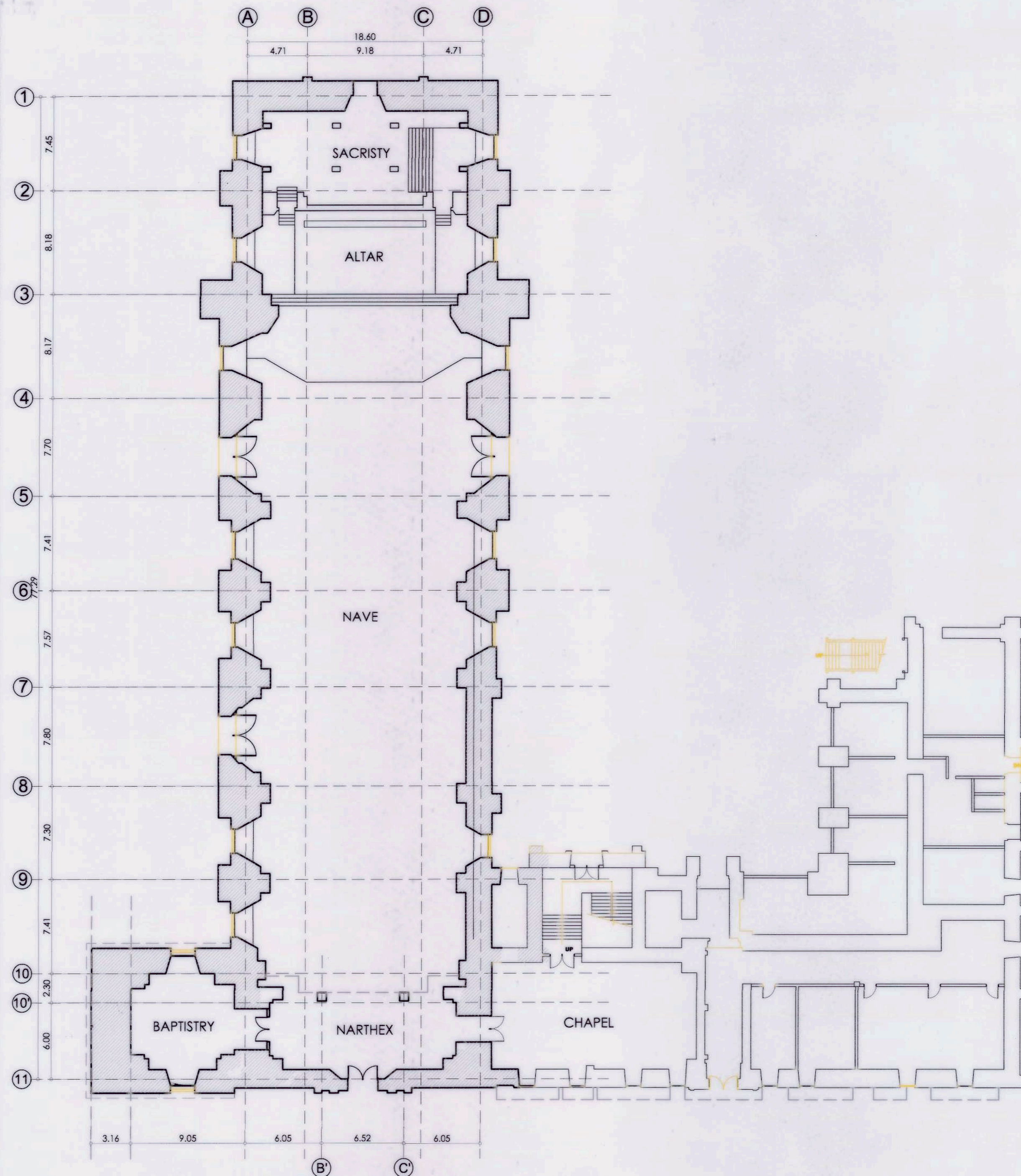
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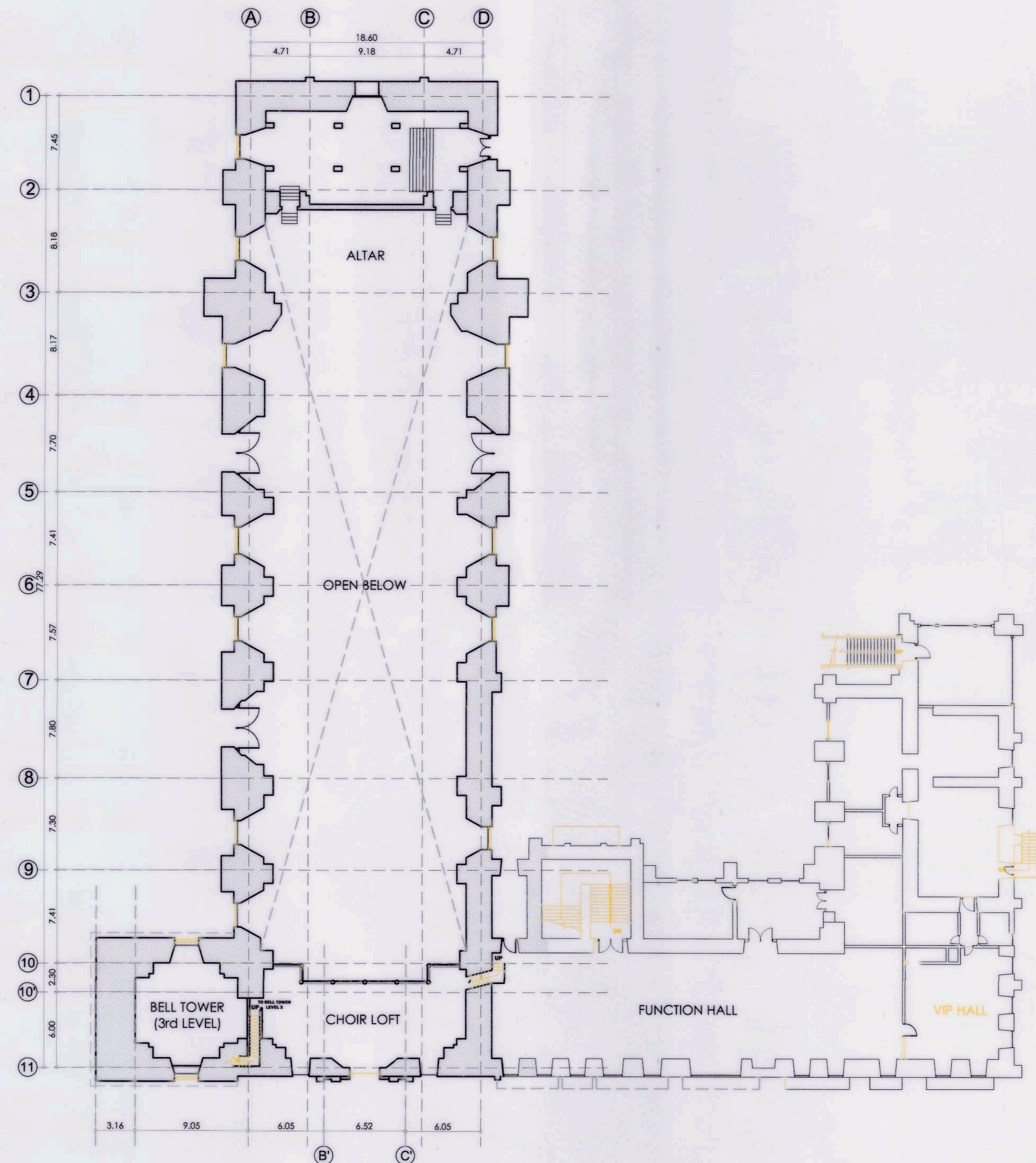
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2

4



GROUND FLOOR PLAN
SCALE: 1:250 MTS.



SECOND FLOOR PLAN
SCALE: 1:250 MTS.



TIEZA
TOURISM INFRASTRUCTURE
AND ENTERPRISE ZONE AUTHORITY
6th & 7th FLR. TOWER 1 DOUBLE DRAGON PLAZA
DOUBLE DRAGON MERIDIAN PARK, MACAPAGAL AVENUE
CORNER EDSA EXTENSION BAY AREA PASAY CITY 1308

PROJECT TITLE/ LOCATION:

**RECONSTRUCTION AND RETROFITTING
OF SAN AGUSTIN CHURCH
IN LUBAO, PAMPANGA**

LOCATION: LUBAO PAMPANGA

PREPARED BY:

EFREN A. RESOSO

DRAWN BY:
DATE:

PROJECT EVALUATION AND PLANNING DEPARTMENT

CHECKED BY:

RADY E. ADAME

MANAGER
PROJECT PLANNING & DESIGN DIVISION

REVIEWED BY:

JEFFREY L. MACALALAD

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RECOMMENDING APPROVAL:

GREGORY A. OLLER

ASSISTANT CHIEF OPERATING OFFICER
ARCHITECTURAL & ENGINEERING SERVICES SECTOR

APPROVED BY:

MARK T. LAPID

CHIEF OPERATING OFFICER

SHEET CONTENTS:

GROUND FLOOR PLAN
SECOND FLOOR PLAN

REVISIONS:

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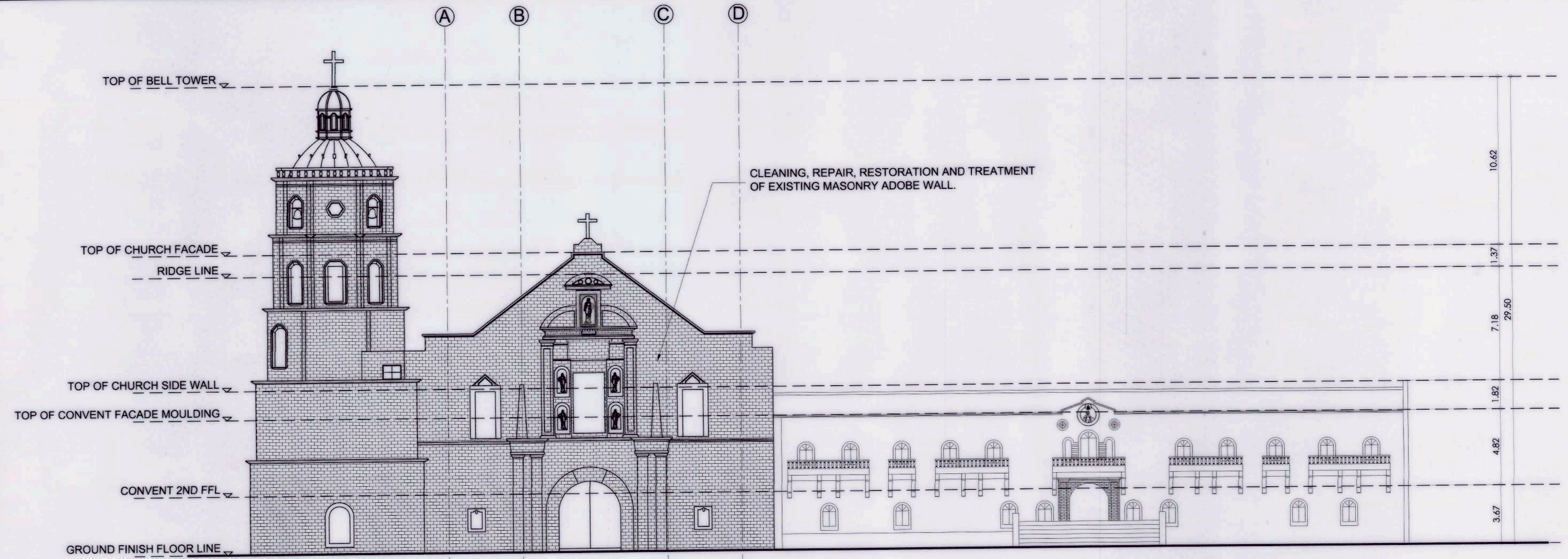
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FRONT VIEW

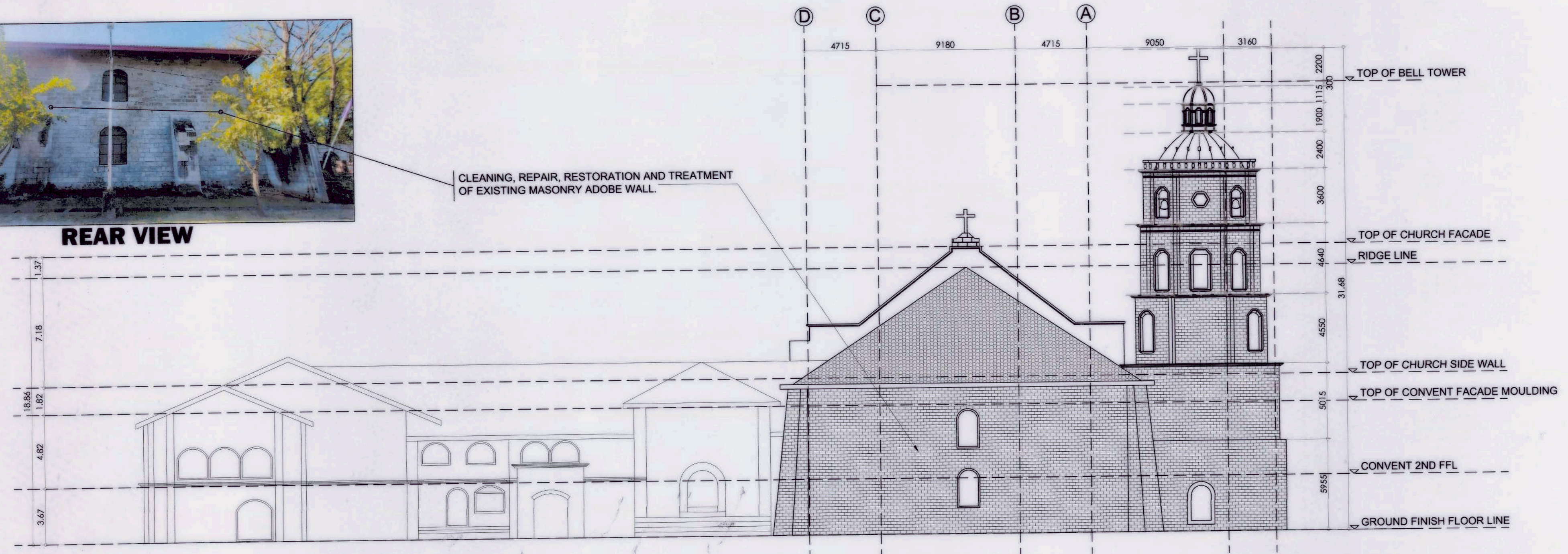


FRONT ELEVATION

SCALE 1 : 200 MTS.



REAR VIEW



REAR ELEVATION

SCALE 1 : 200 MTS.



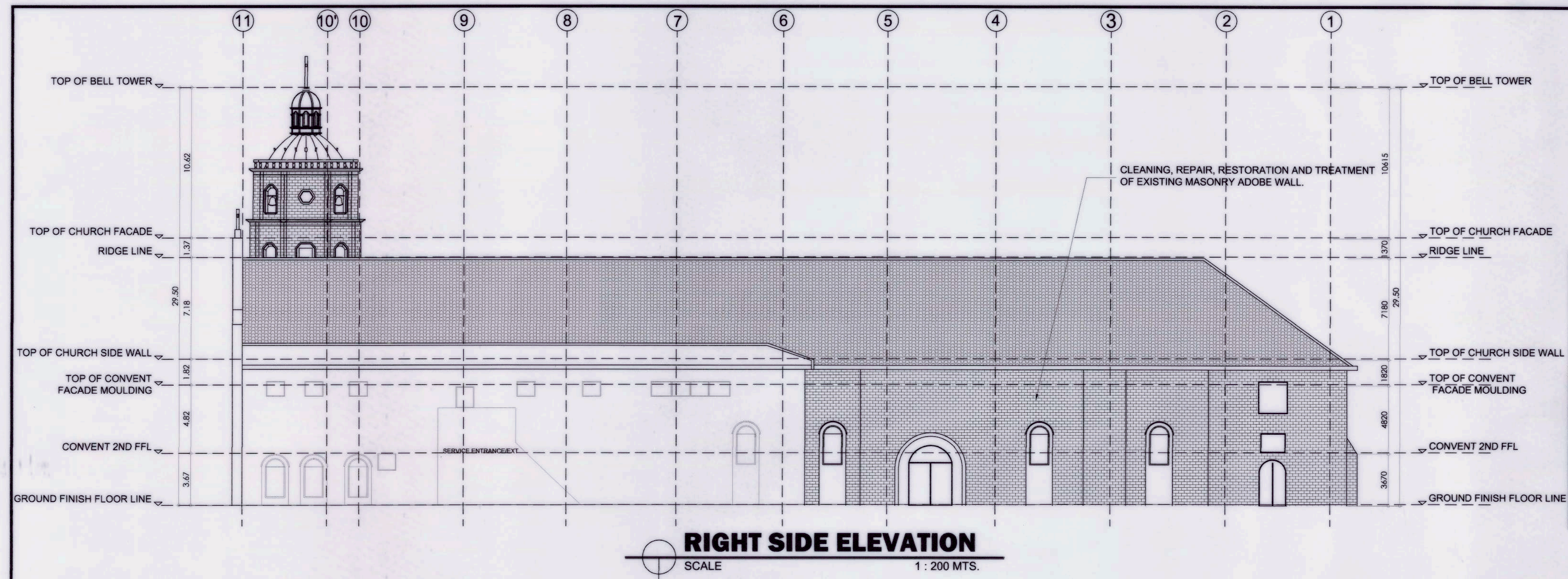
TIEZA
TOURISM INFRASTRUCTURE
AND ENTERPRISE ZONE AUTHORITY
6th & 7th FLR. TOWER 1 DOUBLE DRAGON PLAZA
DOUBLE DRAGON MERIDIAN PARK, MACAPAGAL AVENUE
CORNER EDSA EXTENSION BAY AREA PASAY CITY 1308

PROJECT TITLE/ LOCATION:
**RECONSTRUCTION AND RETROFITTING
OF SAN AGUSTIN CHURCH
IN LUBAO, PAMPANGA**
LOCATION : LUBAO PAMPANGA

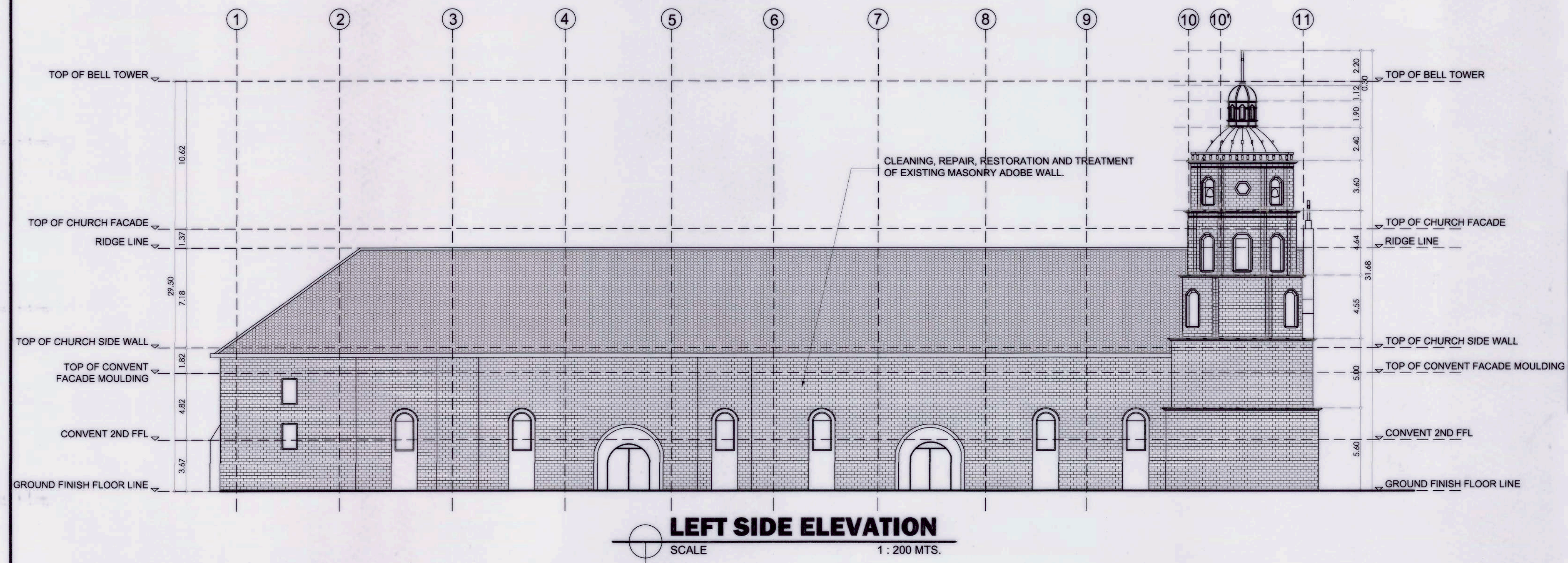
PROJECT EVALUATION AND PLANNING DEPARTMENT
PREPARED BY: EFREN A. RESOSO
CHECKED BY: RADY E. ADAME
REVIEWED BY: GEOFFREY L. MACALALAD
MANAGER PROJECT PLANNING & DESIGN DIVISION
MANAGER PROJECT EVALUATION & PLANNING DEPARTMENT

RECOMMENDING APPROVAL: GREGORY A. OLLER
APPROVED BY: MARK T. LAPID
ASSISTANT CHIEF OPERATING OFFICER ARCHITECTURAL & ENGINEERING SERVICES SECTOR
CHIEF OPERATING OFFICER


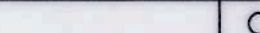

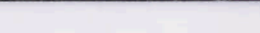
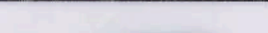
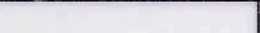
SHEET CONTENTS: FRONT ELEVATION REAR ELEVATION
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RIGHT SIDE VIEW



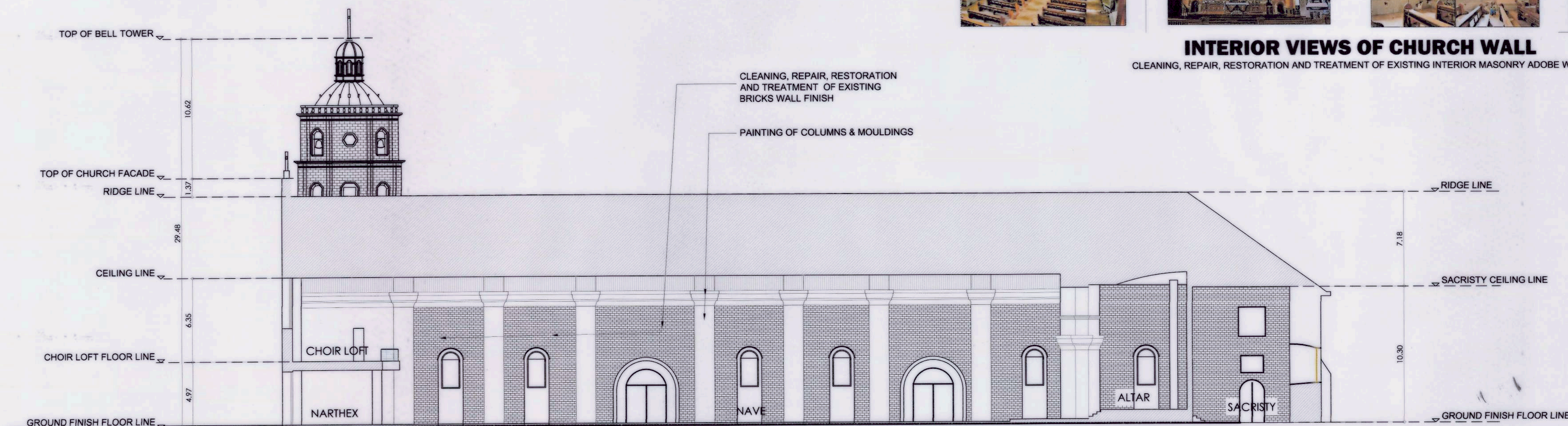
LEFT SIDE VIEW

| | | | | | | | | | | |
|--|---|--|--|---|---|---|--|---|---|----------------------------|
|  <p>TIEZA TOURISM INFRASTRUCTURE AND ENTERPRISE ZONE AUTHORITY 6th & 7th FLR. TOWER 1 DOUBLE DRAGON PLAZA DOUBLE DRAGON MERIDIAN PARK, MACAPAGAL AVENUE CORNER EDSA EXTENSION BAY AREA PASAY CITY 1308</p> | PROJECT TITLE/ LOCATION: | | PROJECT EVALUATION AND PLANNING DEPARTMENT | | | RECOMMENDING APPROVAL: | APPROVED BY: | SHEET CONTENTS: | R.A. 9266 | SHEET NO. |
| | RECONSTRUCTION AND RETROFITTING OF SAN AGUSTIN CHURCH IN LUBAO, PAMPANGA | | PREPARED BY:  EFREN A. RESOSO | CHECKED BY:  RADY E. ADAME | REVIEWED BY:  JEFFREY L. MACALALAD |  GREGORY A. OLLER |  MARK T. LAPID | RIGHT SIDE ELEVATION LEFT SIDE ELEVATION | THIS DRAWING AS INSTRUMENT OF SERVICE IS A PROPERTY OF TIEZA. IT SHALL BE UNLAWFUL TO DUPLICATE OR TO MAKE COPIES OF THIS DOCUMENT WITHOUT THE CONSENT OF TIEZA. | <div>5</div> <div>14</div> |
| | LOCATION : LUBAO PAMPANGA | | DRAWN BY: | MANAGER | MANAGER | ASSISTANT CHIEF OPERATING OFFICER | CHIEF OPERATING OFFICER | REVISIONS: | | |
| | DATE: | | PROJECT EVALUATION & PLANNING DESIGN DIVISION | PROJECT EVALUATION & PLANNING DEPARTMENT | ARCHITECTURAL & ENGINEERING SERVICES SECTOR | | | | | |



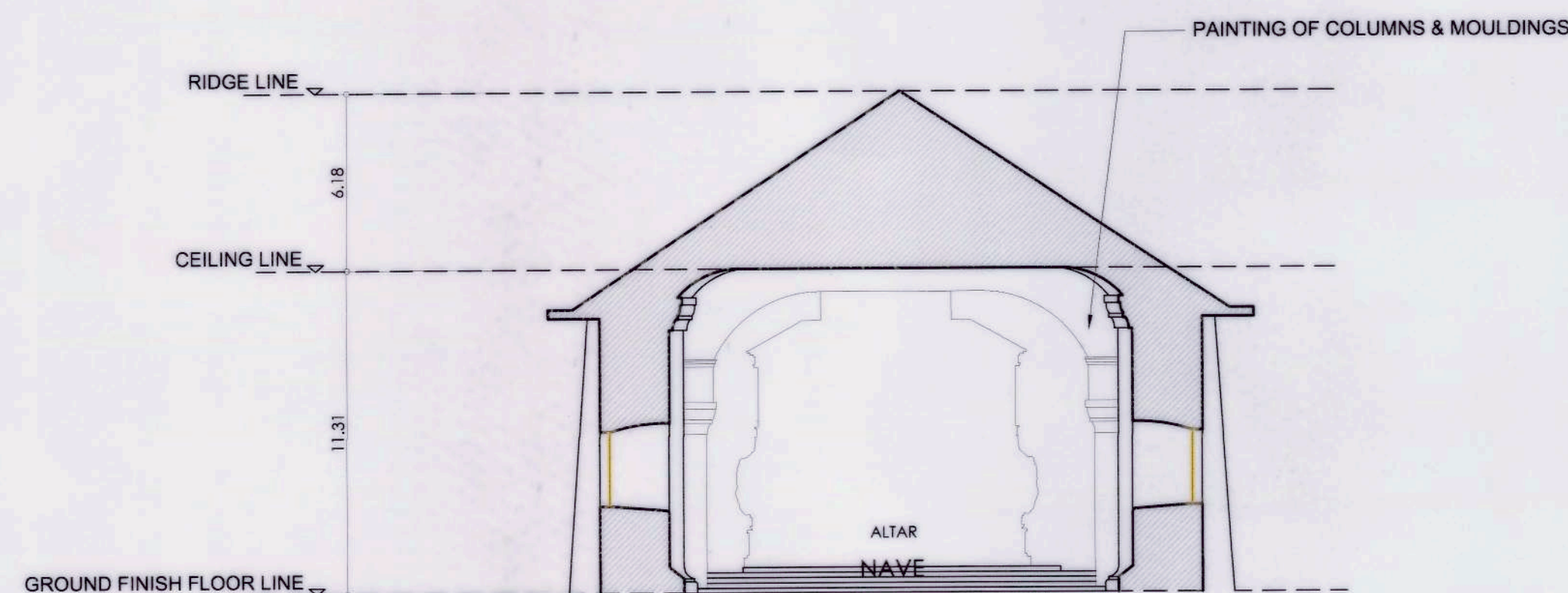
INTERIOR VIEWS OF CHURCH WALL

CLEANING, REPAIR, RESTORATION AND TREATMENT OF EXISTING INTERIOR MASONRY ADOBE WALL.



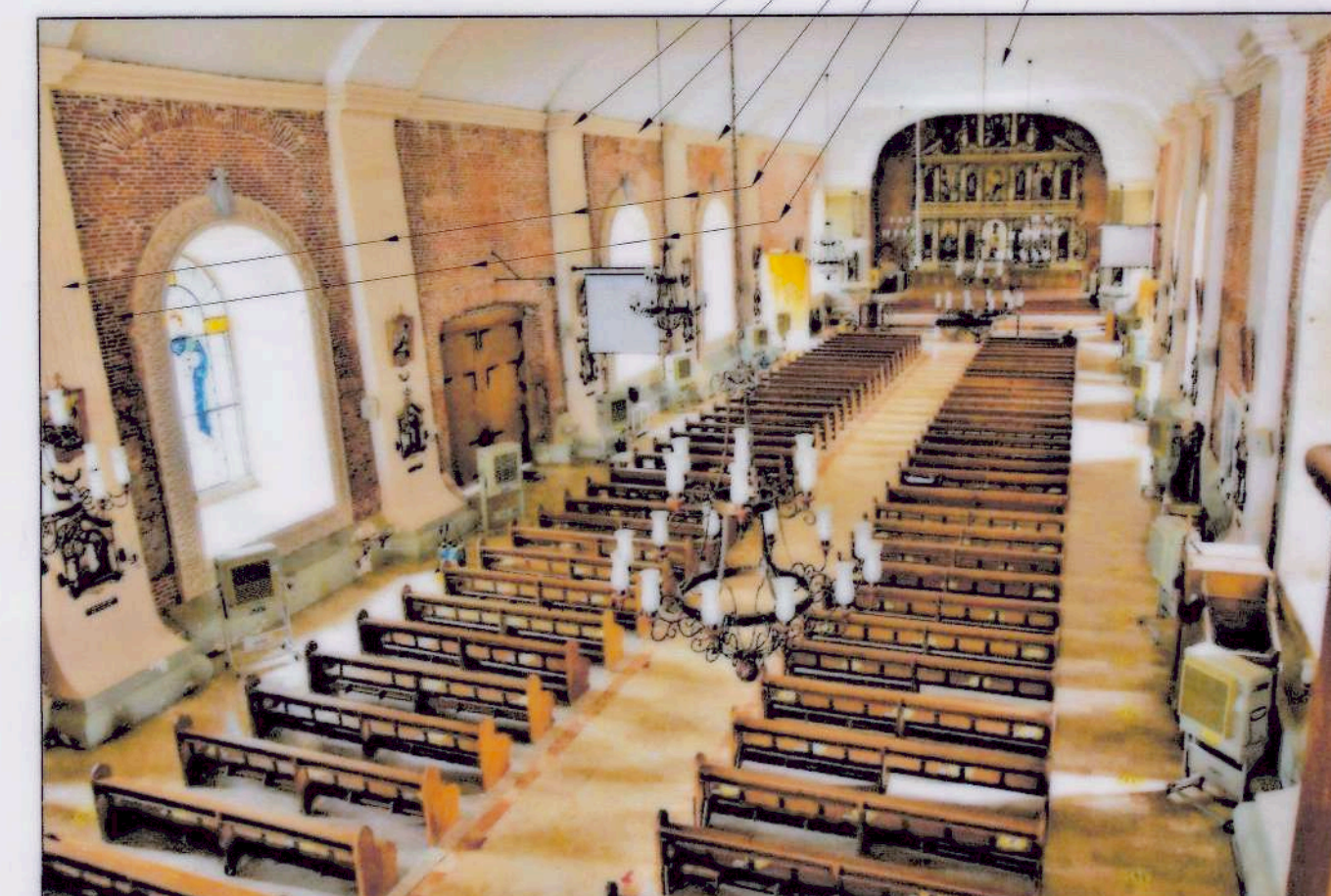
LONGITUDINAL SECTION

SCALE 1 : 200 MTS.



CROSS SECTION

SCALE 1 : 200 MTS.



CHURCH INTERIOR PROFILE

REPAINTING OF COLUMNS & MOULDINGS
CLEANING, REPAIR, RESTORATION AND TREATMENT OF EXISTING BRICKS WALL FINISH
REPAINTING OF CEILING



TIEZA
TOURISM INFRASTRUCTURE
AND ENTERPRISE ZONE AUTHORITY
6th & 7th FLR. TOWER 1 DOUBLE DRAGON PLAZA
DOUBLE DRAGON MERIDIAN PARK, MACAPAGAL AVENUE
CORNER EDSA EXTENSION BAY AREA PASAY CITY 1308

PROJECT TITLE/ LOCATION:
**RECONSTRUCTION AND RETROFITTING
OF SAN AGUSTIN CHURCH
IN LUBAO, PAMPANGA**

LOCATION: LUBAO PAMPANGA

PREPARED BY:
EFREN A. RESOSO

DRAWN BY:
DATE:

PROJECT EVALUATION AND PLANNING DEPARTMENT

CHECKED BY:
RADY E. ADAME

MANAGER
PROJECT PLANNING & DESIGN DIVISION

REVIEWED BY:
JEFFREY L. MACALALAD

MANAGER
PROJECT EVALUATION & PLANNING DEPARTMENT

RECOMMENDING APPROVAL:
GREGORY A. OLLER

ASSISTANT CHIEF OPERATING OFFICER
ARCHITECTURAL & ENGINEERING SERVICES SECTOR

APPROVED BY:
MARK T. LAPID

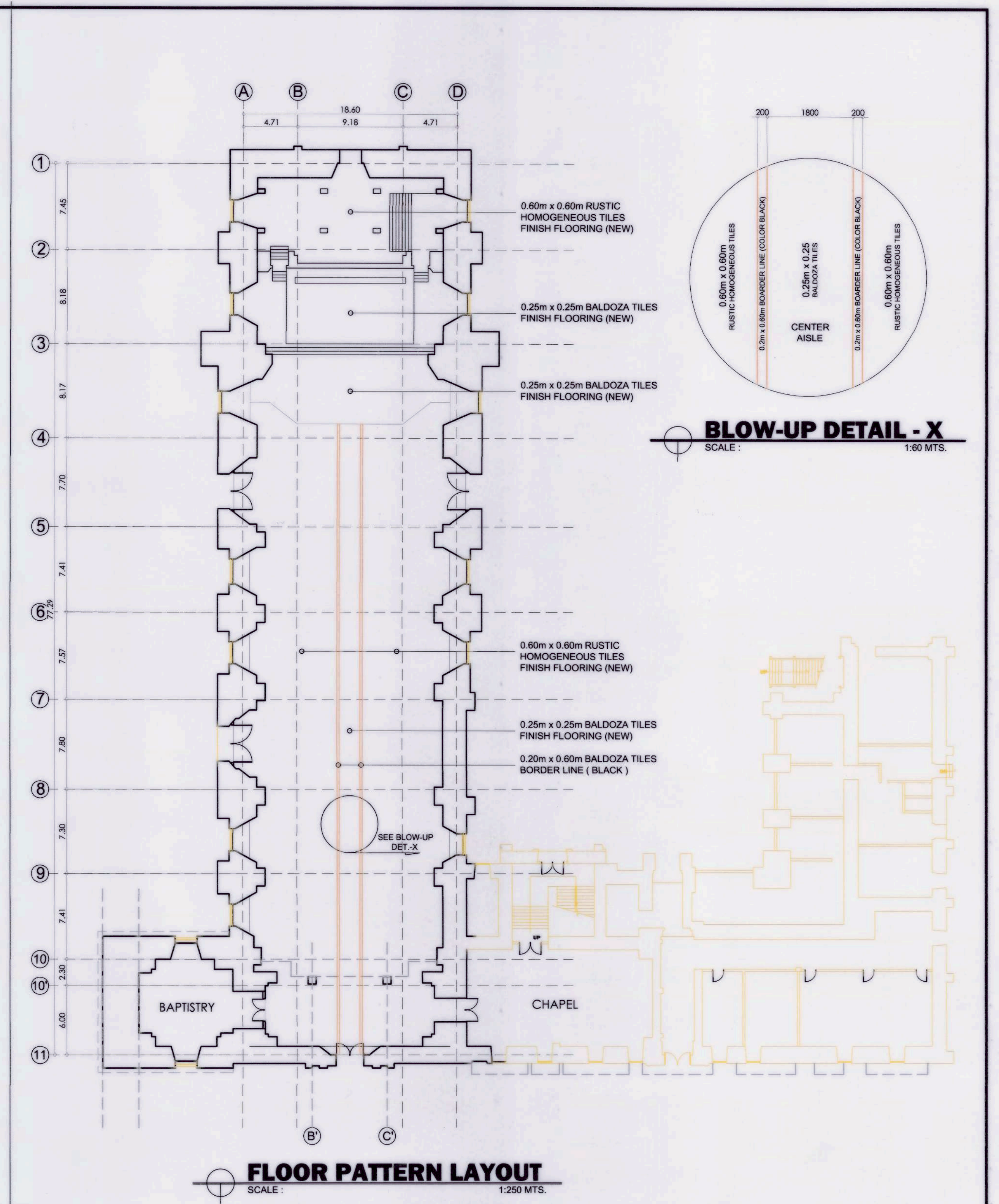
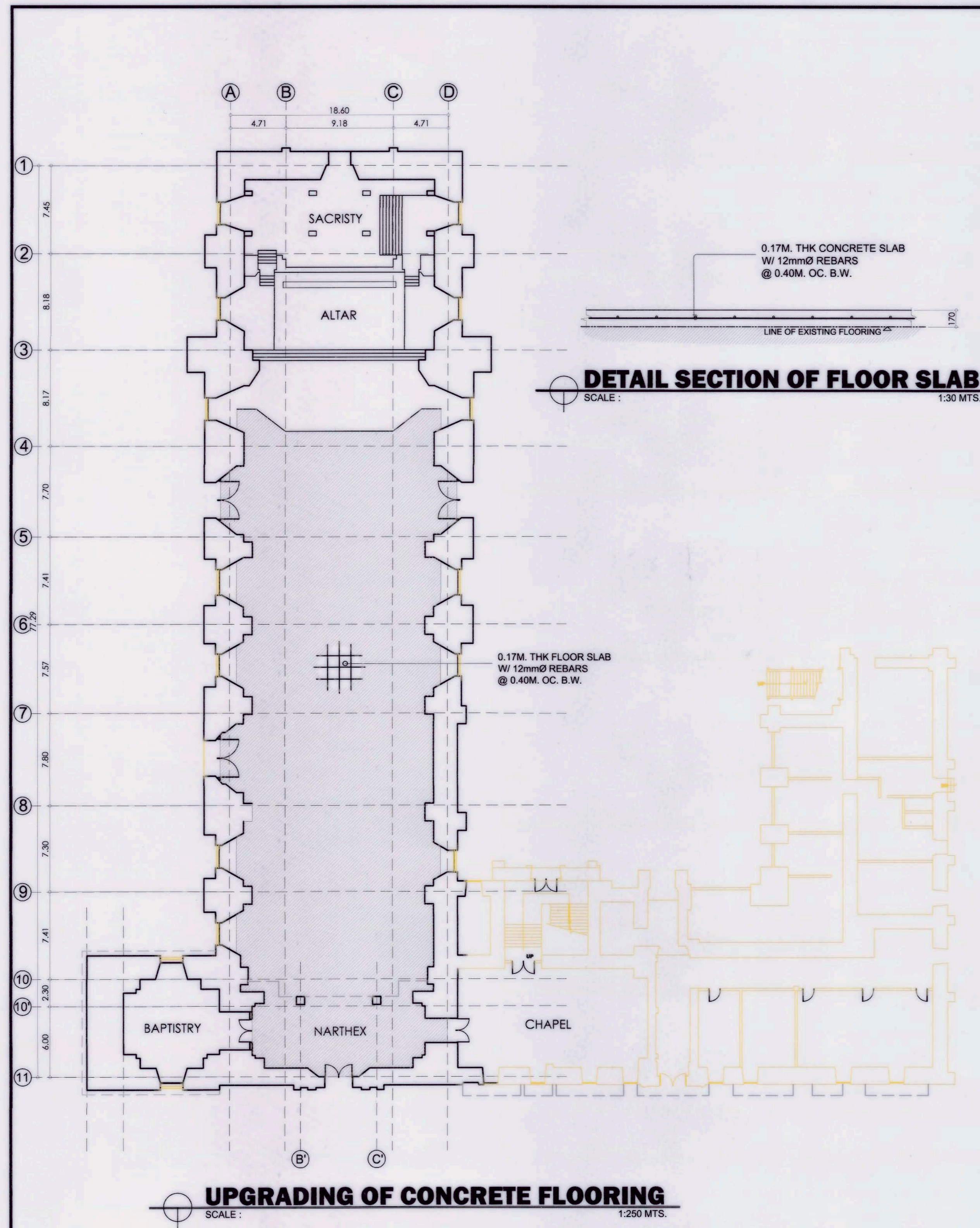
CHIEF OPERATING OFFICER

SHEET CONTENTS:
LONGITUDINAL SECTION
CROSS SECTION
CHURCH INTERIOR PROFILE

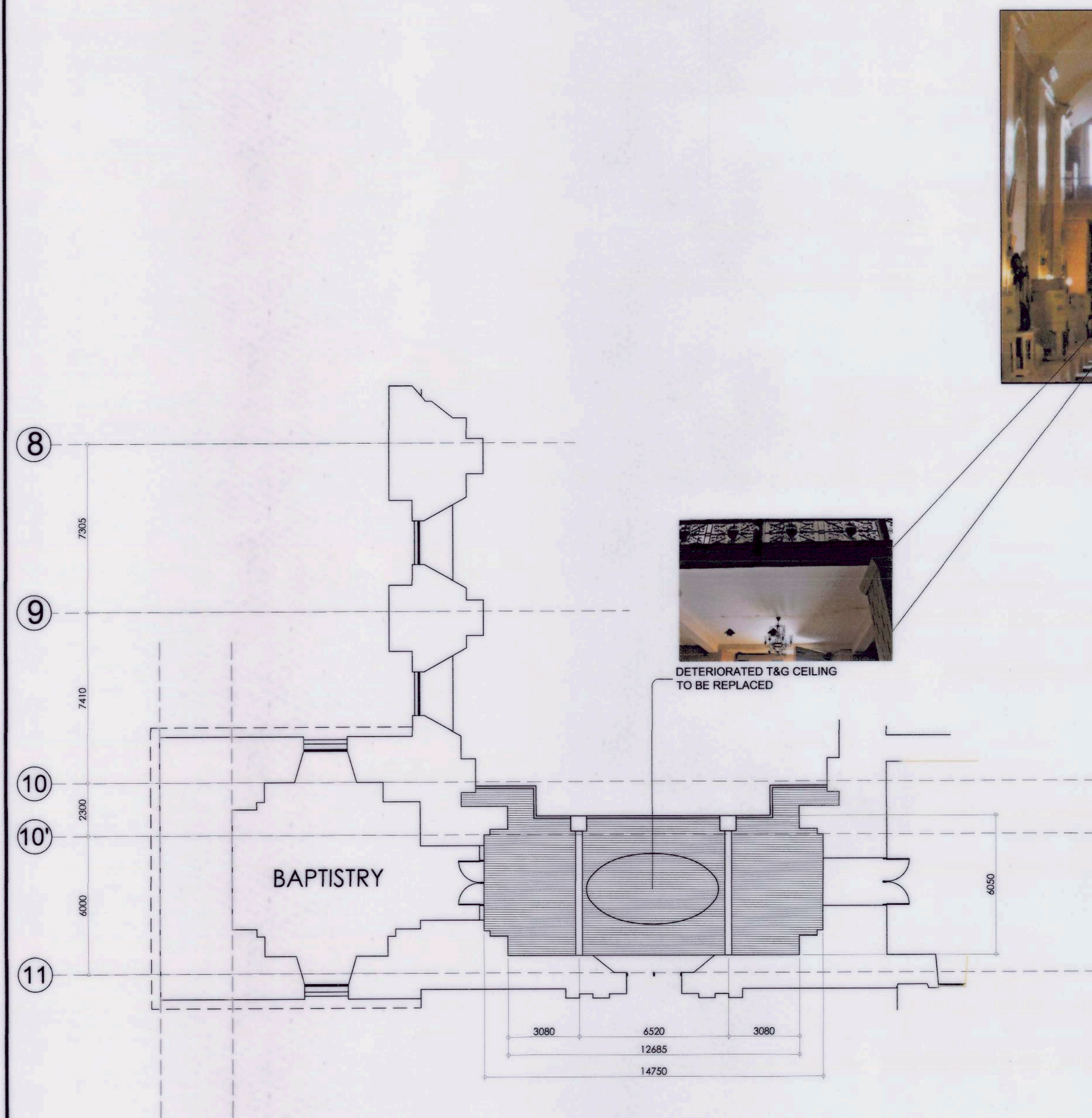
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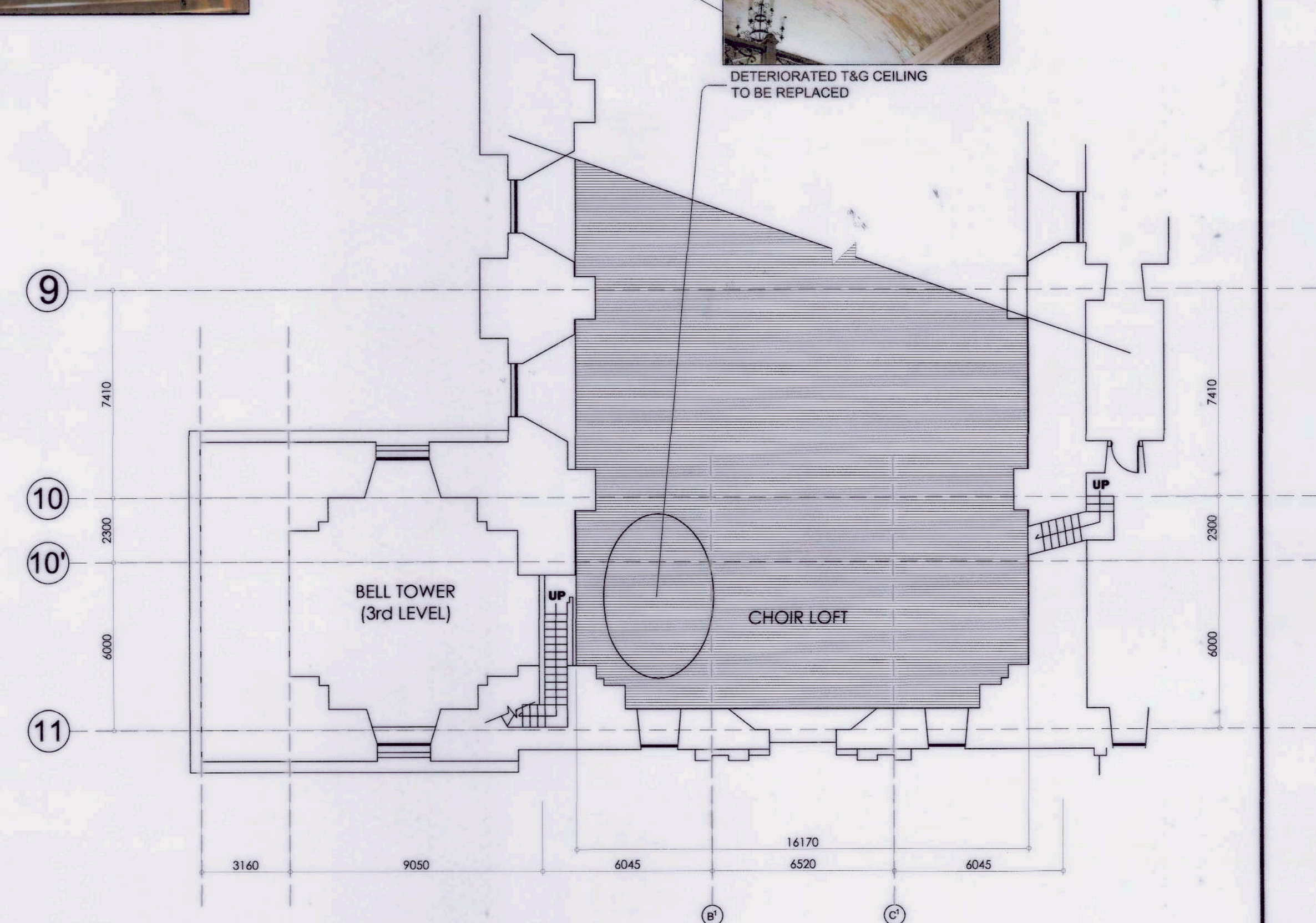
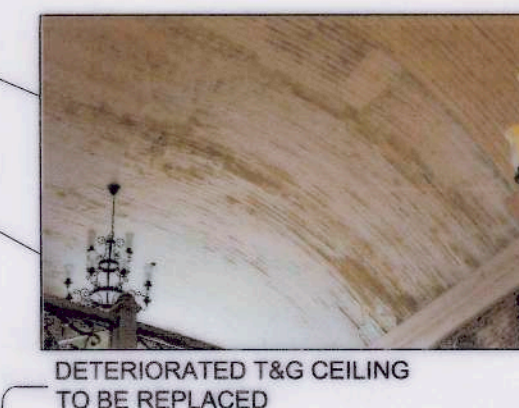
SHEET NO.
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| <p>TIEZA TOURISM INFRASTRUCTURE AND ENTERPRISE ZONE AUTHORITY 6th & 7th FLR. TOWER 1 DOUBLE DRAGON PLAZA DOUBLE DRAGON MERIDIAN PARK, MACAPAGAL AVENUE CORNER EDSA EXTENSION BAY AREA PASAY CITY 1308</p> | PROJECT TITLE/ LOCATION: | | PROJECT EVALUATION AND PLANNING DEPARTMENT | | | RECOMMENDING APPROVAL: | APPROVED BY: | SHEET CONTENTS: | R.A. 9266 | SHEET NO. |
| | RECONSTRUCTION AND RETROFITTING OF SAN AGUSTIN CHURCH IN LUBAO, PAMPANGA | | PREPARED BY: | CHECKED BY: | REVIEWED BY: | | | | | |
| | LOCATION: LUBAO PAMPANGA | | EFREN A. RESOSO | RADY E. ADAME | JEFFREY L. MACALALAD | GREGORY A. OLLER | MARK T. LAPID | UPGRADING OF CONCRETE FLOORING SECTION THRU - B FLOOR PATTERN LAYOUT BLOW-UP DETAIL - X | THIS DRAWING AS INSTRUMENT OF SERVICE IS A PROPERTY OF TIEZA. IT SHALL BE UNLAWFUL TO DUPLICATE OR TO MAKE COPIES OF THIS DOCUMENT WITHOUT THE CONSENT OF TIEZA. | 7 |
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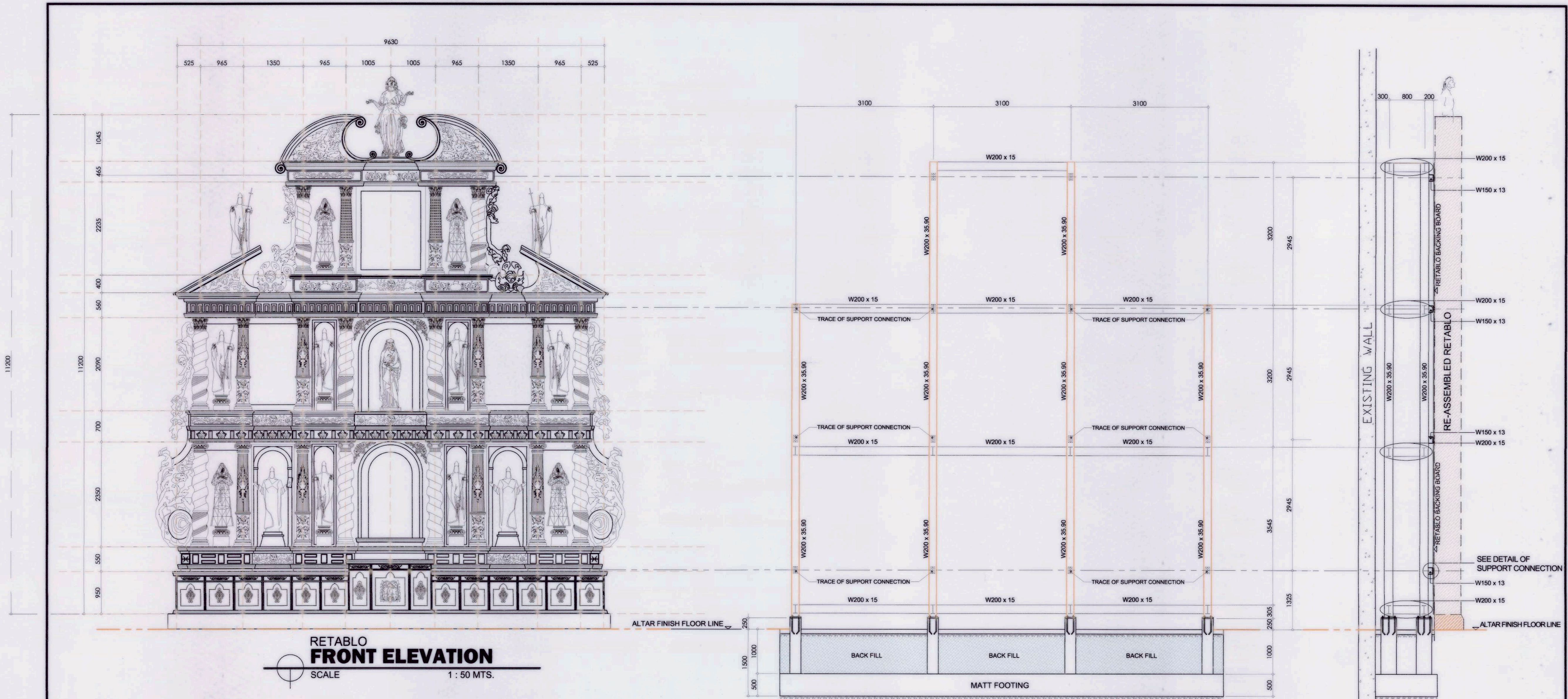


NARTHEX REFLECTED CEILING PLAN
SCALE : 1:150 MTS.



CHOIR LOFT REFLECTED CEILING PLAN
SCALE : 1:150 MTS.

| | | | | | | | | | | |
|--|--|--|---|---|--|--|--|--|--|----------------------|
| | TIEZA TOURISM INFRASTRUCTURE AND ENTERPRISE ZONE AUTHORITY 6th & 7th FLR. TOWER 1 DOUBLE DRAGON PLAZA DOUBLE DRAGON MERIDIAN PARK, MACAPAGAL AVENUE CORNER EDSA EXTENSION BAY AREA PASAY CITY 1308 | PROJECT TITLE/ LOCATION: RECONSTRUCTION AND RETROFITTING OF SAN AGUSTIN CHURCH IN LUBAO, PAMPANGA LOCATION : LUBAO PAMPANGA | PROJECT EVALUATION AND PLANNING DEPARTMENT PREPARED BY: ERREN A. RESOSO DRAWN BY: DATE: | CHECKED BY: RADY E. ADAME MANAGER PROJECT PLANNING & DESIGN DIVISION | REVIEWED BY: JEOFFREY L. MACALALAD MANAGER PROJECT EVALUATION & PLANNING DEPARTMENT | RECOMMENDING APPROVAL: GREGORY A. OLLER ASSISTANT CHIEF OPERATING OFFICER ARCHITECTURAL & ENGINEERING SERVICES SECTOR | APPROVED BY: MARK T. LAPID CHIEF OPERATING OFFICER | SHEET CONTENTS: NARTHEX REFLECTED CEILING PLAN CHOIR LOFT REFLECTED CEILING PLAN REVISIONS: | R.A. 9266 THIS DRAWING AS INSTRUMENT OF SERVICE IS A PROPERTY OF TIEZA. IT SHALL BE UNLAWFUL TO DUPLICATE OR TO MAKE COPIES OF THIS DOCUMENT WITHOUT THE CONSENT OF TIEZA. | SHEET NO. 8 14 |
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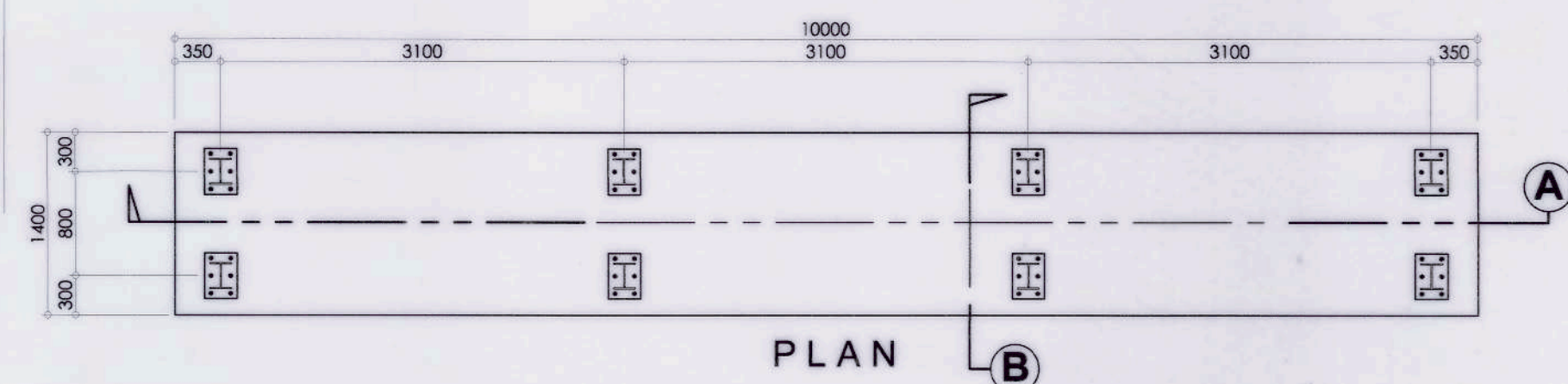


04 Repair and restoration of old church Retablo (Altar)



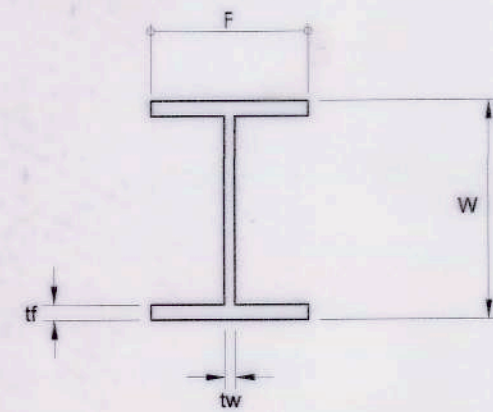
EXISTING FRAMES OF CHURCH RETABLO (SCULPTURED WOOD MATERIALS).

- REPAIR AND RESTORATION OF OLD CHURCH RETABLO
- SCOPE OF WORKS :
 - REPAIR, PAINTING, GOLDLEAF GILDING, CLEANING AND TREATMENT.
 - CONSTRUCTION OF STEEL STRUCTURE SUPPORT.



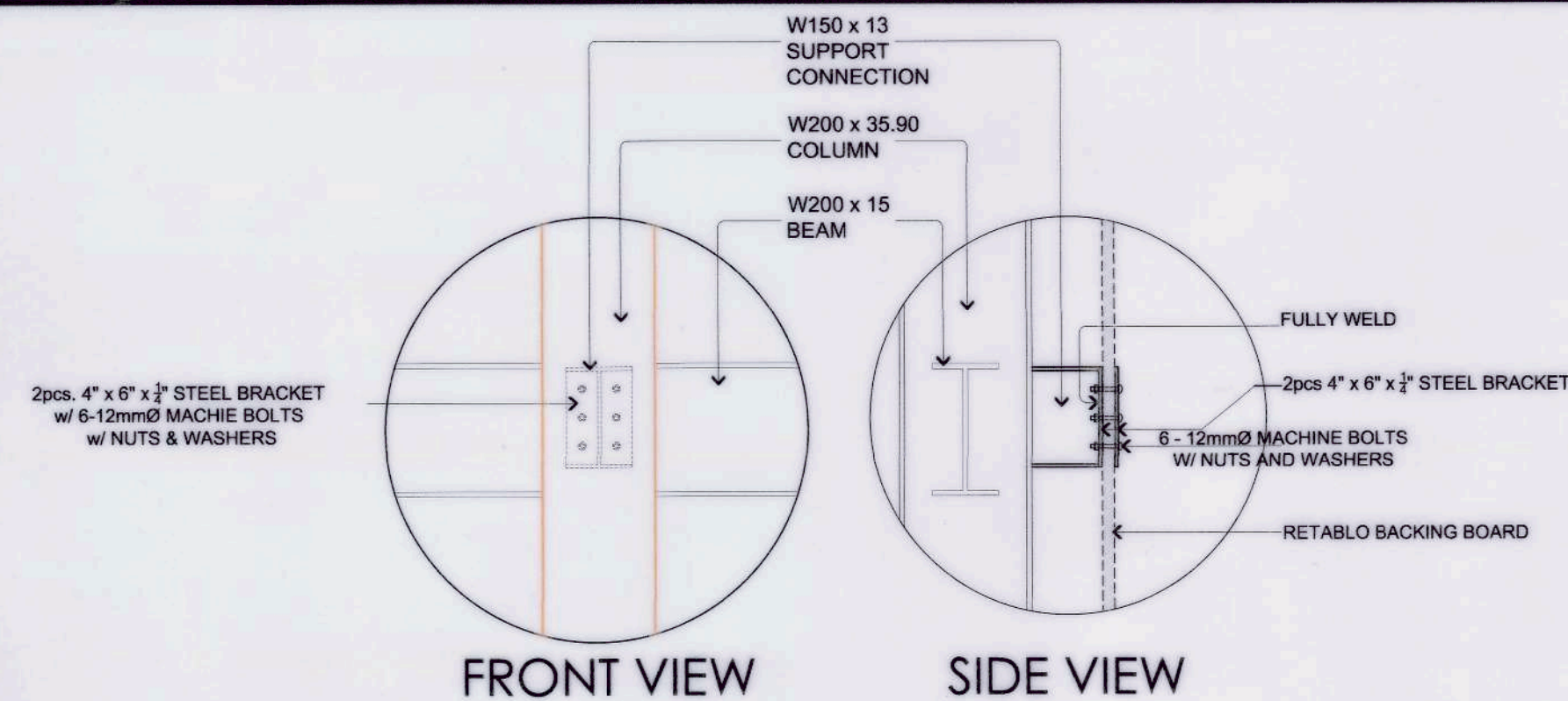
DETAIL OF RETABLO SUPPORT (STEEL STRUCTURE SUPPORT)
SCALE 1 : 50 MTS.

| | | | | | | | | | | |
|---|---|--|--|---|---|--|-------------------------|--|---|----------------------------|
| <p>TIEZA TOURISM INFRASTRUCTURE AND ENTERPRISE ZONE AUTHORITY 6th & 7th FLR., TOWER 1 DOUBLE DRAGON PLAZA DOUBLE DRAGON MERIDIAN PARK, MACAPAGAL AVENUE CORNER EDSA EXTENSION BAY AREA PASAY CITY 1308</p> | PROJECT TITLE/ LOCATION: | | PROJECT EVALUATION AND PLANNING DEPARTMENT | | | RECOMMENDING APPROVAL: | APPROVED BY: | SHEET CONTENTS: | R.A. 9266 | SHEET NO. |
| | RECONSTRUCTION AND RETROFITTING OF SAN AGUSTIN CHURCH IN LUBAO, PAMPANGA | | PREPARED BY: | CHECKED BY: | REVIEWED BY: | | | RETABLO FRONT ELEVATION DETAILS OF RETABLO SUPPORT (PLAN & SECTIONS) | THIS DRAWING AS INSTRUMENT OF SERVICE IS A PROPERTY OF TIEZA. IT SHALL BE UNLAWFUL TO DUPLICATE OR TO MAKE COPIES OF THIS DOCUMENT WITHOUT THE CONSENT OF TIEZA. | <div>9</div> <div>14</div> |
| | LOCATION : LUBAO PAMPANGA | | EFREN A. RESOSO | RADY E. ADAME | JEFFREY L. MACALALAD | GREGORY A. OLLER | MARK T. LAPID | | | |
| | DRAWN BY: DATE: | | | MANAGER PROJECT PLANNING & DESIGN DIVISION | MANAGER PROJECT EVALUATION & PLANNING DEPARTMENT | ASSISTANT CHIEF OPERATING OFFICER ARCHITECTURAL & ENGINEERING SERVICES SECTOR | CHIEF OPERATING OFFICER | REVISIONS: | | |



SECTION PROPERTIES

| SECTION | W (mm) | F (mm) | tw (mm) | tf (mm) |
|--------------|--------|--------|---------|---------|
| W200 x 35.90 | 200 | 170 | 10 | 10 |
| W200 x 15 | 200 | 100 | 4.32 | 10 |
| W150 x 13 | 150 | 100 | 4.95 | 4.32 |



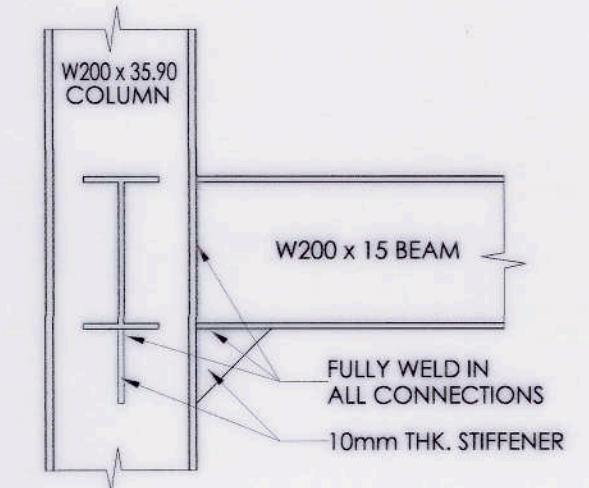
FRONT VIEW

SIDE VIEW

SUPPORT CONNECTION DETAIL

SCALE

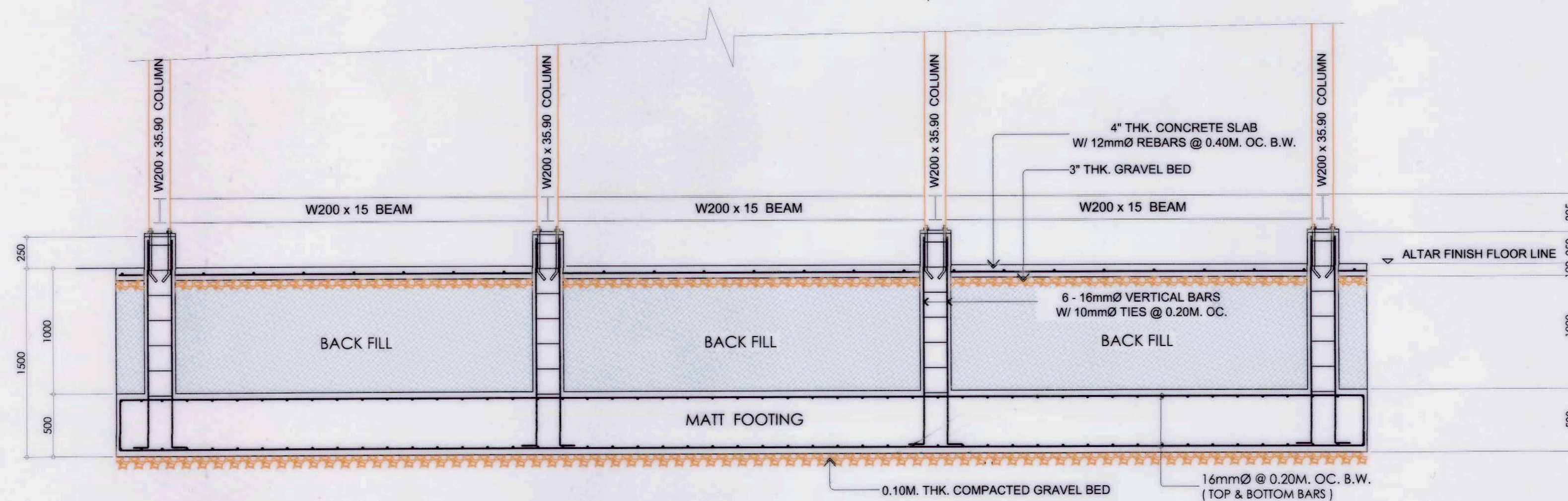
1 : 10 MTS.



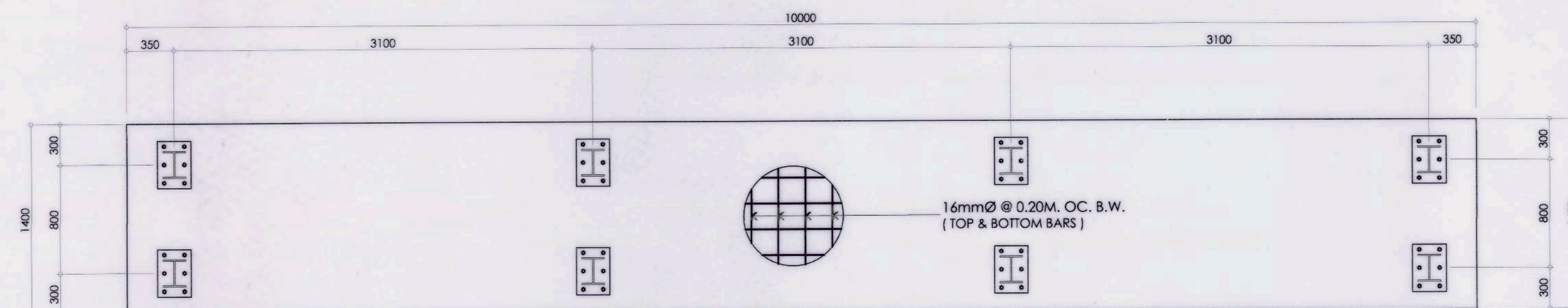
BEAM / COLUMN CONNECTION DETAIL

SCALE

1 : 10 MTS.



SECTION

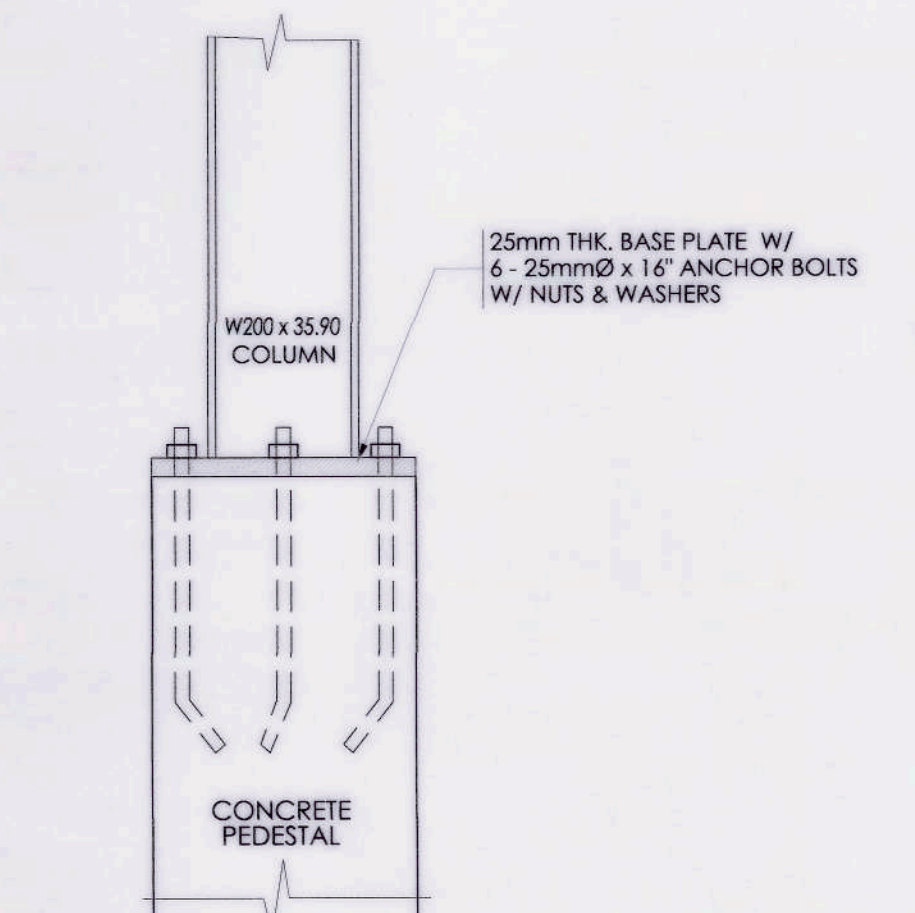


PLAN

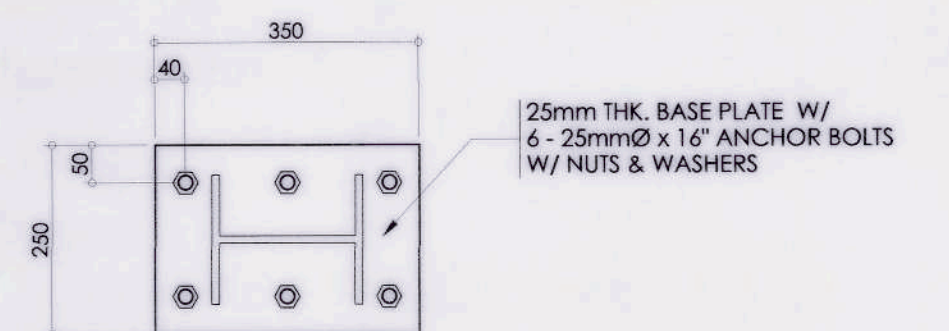
DETAIL OF MATT FOOTING

SCALE

1 : 30 MTS.



SECTION



PLAN

TYPICAL COLUMN DETAIL

SCALE

1 : 10 MTS.



TIEZA
TOURISM INFRASTRUCTURE
AND ENTERPRISE ZONE AUTHORITY
6th & 7th FLR. TOWER 1 DOUBLE DRAGON PLAZA
DOUBLE DRAGON MERIDIAN PARK, MACAPAGAL AVENUE
CORNER EDSA EXTENSION BAY AREA PASAY CITY 1308

PROJECT TITLE/ LOCATION:

**RECONSTRUCTION AND RETROFITTING
OF SAN AGUSTIN CHURCH
IN LUBAO, PAMPANGA**

LOCATION:

LUBAO PAMPANGA

PREPARED BY:

JOSEPH QUIBAN

DRAWN BY:

DATE:

PROJECT EVALUATION AND PLANNING DEPARTMENT

CHECKED BY:

RADY E. ADAME

MANAGER
PROJECT PLANNING & DESIGN DIVISION

REVIEWED BY:

JEOFFREY L. MACALALAD

MANAGER
PROJECT EVALUATION & PLANNING DEPARTMENT

RECOMMENDING APPROVAL:

GREGORY A. OLLER

ASSISTANT CHIEF OPERATING OFFICER
ARCHITECTURAL & ENGINEERING SERVICES SECTOR

APPROVED BY:

MARK T. LAPID

CHIEF OPERATING OFFICER

SHEET CONTENTS:

DETAIL OF MATT FOOTING
SUPPORT CONNECTION DETAIL
BEAM/COLUMN CONNECTION DETAIL
TYPICAL COLUMN DETAIL

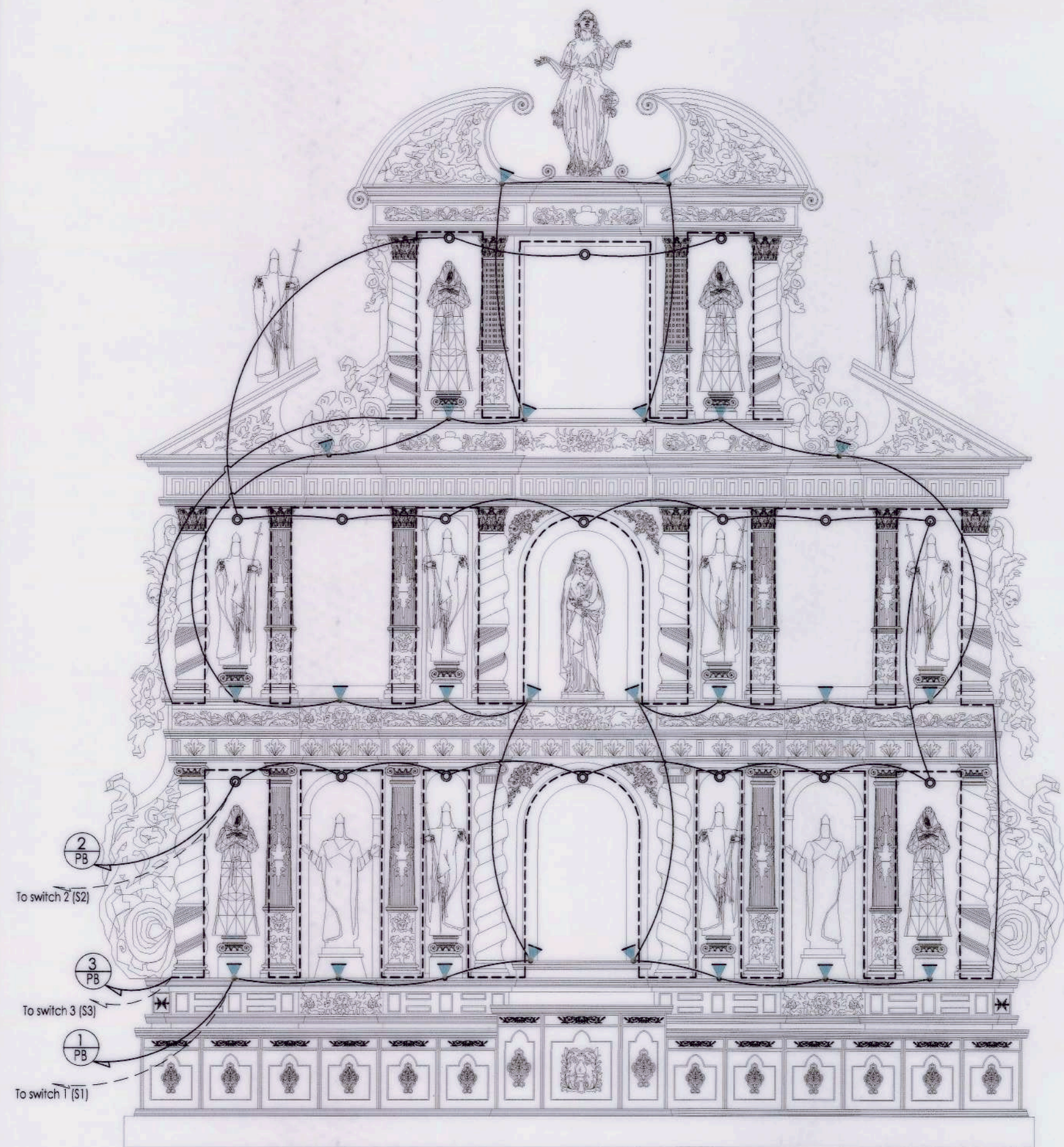
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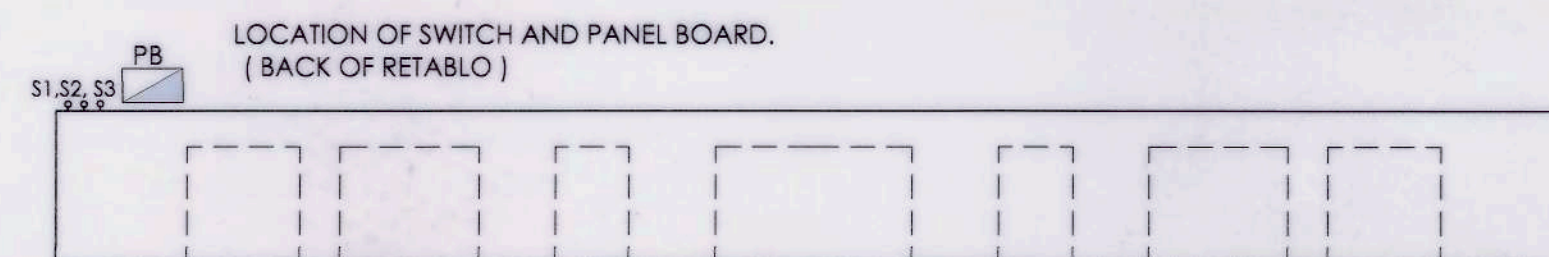
R.A. 9266

SHEET NO.

10
14



ELEVATION



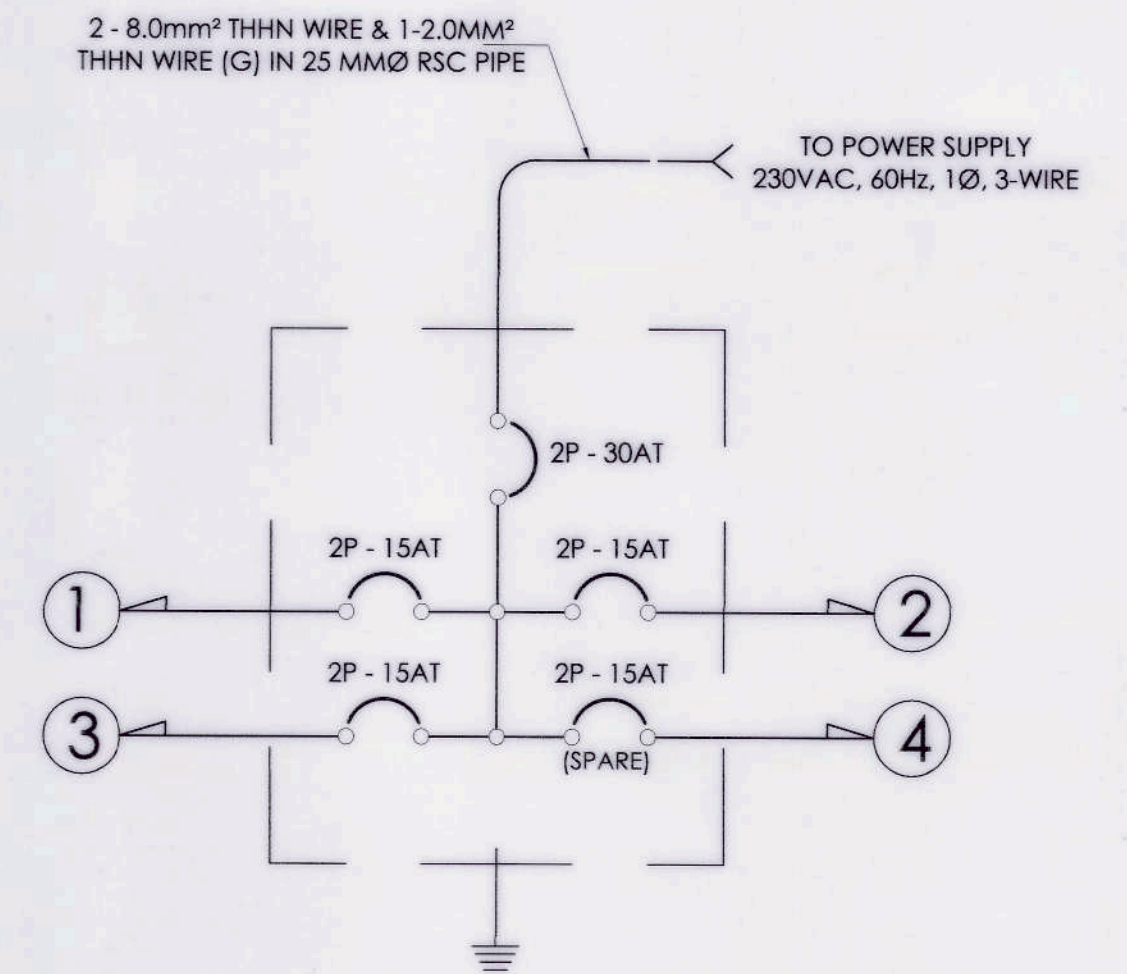
PLAN

RETABLO
ELECTRICAL LAYOUT
SCALE 1 : 50 MTS.

LOAD SCHEDULE (PANEL BOARD) PB

| CKT NO. | LOAD DESCRIPTION | V | W | I | SIZE OF WIRE AND CONDUIT | PROTECTIVE DEVICE |
|---------|--|-----|-------|------|--|-------------------|
| 1 | 24 x 9w LED LIGHTING OUTLET (SPOT LIGHT) | 230 | 216 | 0.94 | 2 - 2.0mm ² THHN WIRE IN 20mmØ PVC PIPE | 2P - 15AT - 50AF |
| 2 | 17 x 9w LED LIGHTING OUTLET (DROP LIGHT) | 230 | 153 | 0.67 | 2 - 2.0mm ² THHN WIRE IN 20mmØ PVC PIPE | 2P - 15AT - 50AF |
| 3 | LED STRIP LIGHTS | 230 | 732 | 3.18 | 2 - 2.0mm ² THHN WIRE IN 20mmØ PVC PIPE | 2P - 15AT - 50AF |
| 4 | S P A R E | 230 | 1000 | 4.35 | 2 - 2.0mm ² THHN WIRE IN 20mmØ PVC PIPE | 2P - 15AT - 50AF |
| | TOTAL | | 2,101 | 9.14 | | |

$I_{TOTAL} = 2,101 \times 100\% D.F. = 9.14 \text{ Amps}$
MAIN CONDUCTOR : USE 2 - 8mm² THHN WIRE & 1-2.0mm² WIRE (G)
IN 25MMØ RSC PIPE
MAIN DISCONNECTING MEANS : PROVIDE 2P - 30AT- 50AF, 240VAC MCCB



RISER DIAGRAM - PB

LEGEND :

- ⊙ - PINLIGHT OUTLET, 6"Ø W/ 9w LED BULB, 230VAC, 60Hz.
- ◀ - SPOT LIGHT
- - LED STRIPLIGHTS, 7.7w/m, 230VAC
- S1, S2, S3 - ONE-GANG SWITCH, 16A, 250VAC
- ⌋ PB - CIRCUIT HOMERUN, CONNECT TO PANELBOARD
- ▢ PB - PANELBOARD, RATING AS INDICATED, "BOLT-ON" TYPE CB

GEN. NOTES & SPECIFICATIONS :

- ALL WORKS HEREIN SHALL BE DONE IN STRICT CONFORMITY WITH THE LATEST EDITION OF THE PHILIPPINE ELECTRICAL CODE (P.E.C.) AND NATIONAL BUILDING CODE, THE PRESENT REQUIREMENTS OF THE LOCAL POWER COMPANY CONCERNED, AND OTHER GOVERNMENT AGENCIES HAVING AUTHORITY HEREIN.
- POWER SUPPLY SHALL BE 230 VOLTS, SINGLE PHASE, 3-WIRE, 60Hertz.
- THE SMALLEST WIRE TO BE USED SHALL BE 2.0mm² PURE COOPER WITH 600V THERMOPLASTIC INSULATION TYPE, THHN STRANDED FOR BOTH HOMERUN AND GENERAL WIRINGS
- THE SMALLEST TYPE OF CONDUIT DIAMETER TO BE USED SHALL BE RATED 15mmØ, TRADE SIZE (1/2"Ø).
- JUNCTION AND SQUARE BOXES SHALL NOT BE LESS THAN GAUGE #16 DEEP TYPE WITH BLANK COVER.
- RECEPTACLE AND LIGHT SWITCHES FOR GENERAL USE SHALL BE RATED 10 Amps., 250 VOLTS.
- ALL WIRING INSTALLATION SHALL BE EXECUTED IN ELECTRICAL CONDUIT PIPES FOR GENERAL INSTALLATIONS AND SHALL BE PROVIDED WITH DEEP TYPE BOXES, SUPPORTS, FITTINGS AND MUST BE RIGIDLY INSTALLED.
- STANDARD MOUNTING HEIGHTS SHALL BE AS FOLLOWS :
 - A.) LIGHT CONTROL SWITCHES - 1.37m ABOVE FLOOR FINISHED.
 - B.) CONVENIENCE OUTLETS - 0.30m ABOVE FLOOR FIN.
- 0.15m. ABOVE COUNTER @ CENTER.
 - C.) PANEL BOARD - 1.50m ABOVE FLOOR FINISHED @ CENTER.



TIEZA
TOURISM INFRASTRUCTURE
AND ENTERPRISE ZONE AUTHORITY
6th & 7th FLR. TOWER 1 DOUBLE DRAGON PLAZA
DOUBLE DRAGON MERIDIAN PARK, MACAPAGAL AVENUE
CORNER EDSA EXTENSION BAY AREA PASAY CITY 1308

PROJECT TITLE/ LOCATION:
**RECONSTRUCTION AND RETROFITTING
OF SAN AGUSTIN CHURCH
IN LUBAO, PAMPANGA**
LOCATION : LUBAO PAMPANGA

PROJECT EVALUATION AND PLANNING DEPARTMENT
PREPARED BY: JERRY S. ESPINA
ELECTRICAL ENGINEER
CHECKED BY: RADY E. ADAME
MANAGER
PROJECT PLANNING & DESIGN DIVISION
REVIEWED BY: GEOFFREY L. MACALALAD
MANAGER
PROJECT EVALUATION & PLANNING DEPARTMENT

RECOMMENDING APPROVAL: GREGORY A. OLLER
ASSISTANT CHIEF OPERATING OFFICER
ARCHITECTURAL & ENGINEERING SERVICES SECTOR

APPROVED BY: MARK T. LAPID
CHIEF OPERATING OFFICER

SHEET CONTENTS:
ELECTRICAL LAYOUT
LOAD SCHEDULE
RISER DIAGRAM
LEGEND
GEN. NOTES & SPECS
REVISIONS:

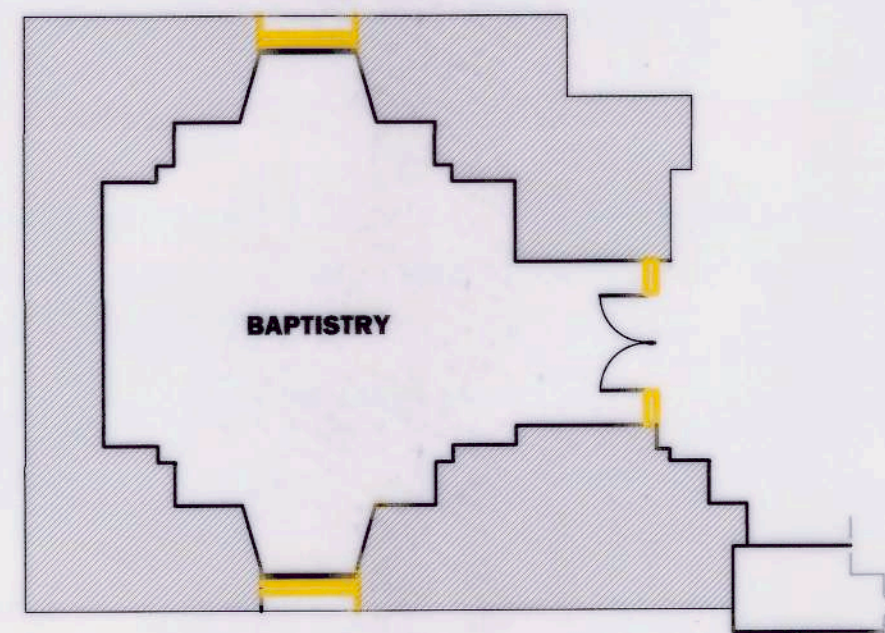
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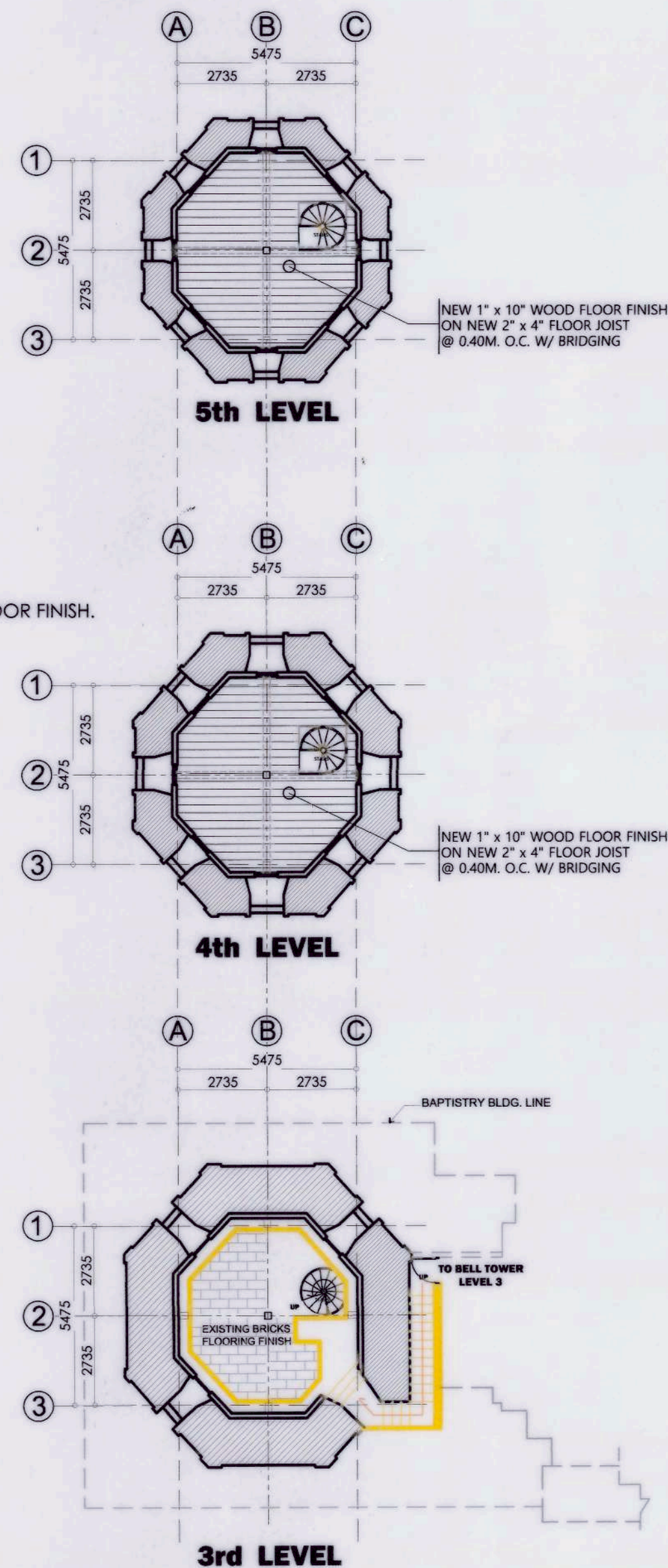
PICTORIAL VIEW OF DILAPIDATED FLOORING

SCOPE OF WORKS :

- TOTAL REPLACEMENT OF WOOD FLOOR JOISTS, GIRDERS AND WOOD FLOOR FINISH.
- APPLICATION OF ANTI-ANAY TREATMENT.
- PAINTING.

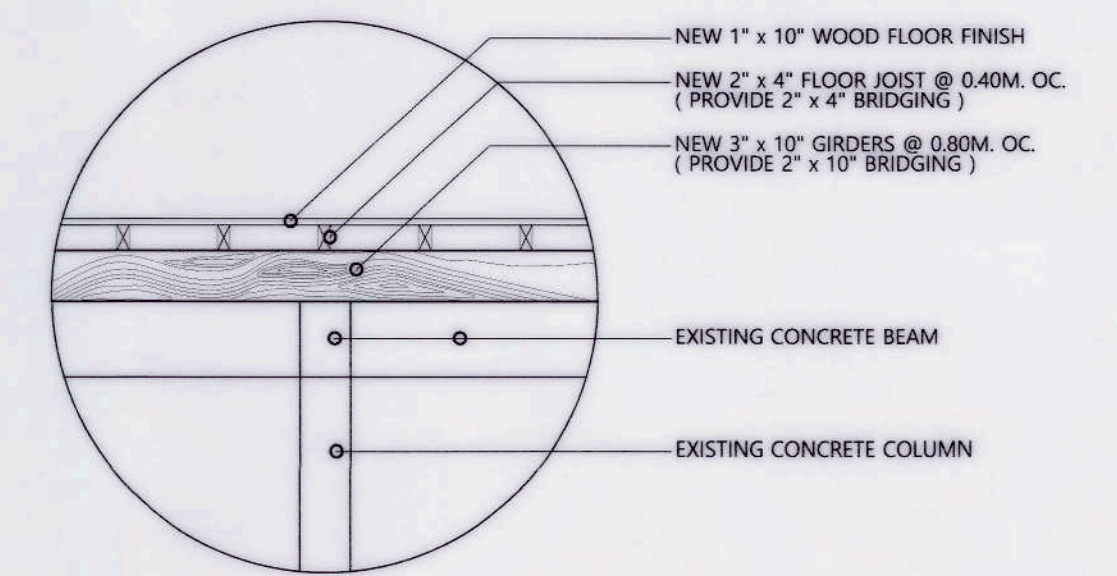
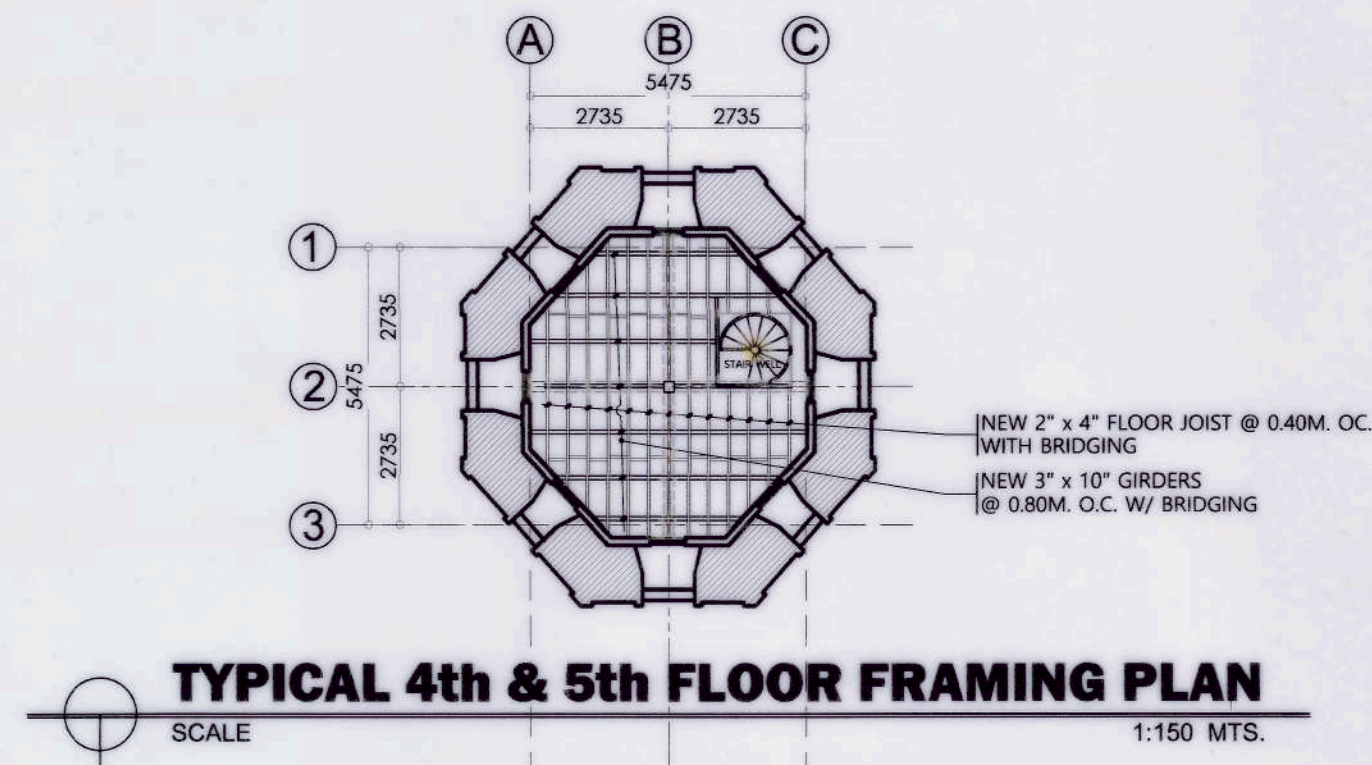


BAPTISTRY



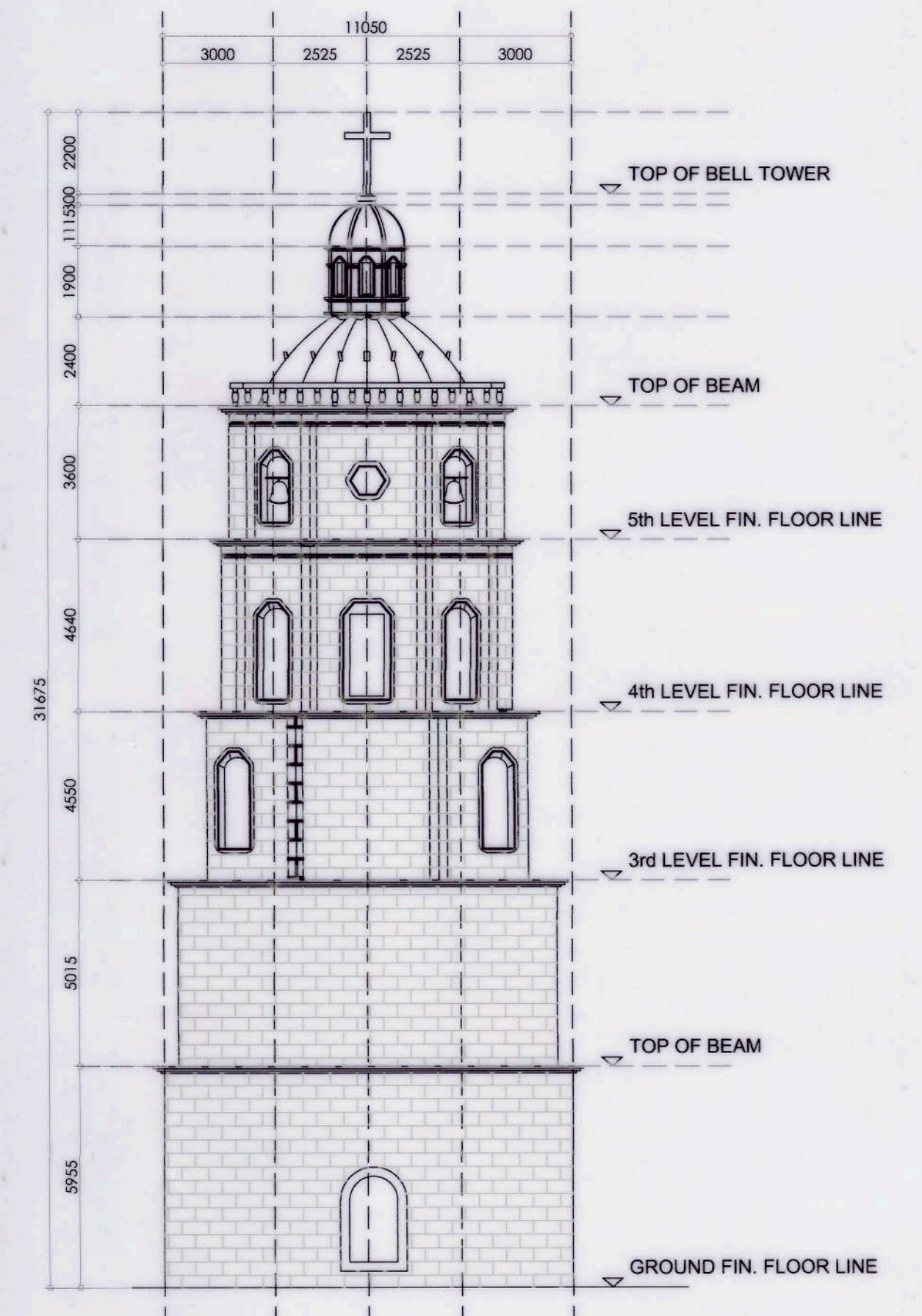
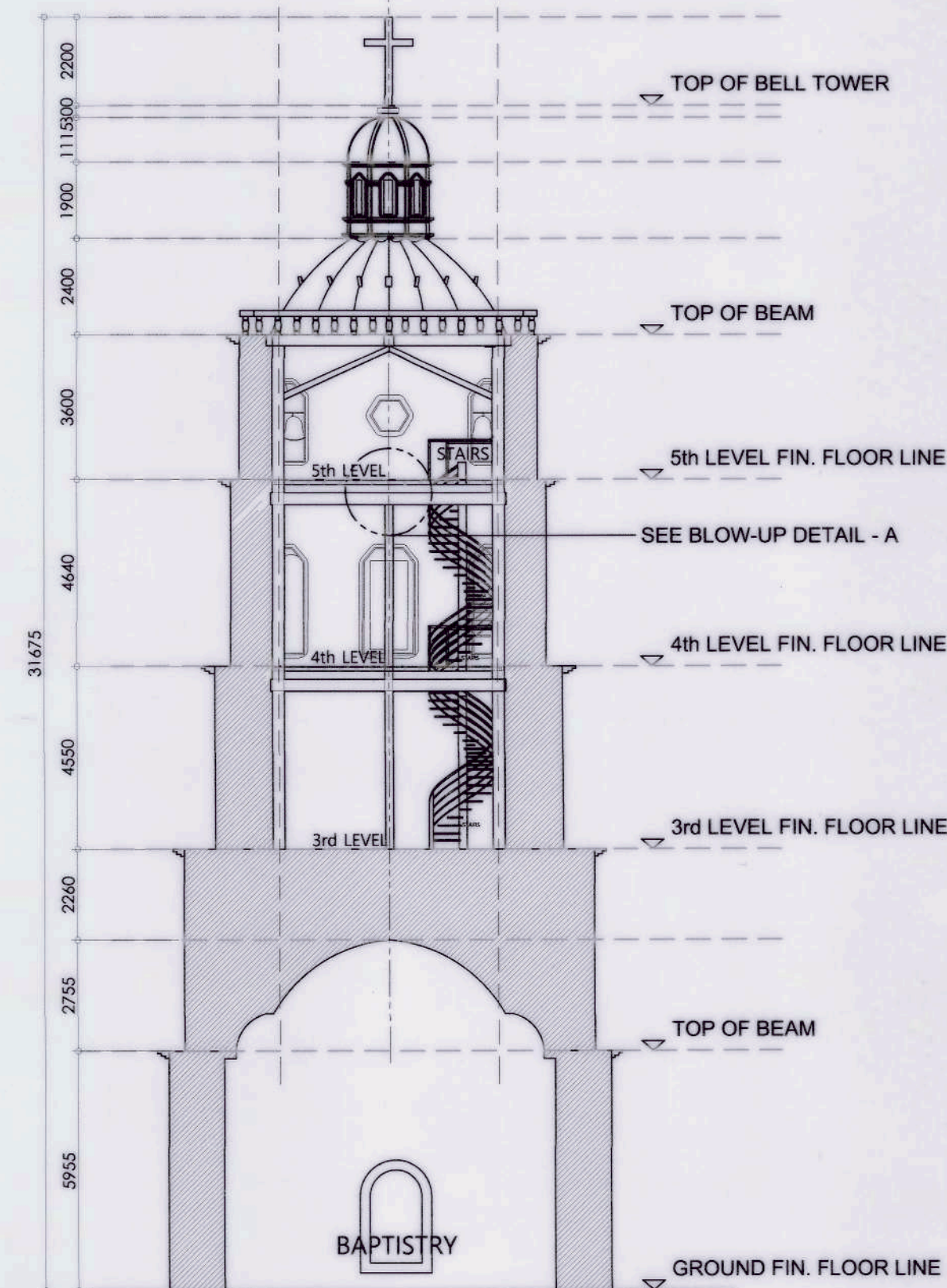
BELL TOWER FLOOR PLANS

SCALE 1:150 MTS.



BLOW-UP DETAIL - A

SCALE 1:30 MTS.



TIEZA
TOURISM INFRASTRUCTURE
AND ENTERPRISE ZONE AUTHORITY
6th & 7th FLR. TOWER 1 DOUBLE DRAGON PLAZA
DOUBLE DRAGON MERIDIAN PARK, MACAPAGAL AVENUE
CORNER EDSA EXTENSION BAY AREA PASAY CITY 1308

PROJECT TITLE/ LOCATION:
**RECONSTRUCTION AND RETROFITTING
OF SAN AGUSTIN CHURCH
IN LUBAO, PAMPANGA**

LOCATION: LUBAO PAMPANGA

PROJECT EVALUATION AND PLANNING DEPARTMENT

PREPARED BY:
EFREN A. RESOSO

DRAWN BY:
DATE:

CHECKED BY:
RADY E. ADAME

MANAGER
PROJECT PLANNING & DESIGN DIVISION

REVIEWED BY:
JEFFREY L. MACALALAD

MANAGER
PROJECT EVALUATION & PLANNING DEPARTMENT

RECOMMENDING APPROVAL:
GREGORY A. OLLER

ASSISTANT CHIEF OPERATING OFFICER
ARCHITECTURAL & ENGINEERING SERVICES SECTOR

APPROVED BY:
MARK T. LAPID

CHIEF OPERATING OFFICER

SHEET CONTENTS:
BELL TOWER FLOOR PLANS
ELEVATION
SECTION
TYPICAL FLOOR FRAMING PLAN
BLOW-UP DETAIL - A

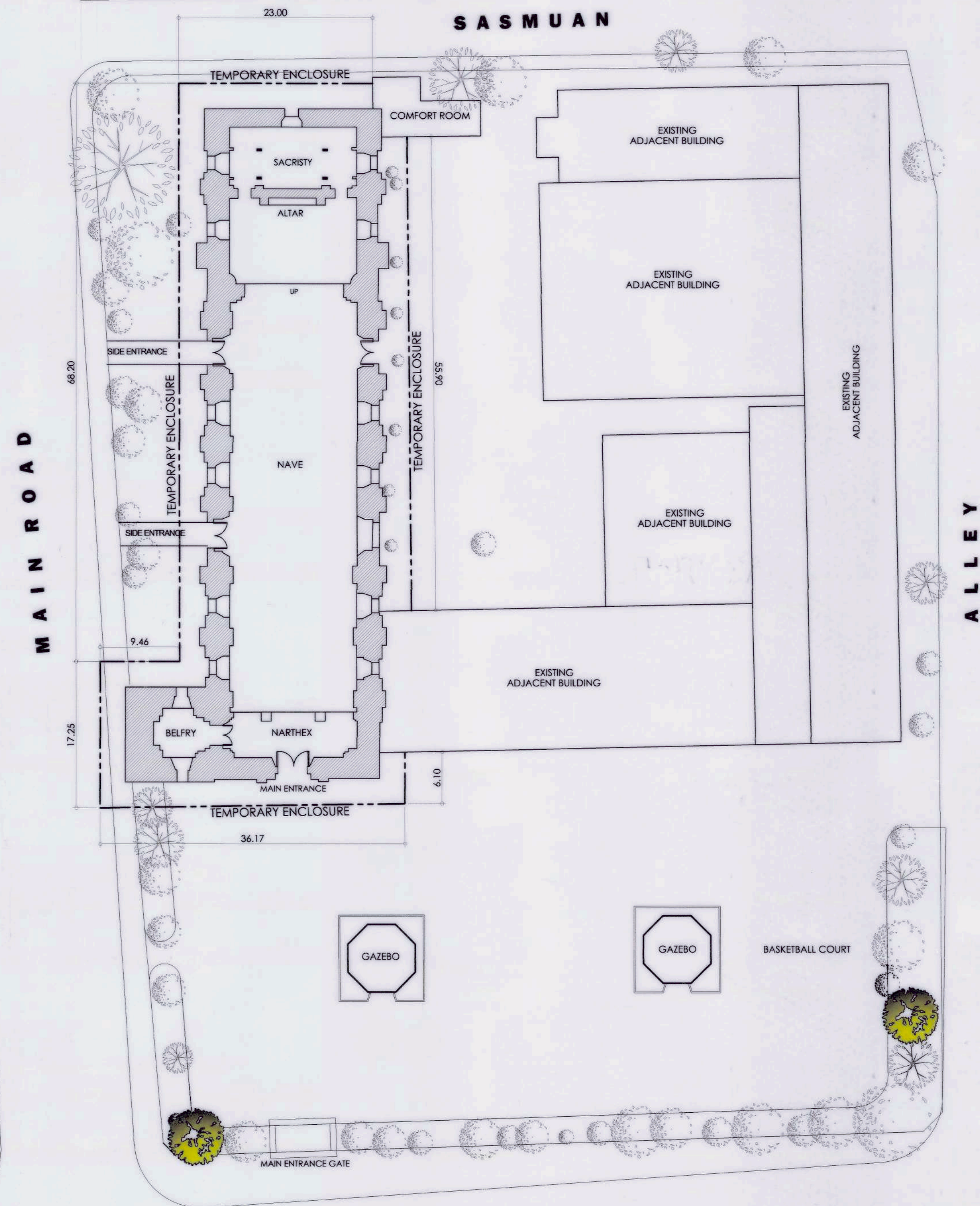
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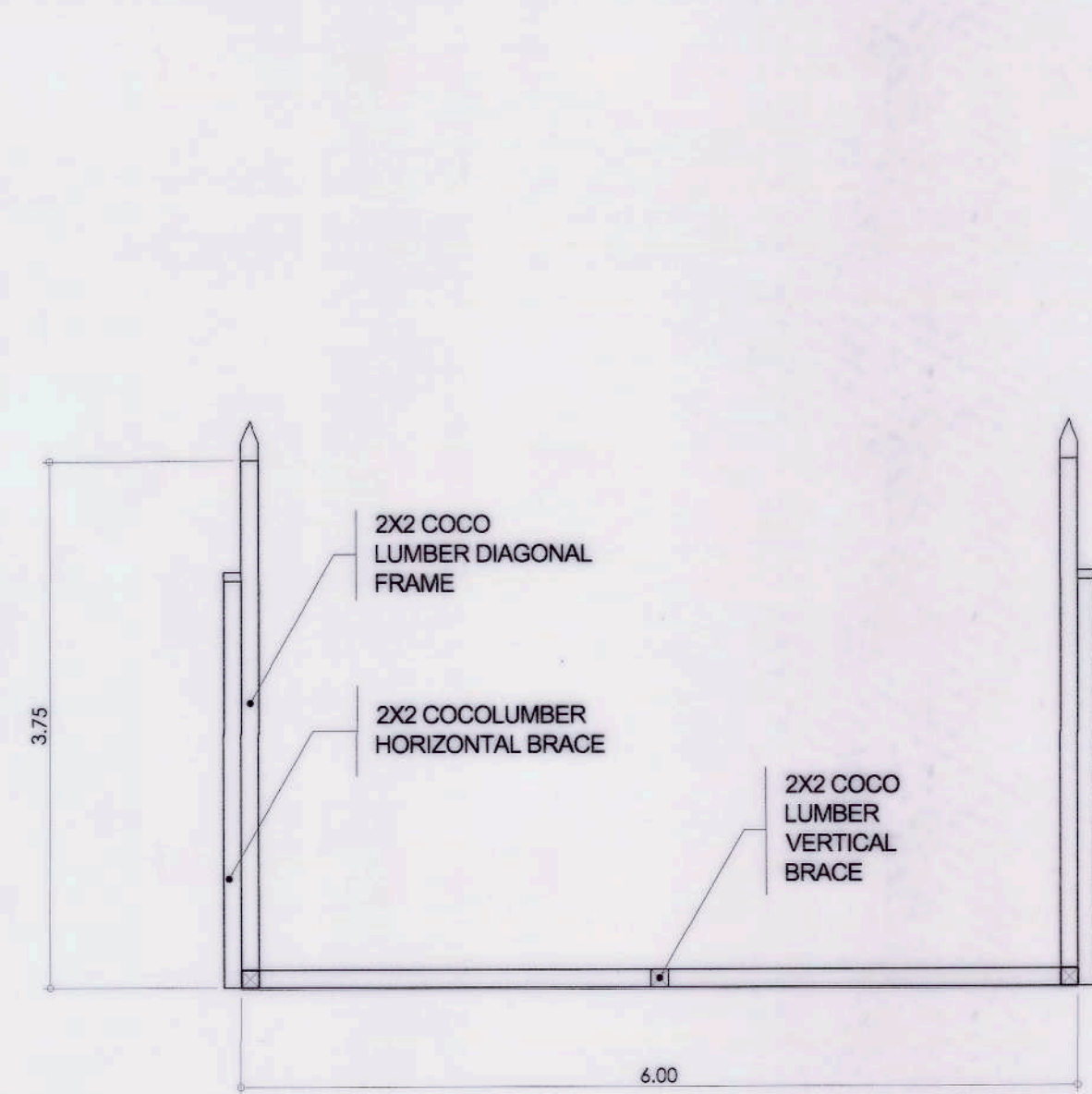
SHEET NO.
12
14

TEMPORARY ENCLOSURE (FENCE) LAYOUT
SCALE 1:400MTS

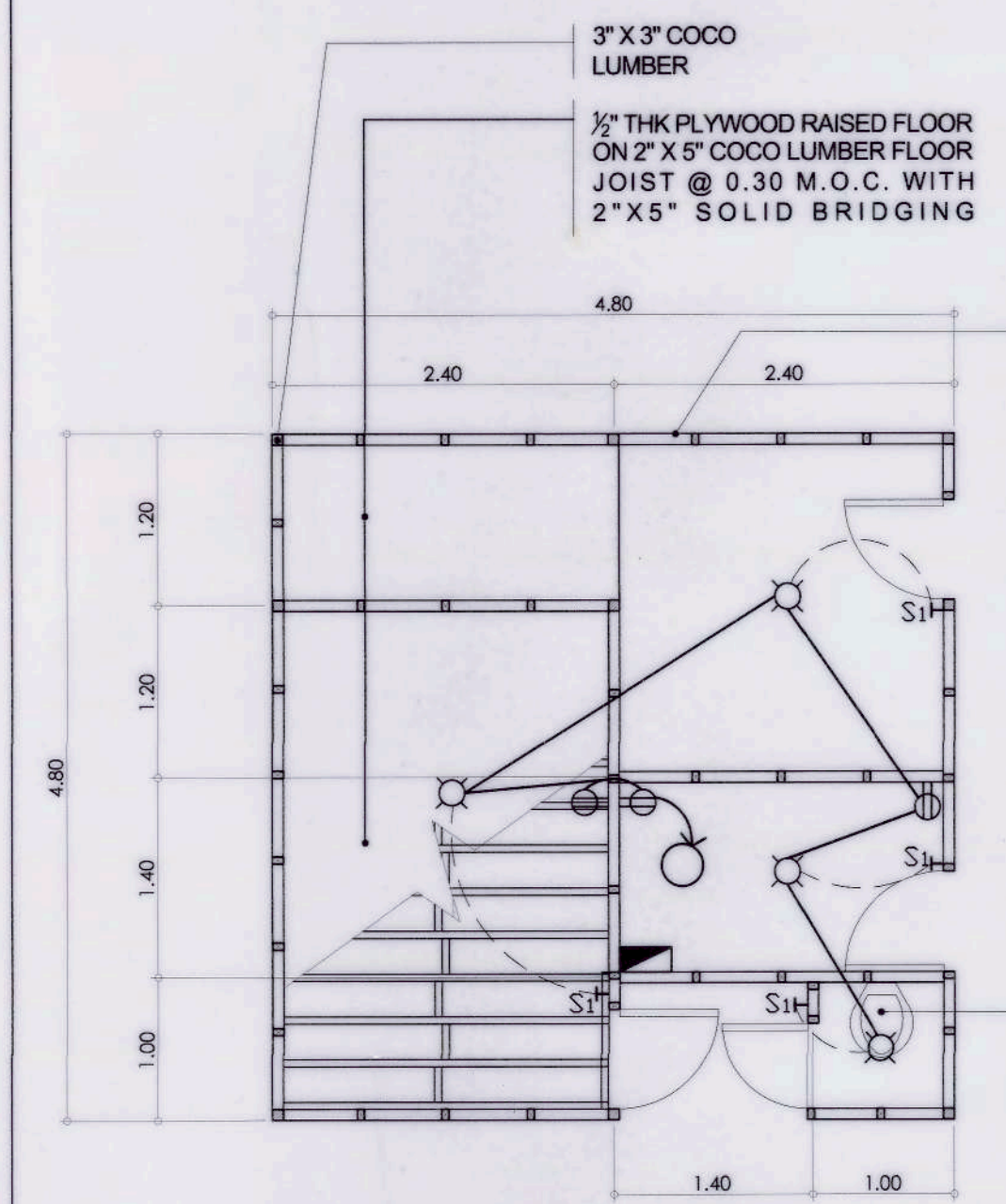


TEMPORARY FACILITIES

| PROJECT TITLE/ LOCATION: | | PROJECT EVALUATION AND PLANNING DEPARTMENT | | | RECOMMENDING APPROVAL: | APPROVED BY: | SHEET CONTENTS: | R.A. 9266 | SHEET NO. |
|---|--|--|---|---|--|-------------------------|--------------------------|-----------|-----------|
| RECONSTRUCTION AND RETROFITTING OF SAN AGUSTIN CHURCH IN LUBAO, PAMPANGA | | PREPARED BY: | CHECKED BY: | REVIEWED BY: | | | PROPOSED SITE DEVT. PLAN | | 13 |
| LOCATION: LUBAO PAMPANGA | | EFREN A. RESOSO | RADY E. ADAME | JEFFREY L. MACALALAD | GREGORY A. OLLER | MARK T. LAPID | | | 14 |
| DRAWN BY: | | DATE: | MANAGER PROJECT PLANNING & DESIGN DIVISION | QIC - MANAGER PROJECT EVALUATION & PLANNING DEPARTMENT | ASSISTANT CHIEF OPERATING OFFICER ARCHITECTURAL & ENGINEERING SERVICES SECTOR | CHIEF OPERATING OFFICER | REVISIONS: | | |

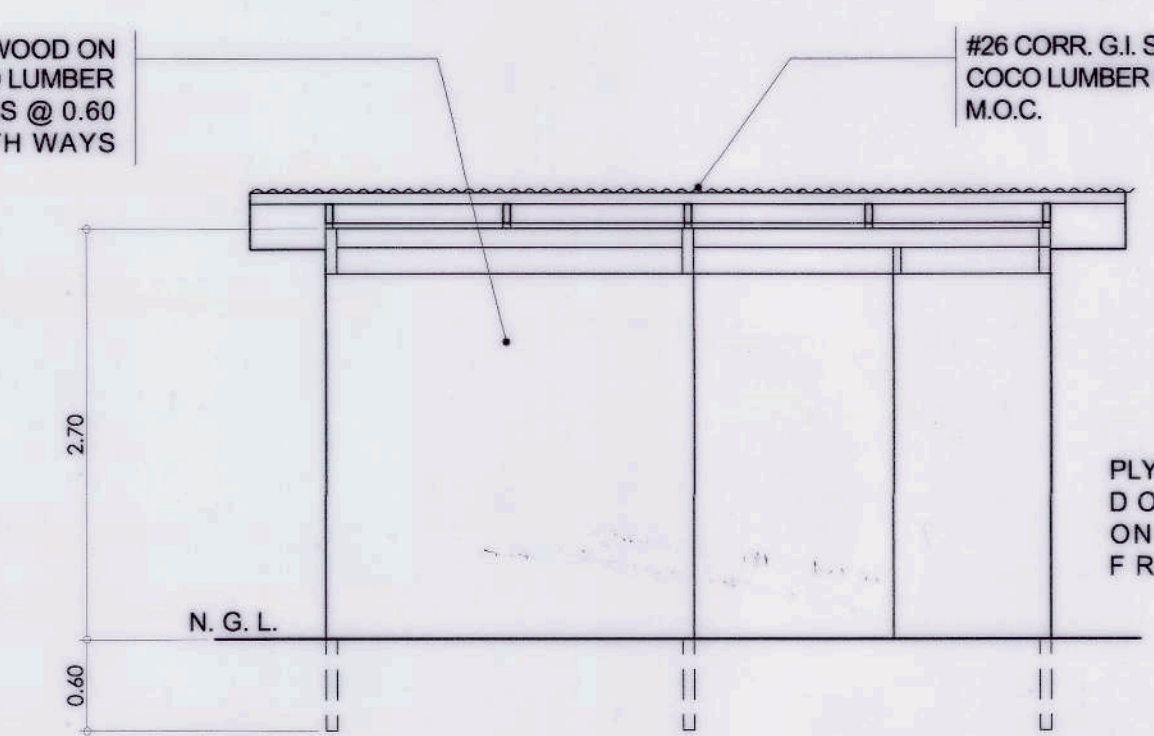


PLAN
SCALE 1:50MTS

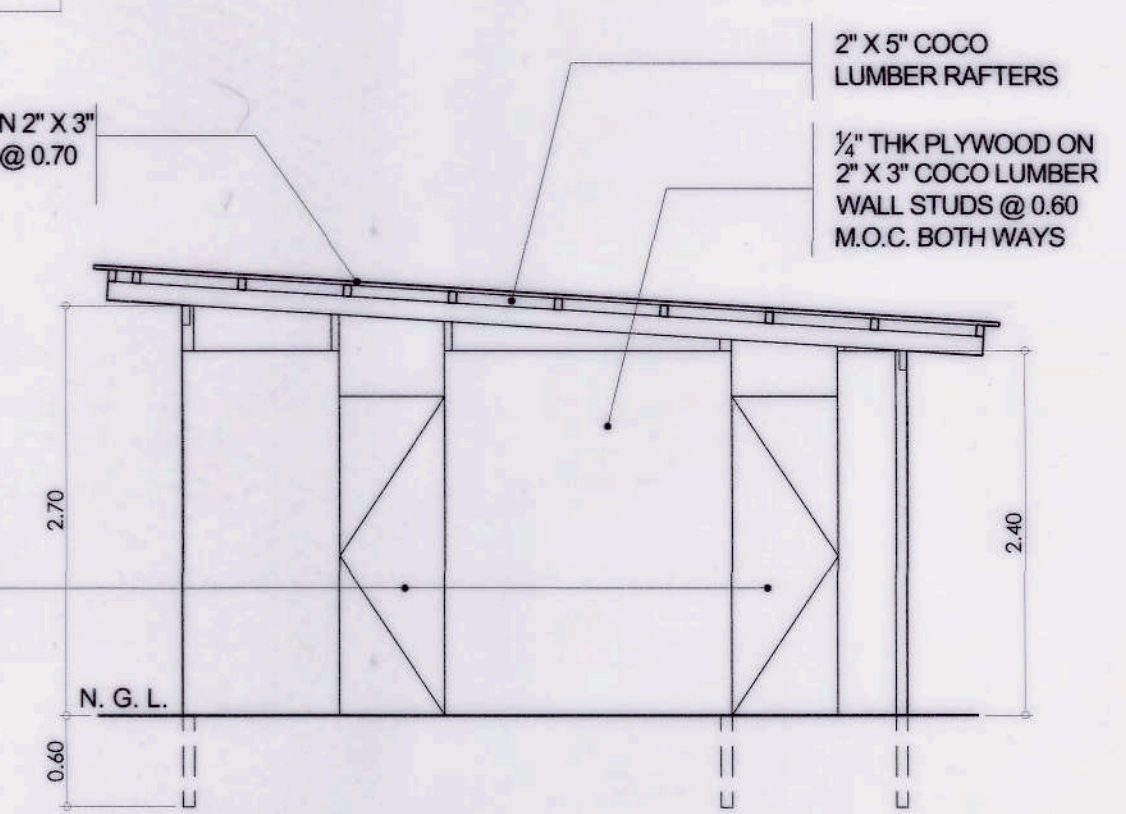


PLAN
SCALE 1:50MTS

- LEGEND:**
- NO. 12 TW WIRE FOR MAIN LINE
 - NO. 14 TW WIRE FOR SWITCH
 - SAFETY SWITCH 30A
 - 25W CFL BULB
 - ONE GANG SWITCH
 - CONVENIENCE OUTLET

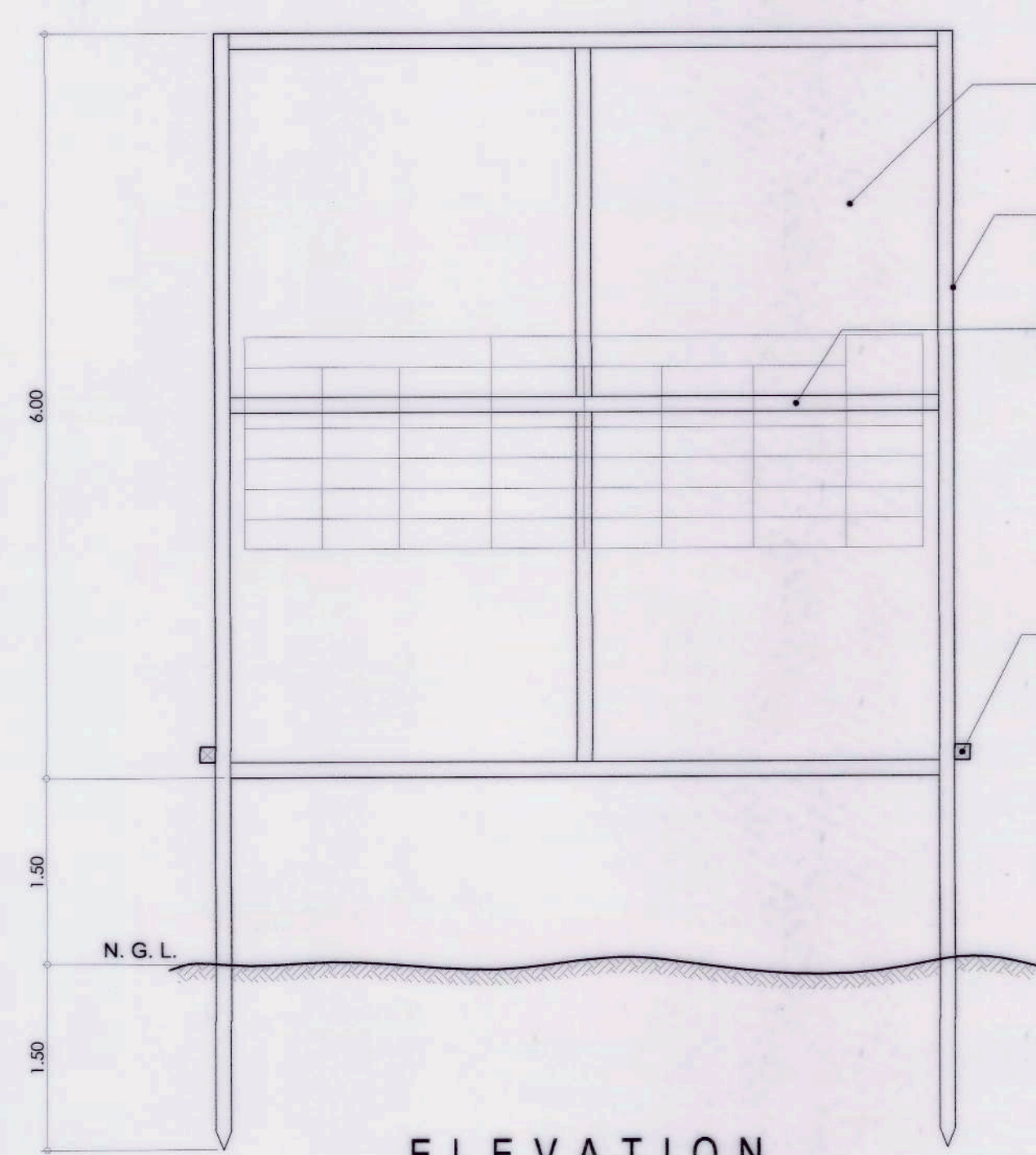


FRONT ELEVATION
SCALE 1:50MTS

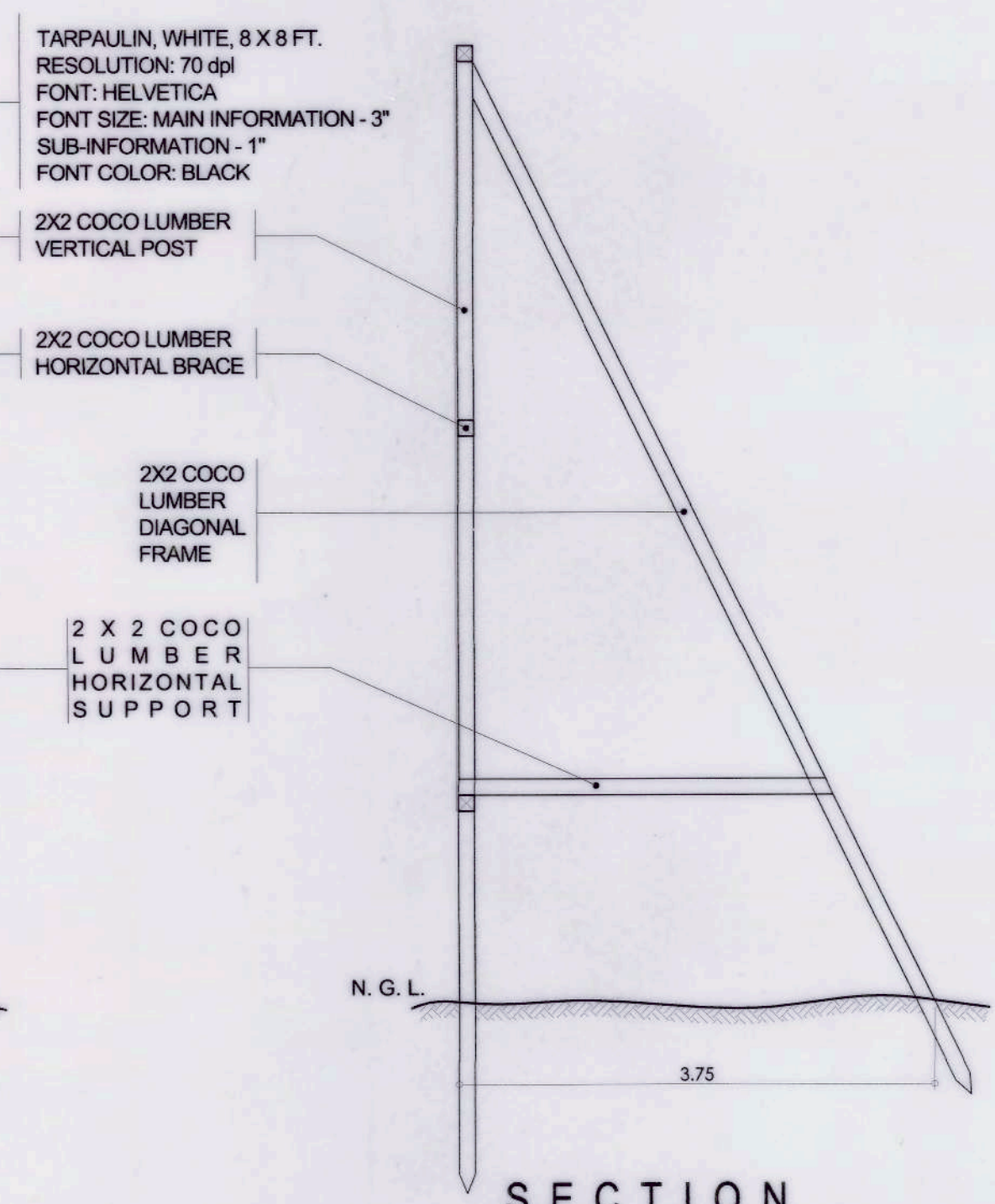


RIGHT SIDE ELEVATION
SCALE 1:50MTS

TEMPORARY BARRACKS

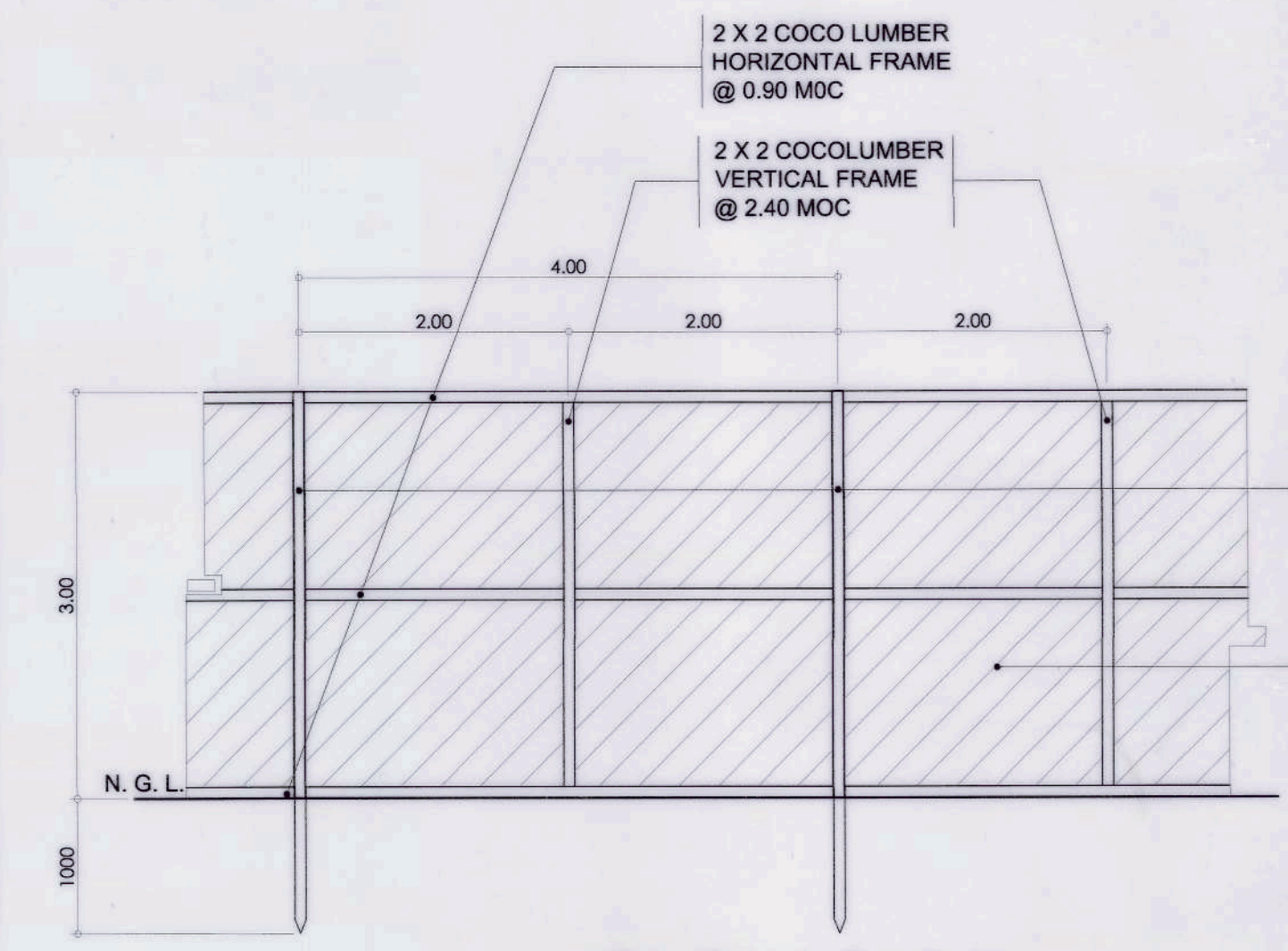


ELEVATION
SCALE 1:50MTS

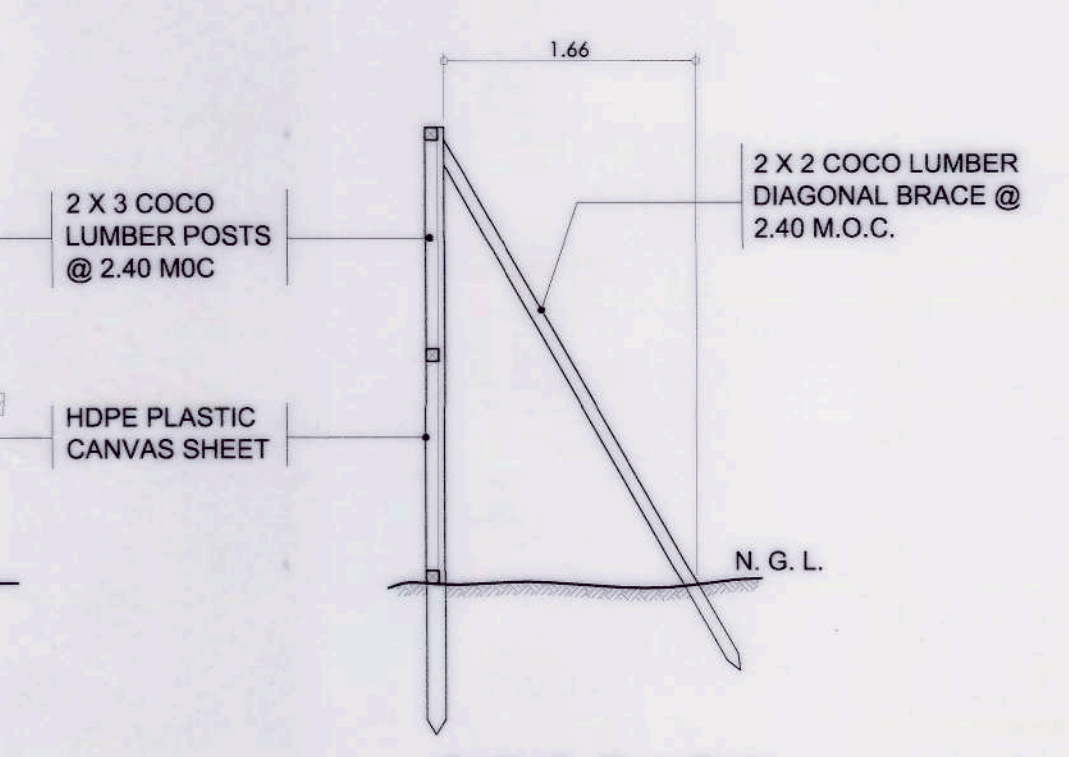


SECTION
SCALE 1:50MTS

SIGNAGE



ELEVATION
SCALE 1:50MTS



SECTION
SCALE 1:50MTS

TEMPORARY FENCE

TEMPORARY FACILITIES

| | | | | | | | | | | |
|--|--|--|--|--|---|-------------------------|---------------|--|-----------|-----------|
| <p>TIEZA TOURISM INFRASTRUCTURE AND ENTERPRISE ZONE AUTHORITY 6th & 7th FLR. TOWER 1 DOUBLE DRAGON PLAZA DOUBLE DRAGON MERIDIAN PARK, MACAPAGAL AVENUE CORNER EDSA EXTENSION BAY AREA PASAY CITY 1308</p> | PROJECT TITLE/ LOCATION: | | PROJECT EVALUATION AND PLANNING DEPARTMENT | | | RECOMMENDING APPROVAL: | APPROVED BY: | SHEET CONTENTS: | R.A. 9266 | SHEET NO. |
| | RECONSTRUCTION AND RETROFITTING OF SAN AGUSTIN CHURCH IN LUBAO, PAMPANGA | | PREPARED BY: | CHECKED BY: | REVIEWED BY: | | | | | |
| | LOCATION: LUBAO PAMPANGA | | EFREN A. RESOSO | RADY E. ADAME | JEFFREY L. MACALALAD | GREGORY A. OLLER | MARK T. LAPID | TEMPORARY FACILITIES | | 14 |
| | DRAWN BY: DATE: | | MANAGER PROJECT PLANNING & DESIGN DIVISION | MANAGER PROJECT EVALUATION & PLANNING DEPARTMENT | ASSISTANT CHIEF OPERATING OFFICER ARCHITECTURAL & ENGINEERING SERVICES SECTOR | CHIEF OPERATING OFFICER | REVISIONS: | THIS DRAWING AS INSTRUMENT OF SERVICE IS A PROPERTY OF TIEZA. IT SHALL BE UNLAWFUL TO DUPLICATE OR TO MAKE COPIES OF THIS DOCUMENT WITHOUT THE CONSENT OF TIEZA. | | |

Section VIII. Bill of Quantities

Notes on the Bill of Quantities

Objectives

The objectives of the Bill of Quantities are:

- a. to provide sufficient information on the quantities of Works to be performed to enable Bids to be prepared efficiently and accurately; and
- b. when a Contract has been entered into, to provide a priced Bill of Quantities for use in the periodic valuation of Works executed.

In order to attain these objectives, Works should be itemized in the Bill of Quantities in sufficient detail to distinguish between the different classes of Works, or between Works of the same nature carried out in different locations or in other circumstances which may give rise to different considerations of cost. Consistent with these requirements, the layout and content of the Bill of Quantities should be as simple and brief as possible.

Daywork Schedule

A Daywork Schedule should be included only if the probability of unforeseen work, outside the items included in the Bill of Quantities, is high. To facilitate checking by the Entity of the realism of rates quoted by the Bidders, the Daywork Schedule should normally comprise the following:

- a. A list of the various classes of labor, materials, and Constructional Plant for which basic daywork rates or prices are to be inserted by the Bidder, together with a statement of the conditions under which the Contractor will be paid for work executed on a daywork basis.
- b. Nominal quantities for each item of Daywork, to be priced by each Bidder at Daywork rates as Bid. The rate to be entered by the Bidder against each basic Daywork item should include the Contractor's profit, overheads, supervision, and other charges.

Provisional Sums

A general provision for physical contingencies (quantity overruns) may be made by including a provisional sum in the Summary Bill of Quantities. Similarly, a contingency allowance for possible price increases should be provided as a provisional sum in the Summary Bill of Quantities. The inclusion of such provisional sums often facilitates budgetary approval by avoiding the need to request periodic supplementary approvals as the future need arises. Where such provisional sums or contingency allowances are used, the SCC should state the manner in which they will be used, and under whose authority (usually the Procuring Entity's Representative's).

The estimated cost of specialized work to be carried out, or of special goods to be supplied, by other contractors should be indicated in the relevant part of the Bill of Quantities as a particular provisional sum with an appropriate brief description. A separate procurement procedure is normally carried out by the Procuring Entity to select such specialized contractors. To provide an element of competition among the Bidders in respect of any facilities, amenities, attendance, etc., to be provided by the successful Bidder as prime Contractor for the use and convenience of the specialist contractors, each related provisional sum should be followed by an item in the Bill of Quantities inviting the Bidder to quote a sum for such amenities, facilities, attendance, etc.

Signature Box

A signature box shall be added at the bottom of each page of the Bill of Quantities where the authorized representative of the Bidder shall affix his signature. Failure of the authorized representative to sign each and every page of the Bill of Quantities shall be a cause for rejection of his bid.

These Notes for Preparing a Bill of Quantities are intended only as information for the Procuring Entity or the person drafting the Bidding Documents. They should not be included in the final documents.

Tourism Infrastructure and Enterprise Zone Authority

7th Floor, Tower 1 Double Dragon, Double Dragon Meridian Park, Macapagal Ave. cor. EDSA Extension,
Bay Area, Pasay City

SUMMARY OF BID

PROJECT : RECONSTRUCTION AND RETROFITTING OF SAN AGUSTIN CHURCH SAN
NICOLAS 1ST, LUBAO PAMPANGA.

DURATION : 180 Calendar Days

| Item No. | ITEM OF WORK | AMOUNT |
|----------|--|--------|
| A. | GENERAL REQUIREMENTS | |
| B | SURFACE PREPARATION AND CLEANING OF WALL | |
| C | INJECTION OF LIME WATER AND SLURRY LIMIENTO CORE OF WALLS | |
| D | CHIPPING OF PLASTER CEMENT AND REPOINTING OF JOINTS | |
| E | REPAIR AND RESTORATION OF OLD CHURCH RETABLO | |
| F | CONCRETING OF CHURCH FLOOR (NAVE & BAPTISTERY ONLY) | |
| G | INSTALLATION OF TILES IN CHURCH | |
| H | REPAIR AND RESTORATION OF BELTRY | |
| I | REPAIR AND REPAINTING OF CEILING | |
| J | GROUTING OF JOINT AND LIME WASH OF ALL MASONRY WALLS | |
| K | SYSTEMATIC DISMANTLING OF LOOSE MASONRY UNITS FOR REPLACEMENT AND RE-INSTALLATION | |
| L | SCAFFOLDING | |
| | TOTAL BID PRICE | |

AMOUNT IN WORDS

Name of Company

Business Address

Name & Signature of
Authorized Representative

Designation

BILL OF QUANTITIES

Project : RECONSTRUCTION OF RETROFITTING OF SAN AGUSTIN CHURCH
 Location : San Nicolas 1st Lubao, Pampanga

| ITEM NO. | DESCRIPTION | UNIT | QTY. |
|--------------------|--|------------------------------------|----------------|
| I. | GENERAL REQUIREMENTS | | |
| | Health and Safety Program | Lot | 1.00 |
| | Temporary Barracks | Lot | 1.00 |
| | Project Signage | Lot | 1.00 |
| | Temporary Enclosure | Lot | 1.00 |
| II. | SURFACE PREPARATION AND CLEANING OF WALL | 3,987.86 | m ² |
| III. | INJECTION OF LIME WATER AND SLURRY LIME INTO CORE OF WALLS | 4,411.86 | m ² |
| IV. | CHIPPING OF PLASTER CEMENT AND REPOINTING OF JOINTS | 3,987.86 | m ² |
| V. | REPAIR AND RESTORATION OF OLD CHURCH RETABLO | | |
| | Retablo - Painting Works (Masonry/Concrete) | 295.65 | m ² |
| | Retablo - Electrical Works | 1.00 | lot |
| | Repair and Restoration of Retablo | 295.00 | m ² |
| VI. | CONCRETING OF CHURCH FLOOR (NAVE & BAPTISTERY ONLY) | 271.00 | m ³ |
| VII. | INSTALLATION OF TILES IN CHURCH | | |
| | 0.20m x 0.60m Tiles (Boarder Line) | 9.60 | m ² |
| | 0.25m x 0.25m Baldoza Tiles | 306.25 | m ² |
| | 0.60m x 0.60m Rustic Homogeneous Tiles | 1,501.20 | m ² |
| VIII. | REPAIR AND RESTORATION OF BELTRY | 74.74 | m ² |
| IX. | REPAIR AND REPAINTING OF CEILING | 1,388.80 | m ² |
| X. | GROUTING OF JOINT AND LIME WASH OF ALL MASONRY WALLS | 3,987.86 | m ² |
| XI. | SYSTEMATIC DISMANTLING OF LOOSE MASONRY UNITS FOR REPLACEMENT AND RE-INSTALLATION | 1,096.96 | m ² |
| XII. | SCAFFOLDINGS | 1 | lot |
| GRAND TOTAL | | In Words: Pesos In Figures: Php | |

Submitted By

 Name of the Representative of the Bidder

 Name of the Engineer

Section IX. Checklist of Technical and Financial Documents

Notes on the Checklist of Technical and Financial Documents

The prescribed documents in the checklist are mandatory to be submitted in the Bid, but shall be subject to the following:

- a. GPPB Resolution No. 09-2020 on the efficient procurement measures during a State of Calamity or other similar issuances that shall allow the use of alternate documents in lieu of the mandated requirements; or
- b. any subsequent GPPB issuances adjusting the documentary requirements after the effectivity of the adoption of the PBDs.

The BAC shall be checking the submitted documents of each Bidder against this checklist to ascertain if they are all present, using a non-discretionary “pass/fail” criterion pursuant to Section 30 of the 2016 revised IRR of RA No. 9184.

Checklist of Technical and Financial Documents

I. TECHNICAL COMPONENT ENVELOPE

Class “A” Documents

Legal Documents

- ☐ (a) Valid PhilGEPS Registration Certificate (Platinum Membership) (all pages);
and
- ☐ (b) Registration certificate from Securities and Exchange Commission (SEC) with Article of Incorporation (AOI), Department of Trade and Industry (DTI) for sole proprietorship, or Cooperative Development Authority (CDA) for cooperatives or its equivalent document;
and
- ☐ (c) Mayor’s or Business permit issued by the city or municipality where the principal place of business of the prospective bidder is located, or the equivalent document for Exclusive Economic Zones or Areas;
and
- ☐ (e) Tax clearance per E.O. No. 398, s. 2005, as finally reviewed and approved by the Bureau of Internal Revenue (BIR).

Technical Documents

- ☐ (f) Statement of the prospective bidder of all its ongoing government and private contracts, including contracts awarded but not yet started, if any, whether similar or not similar in nature and complexity to the contract to be bid; **and**
- ☐ (g) Statement of the bidder’s Single Largest Completed Contract (SLCC) similar to the contract to be bid, except under conditions provided under the rules;
and
- ☐ (h) Philippine Contractors Accreditation Board (PCAB) License;
or
Special PCAB License in case of Joint Ventures;
and registration for the type and cost of the contract to be bid; **and**
- ☐ (i) Original copy of Bid Security. If in the form of a Surety Bond, submit also a certification issued by the Insurance Commission;
or
Original copy of Notarized Bid Securing Declaration; **and**
- ☐ (j) Project Requirements, which shall include the following:
 - ☐ a. Organizational chart for the contract to be bid;
 - ☐ b. List of contractor’s key personnel (e.g., Project Manager, Project Engineers, Materials Engineers, and Foremen), to be assigned to the contract to be bid, with their complete qualification and experience data;
 - ☐ c. List of contractor’s major equipment units, which are owned, leased, and/or under purchase agreements, supported by proof of ownership or certification of availability of equipment from the equipment lessor/vendor for the duration of the project, as the case may be; **and**
- ☐ (k) Original duly signed Omnibus Sworn Statement (OSS);

and if applicable, Original Notarized Secretary's Certificate in case of a corporation, partnership, or cooperative; or Original Special Power of Attorney of all members of the joint venture giving full power and authority to its officer to sign the OSS and do acts to represent the Bidder.

- ☐ (l) Statement of Exclusivity (the bidder must certify that the foregoing personnel shall perform work and equipment shall be used exclusively for the project until completion of the project. Please see the attached Form for the purpose.)
- ☐ (m) Certificate or Affidavit of Site Inspection
- ☐ (n) Additional Contract Documents

Financial Documents

- ☐ (o) The prospective bidder's audited financial statements, showing, among others, the prospective bidder's total and current assets and liabilities, stamped "received" by the BIR or its duly accredited and authorized institutions, for the preceding calendar year which should not be earlier than two (2) years from the date of bid submission; **and**
- ☐ (p) The prospective bidder's computation of Net Financial Contracting Capacity (NFCC).

Class "B" Documents

- ☐ (q) If applicable, duly signed joint venture agreement (JVA) in accordance with RA No. 4566 and its IRR in case the joint venture is already in existence;
or
duly notarized statements from all the potential joint venture partners stating that they will enter into and abide by the provisions of the JVA in the instance that the bid is successful.

II. FINANCIAL COMPONENT ENVELOPE

- ☐ (r) Original of duly signed and accomplished Financial Bid Form; **and**

Other documentary requirements under RA No. 9184

- ☐ (s) Original of duly signed Bid Prices in the Bill of Quantities; **and**
- ☐ (t) Duly accomplished Detailed Estimates Form, including a summary sheet indicating the unit prices of construction materials, labor rates, and equipment rentals used in coming up with the Bid; **and**
- ☐ (u) Cash Flow by Quarter.



Republic of the Philippines
Tourism Infrastructure & Enterprise Zone Authority
MANPOWER & EQUIPMENT

Project: RECONSTRUCTION OF RETROFITTING OF SAN AGUSTIN CHURCH
Location : San Nicolas 1st Lubao, Pampanga
Duration: 180 CD
Mode of Implementation: By Contract

| Minimum Required Manpower | Quantity |
|---------------------------|----------|
| Project Manager | 1 |
| Project Engineer | 1 |
| Materials Engineer | 1 |
| Project Foreman | 1 |
| Skilled Worker | 38 |
| Helper/Laborer | 78 |
| Safety Officer | 1 |
| First Aider | 1 |

| Minimum Required Equipment | Quantity |
|----------------------------|----------|
| Basic Construction Tools | 1 |
| Welding Machine | 1 |
| Shoring Jack | 62 |
| one bagger mixer | 1 |
| Bar cutter | 1 |
| Bar bender | 1 |
| Plate Compactor | 1 |

Prepared by:

NEMENCIO G. DURAN
Estimator

Check by:

NOEL F. YAMBAO
OIC - Manager - PMD

Noted by:

JEFFREY L. MACALALAD
Manager - PEPD

PEPD.QF.06

Bid Form for the Procurement of Infrastructure Projects
[shall be submitted with the Bid]

BID FORM

Date : _____
Project Identification No. : _____

To: *[name and address of Procuring Entity]*

Having examined the Philippine Bidding Documents (PBDs) including the Supplemental or Bid Bulletin Numbers *[insert numbers]*, the receipt of which is hereby duly acknowledged, we, the undersigned, declare that:

- a. We have no reservation to the PBDs, including the Supplemental or Bid Bulletins, for the Procurement Project: *[insert name of contract]*;
- b. We offer to execute the Works for this Contract in accordance with the PBDs;
- c. The total price of our Bid in words and figures, excluding any discounts offered below is: *[insert information]*;
- d. The discounts offered and the methodology for their application are: *[insert information]*;
- e. The total bid price includes the cost of all taxes, such as, but not limited to: *[specify the applicable taxes, e.g. (i) value added tax (VAT), (ii) income tax, (iii) local taxes, and (iv) other fiscal levies and duties]*, which are itemized herein and reflected in the detailed estimates,
- f. Our Bid shall be valid within the a period stated in the PBDs, and it shall remain binding upon us at any time before the expiration of that period;
- g. If our Bid is accepted, we commit to obtain a Performance Security in the amount of *[insert percentage amount]* percent of the Contract Price for the due performance of the Contract, or a Performance Securing Declaration in lieu of the the allowable forms of Performance Security, subject to the terms and conditions of issued GPPB guidelines¹ for this purpose;
- h. We are not participating, as Bidders, in more than one Bid in this bidding process, other than alternative offers in accordance with the Bidding Documents;
- i. We understand that this Bid, together with your written acceptance thereof included in your notification of award, shall constitute a binding contract between us, until a formal Contract is prepared and executed; and
- j. We understand that you are not bound to accept the Lowest Calculated Bid or any other Bid that you may receive.

¹ currently based on GPPB Resolution No. 09-2020

- k. We likewise certify/confirm that the undersigned, is the duly authorized representative of the bidder, and granted full power and authority to do, execute and perform any and all acts necessary to participate, submit the bid, and to sign and execute the ensuing contract for the [Name of Project] of the [Name of the Procuring Entity].
- l. We acknowledge that failure to sign each and every page of this Bid Form, including the Bill of Quantities, shall be a ground for the rejection of our bid.

Name: _____

Legal Capacity: _____

Signature: _____

Duly authorized to sign the Bid for and behalf of: _____

Date: _____

Bid Securing Declaration Form

[shall be submitted with the Bid if bidder opts to provide this form of bid security]

REPUBLIC OF THE PHILIPPINES)
CITY OF _____) S.S.

BID SECURING DECLARATION **Project Identification No.: *[Insert number]***

To: *[Insert name and address of the Procuring Entity]*

I/We, the undersigned, declare that:

1. I/We understand that, according to your conditions, bids must be supported by a Bid Security, which may be in the form of a Bid Securing Declaration.
2. I/We accept that: (a) I/we will be automatically disqualified from bidding for any procurement contract with any procuring entity for a period of two (2) years upon receipt of your Blacklisting Order; and, (b) I/we will pay the applicable fine provided under Section 6 of the Guidelines on the Use of Bid Securing Declaration, within fifteen (15) days from receipt of the written demand by the procuring entity for the commission of acts resulting to the enforcement of the bid securing declaration under Sections 23.1(b), 34.2, 40.1 and 69.1, except 69.1(f), of the IRR of RA No. 9184; without prejudice to other legal action the government may undertake.
3. I/We understand that this Bid Securing Declaration shall cease to be valid on the following circumstances:
 - a. Upon expiration of the bid validity period, or any extension thereof pursuant to your request;
 - b. I am/we are declared ineligible or post-disqualified upon receipt of your notice to such effect, and (i) I/we failed to timely file a request for reconsideration or (ii) I/we filed a waiver to avail of said right; and
 - c. I am/we are declared the bidder with the Lowest Calculated Responsive Bid, and I/we have furnished the performance security and signed the Contract.

IN WITNESS WHEREOF, I/We have hereunto set my/our hand/s this ____ day of *[month]* *[year]* at *[place of execution]*.

[Insert NAME OF BIDDER OR ITS AUTHORIZED REPRESENTATIVE]

[Insert signatory's legal capacity]

Affiant

[Jurat]

[Format shall be based on the latest Rules on Notarial Practice]

Omnibus Sworn Statement (Revised)

[shall be submitted with the Bid]

REPUBLIC OF THE PHILIPPINES)
CITY/MUNICIPALITY OF _____) S.S.

AFFIDAVIT

I, [Name of Affiant], of legal age, [Civil Status], [Nationality], and residing at [Address of Affiant], after having been duly sworn in accordance with law, do hereby depose and state that:

1. *[Select one, delete the other:]*

[If a sole proprietorship:] I am the sole proprietor or authorized representative of [Name of Bidder] with office address at [address of Bidder];

[If a partnership, corporation, cooperative, or joint venture:] I am the duly authorized and designated representative of [Name of Bidder] with office address at [address of Bidder];

2. *[Select one, delete the other:]*

[If a sole proprietorship:] As the owner and sole proprietor, or authorized representative of [Name of Bidder], I have full power and authority to do, execute and perform any and all acts necessary to participate, submit the bid, and to sign and execute the ensuing contract for [Name of the Project] of the [Name of the Procuring Entity], as shown in the attached duly notarized Special Power of Attorney;

[If a partnership, corporation, cooperative, or joint venture:] I am granted full power and authority to do, execute and perform any and all acts necessary to participate, submit the bid, and to sign and execute the ensuing contract for [Name of the Project] of the [Name of the Procuring Entity], as shown in the attached [state title of attached document showing proof of authorization (e.g., duly notarized Secretary's Certificate, Board/Partnership Resolution, or Special Power of Attorney, whichever is applicable;)];

3. [Name of Bidder] is not "blacklisted" or barred from bidding by the Government of the Philippines or any of its agencies, offices, corporations, or Local Government Units, foreign government/foreign or international financing institution whose blacklisting rules have been recognized by the Government Procurement Policy Board, **by itself or by relation, membership, association, affiliation, or controlling interest with another blacklisted person or entity as defined and provided for in the Uniform Guidelines on Blacklisting;**

4. Each of the documents submitted in satisfaction of the bidding requirements is an authentic copy of the original, complete, and all statements and information provided therein are true and correct;

5. [Name of Bidder] is authorizing the Head of the Procuring Entity or its duly authorized representative(s) to verify all the documents submitted;

6. *[Select one, delete the rest:]*

[If a sole proprietorship:] The owner or sole proprietor is not related to the Head of the Procuring Entity, members of the Bids and Awards Committee (BAC), the Technical

Working Group, and the BAC Secretariat, the head of the Project Management Office or the end-user unit, and the project consultants by consanguinity or affinity up to the third civil degree;

[If a partnership or cooperative:] None of the officers and members of *[Name of Bidder]* is related to the Head of the Procuring Entity, members of the Bids and Awards Committee (BAC), the Technical Working Group, and the BAC Secretariat, the head of the Project Management Office or the end-user unit, and the project consultants by consanguinity or affinity up to the third civil degree;

[If a corporation or joint venture:] None of the officers, directors, and controlling stockholders of *[Name of Bidder]* is related to the Head of the Procuring Entity, members of the Bids and Awards Committee (BAC), the Technical Working Group, and the BAC Secretariat, the head of the Project Management Office or the end-user unit, and the project consultants by consanguinity or affinity up to the third civil degree;

7. *[Name of Bidder]* complies with existing labor laws and standards; and
8. *[Name of Bidder]* is aware of and has undertaken the responsibilities as a Bidder in compliance with the Philippine Bidding Documents, which includes:
 - a. Carefully examining all of the Bidding Documents;
 - b. Acknowledging all conditions, local or otherwise, affecting the implementation of the Contract;
 - c. Making an estimate of the facilities available and needed for the contract to be bid, if any; and
 - d. Inquiring or securing Supplemental/Bid Bulletin(s) issued for the *[Name of the Project]*.
9. *[Name of Bidder]* did not give or pay directly or indirectly, any commission, amount, fee, or any form of consideration, pecuniary or otherwise, to any person or official, personnel or representative of the government in relation to any procurement project or activity.
10. **In case advance payment was made or given, failure to perform or deliver any of the obligations and undertakings in the contract shall be sufficient grounds to constitute criminal liability for Swindling (Estafa) or the commission of fraud with unfaithfulness or abuse of confidence through misappropriating or converting any payment received by a person or entity under an obligation involving the duty to deliver certain goods or services, to the prejudice of the public and the government of the Philippines pursuant to Article 315 of Act No. 3815 s. 1930, as amended, or the Revised Penal Code.**

IN WITNESS WHEREOF, I have hereunto set my hand this ____ day of ____, 20__ at _____, Philippines.

[Insert NAME OF BIDDER OR ITS AUTHORIZED REPRESENTATIVE]

[Insert signatory's legal capacity]
Affiant

[Jurat]

[Format shall be based on the latest Rules on Notarial Practice]

STATEMENT OF EXCLUSIVITY

I certify that the personnel and the equipment pledged for the bidding for (name of the project) shall be **exclusively used** for the project during its entire duration.

(Date)

(Authorized Representative)

Name of contractor

Signature

IN WITNESS WHEREOF, I have hereunto set my hand this ___ day of ___, 20__ at _____, Philippines.

NAME OF NOTARY PUBLIC

Serial No. of Commission _____

Notary Public for _____ until _____

Roll of Attorneys No. _____

PTR No. _____

IBP No. _____

Doc. No. _____

Page No. _____

Book No. _____

Series of _____

