

CITY OF NORCO REDEVELOPMENT AGENCY

August 8, 2005

Mr. Anthony J. Principi
Chairman
Base Realignment and Closure Commission
2521 So. Clark Street, Suite 600
Arlington, VA 22202

Dear Chairman Principi,

At the July 14, 2005 Los Angeles regional hearing, Captain Edward Schwier, USN (Retired) and I had the honor of presenting the community's case in support of retaining Naval Surface Warfare Center (NSWC) Corona Division at its current location. I believe the evidence presented during the hearing demonstrated conclusively that the Defense Department's recommendation to move NSWC Corona to Naval Base Ventura County (NBVC)(Pt Mugu) is fundamentally flawed and would cause significant operational risk with no financial benefit.

Further research by the community has revealed additional facts that, when coupled with information presented during the regional hearing, argue persuasively that the Department deviated substantially in its analysis and justification.

During the community's formal presentation several questions were asked of the panel that warrant a fuller response. Specifically, you and Commissioner Coyle asked Captain Schwier:

1. What is the community's estimate for replicating NSWC Corona's technical facilities at Naval Base Ventura County (Pt Mugu)?
2. Can the community provide specific examples which illustrate the selective inclusion and exclusion of data that negatively impacted NSWC Corona's overall military value ranking?; and
3. Why can't NSWC Corona's primary mission of providing independent assessment of military systems, platforms and training readiness be preserved if it is moved to Naval Base Ventura County (Pt Mugu)?

I would like to formally respond to these questions and provide you and the Commission with additional data in support of retaining the warfare center at Corona.

Cost to Replicate NSWC Corona's Technical Facilities

The most problematic aspect of the Corona closure proposal is the replication of two one-of-a-kind facilities at NBVC (Pt Mugu). As the Commission well knows, the Navy allocated no money for the construction of two highly customized facilities: the Joint Warfare Assessment Laboratory (JWAL) and the Measure Science Technology Laboratory (MSTL). Instead, the Navy assumed it could simply retrofit vacated existing buildings – an assumption that is widely disputed both inside and out of the military service.

To formally address the Navy's military construction cost estimates, the community hired a leading engineering firm, Bechtel Corp., to conduct a third-party cost study for relocation of the JWAL and MSTL structures. While I have enclosed the full Bechtel report for your review I would like to highlight several key findings:

- Construction costs for building new the JWAL and MSTL, and two auxiliary buildings, is \$59.3 million in current dollars. (Not included in this estimate is the cost to renovate other Pt Mugu facilities which are needed to house personnel and missions for other NSWC technical capabilities.)
- This report assumes only replication of facilities and does not account for many other potentially significant costs (such as noise or vibration isolation, structural enhancements to account for water table and depth to bedrock, and construction dewatering) associated with construction of new facilities at Pt Mugu.
- The study notes that extensive ambient vibration and noise analysis would have to be accomplished to determine if the MSTL could even be constructed at NBVC (Pt Mugu) given the facilities operational requirements.
- Additional studies and costs associated with the liquefaction potential due to earthquakes, tsunamis and other induced flooding, and construction impacts due to the water table at Pt. Mugu have not been included in this cost estimate and thus would be required or recommended.

As we noted at the Regional Hearing, the addition of more than \$55 million of initial cost to the COBRA analysis pushes the breakeven payback period to over 100 years. This report not only clearly supports our contention that cost is grossly underestimated, but that the risk to the mission is similarly underestimated. Without a definitive study to support the feasibility of replicating the MSTL and JWAL capabilities at the Pt. Mugu site, given the unknowns identified earlier in this paragraph, it is unconscionable that a decision to relocate would be seriously considered.

DOD/USN Subjective Calculation of Corona's Military Value

As the Commission is aware, the Defense Department's Technical Joint Cross Service Group (TJCSG) evaluated individual technical facilities in 39 discrete areas: three functional capabilities (Research, Development & Acquisition, and Test & Evaluation)

across 13 functional fields (e.g., sensors, air platforms, information technology, etc.). An elaborate mathematical formula was developed in an effort to quantify the value of work each facility performed in one or more of the 39 technical “bins.” Based on the derived scores, a facility would then be ranked in order of its scores. The facility receiving the highest score received the number one rank and the facility with the lowest score was placed at the bottom.

Remarkably, however, the TJCSG decided to eliminate from consideration and ranking any facility that performed work below an arbitrarily set threshold regardless of its score. The net effect of this decision was to rank individual facilities against a smaller subset of facilities instead of ranking all military facilities that conduct technical research, development & acquisition, or test & evaluation.

This decision by the TJCSG appears both capricious and intellectually questionable, and more importantly, results in highly skewed results. To illustrate this point, a table is provided below which compares NSWC Corona’s initial rankings when all facilities/activities were included with the final rankings when the majority of activities are excluded from evaluation.

TJCSG Tech Areas Table Reference ¹	NSWC Corona’s Initial Ranking <u>All</u> Activities Evaluated ¹	Percentage Ranking (100% Test 0% Work)	Number of Activities Excluded by TJCSG From Final Calculations ²	Final Ranking <u>Excluding</u> Selective Activities ²	Percentage Ranking	NSWC Corona Work Years in Tech Areas
3.1	10/67	83%	51	9/16	83%	26
3.3	16/51	69%	29	12/22	55%	67
3.13	9/25	68%	*	*	68%	0
3.15	9/27	67%	19	7/8	88%	21
3.19	17/105	64%	63	15/42	36%	202
3.20	68/68	91%	*	*	91%	0*
3.21	16/72	78%	51	12/21	57%	77
3.24	17/44	61%	*	*	61%	0
3.28	16/33	52%	22	10/11	91%	8
3.30	12/33	64%	27	5/6	83%	40
3.31	17/103	63%	75	17/28	61%	36
3.33	14/72	81%	52	12/20	60%	132
3.37	21/78	73%	55	14/23	61%	202
3.39	19/70	73%	50	9/20	45%	126

Note 1: Data taken from Appendix B of TJCSG Analysis & Recommendation, Vol XII

Note 2: Data taken from DON-0161B Military Value and Capacity Reports 29 March 2005

* NSWC Corona has no workyears in these areas and was not included in the final military rankings.

Clearly, a fairer, more statistically honest process would be to evaluate a facility against all competitors which perform work in a given “bin.” When this more rigorous standard is applied, NSWC Corona achieves an overall ranking of 72% -- a number which approaches the upper quartile of all technical facilities. This is significant given the

erroneous assertion by DOD in its final recommendations that “in each functional area, NSWC Corona’s quantitative military value scores fell in the bottom half of facilities performing the same function.” This statement is more than misleading; it is factually and demonstratively wrong.

It should also be noted that the Corona recommendation would in effect be sending a facility to a base with a lower military value ranking. This statement is borne out when one considers that, of the 13 technical areas in which both Corona and Pt Mugu were evaluated, Corona is ranked higher (relative to Pt Mugu) in 5 of these technical areas while Pt Mugu is ranked above Corona in only 4 (once DOD recommended missions are transferred from Pt Mugu to China Lake). This fact again highlights the faulty and subjective nature of the entire military value quantitative exercise.

Preservation of Independent Assessment

During the NSWC Corona base visit on July 12, 2005, Commissioner Bilbray asked a base official if Corona’s missions could be relocated. In reply, the base commander stated that Corona’s principle mission of providing independent assessment could be moved *provided* three capabilities were preserved:

1. Corona’s workforce
2. Corona’s processes
3. Corona’s facilities

Loss of any one of these three critical capabilities would endanger Corona’s independent assessment mission. A reasonable analysis of the proposed move demonstrates that the first two capabilities would be irreparably undermined while the Department would be forced to spend an exorbitant amount of money to maintain the third element.

Historically, as demonstrated by past BRAC actions, only 15-20% of a closed installation’s workforce will agree to relocate. A recent survey of NSWC Corona personnel indicated that only 18% would be willing to leave the Corona area should the base be shuttered. Even if that number is doubled, that still leaves the base without a qualified functional workforce equipped to maintain service to the fleet. Additionally, co-locating Corona’s independent assessment mission onto a base that performs functions that are subject to or require Corona’s assessment capability will erode the cultural ethos of “speaking truth” to higher authority and ultimately compromise the performance of independent assessment. Maintaining a physical separation, as well as a distinct chain-of-command, has proven to be the most effective and surest way to safeguard the flow of critical information for high-level DOD decision-makers.

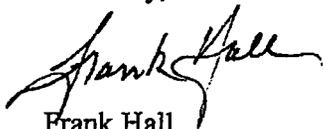
It is worth noting that the in-service engineering agents (ISEA) at both Naval Base Ventura County and China Lake are foremost program management agents and are driven by cost and schedule concerns. Co-locating the independent assessment function with an ISEA, even if a separate chain of command reporting exists, still creates a significant potential for conflict and compromise. To illustrate this point, consider that

three specific programs -- fuzing, telemetry, and threat simulation -- are major activities at Naval Base Ventura County and China Lake that NSWC must independently assess. As was noted in the Regional Hearing, assessment and fuse development/production were both organizationally and physically separated for good reason when the Fleet Missile System Analysis and Evaluation Group (NSWC's predecessor) was established in Corona.

As stated above, the Defense Department's personnel analysis grossly over estimates the number of personnel willing to relocate to Ventura County, California. While failure to maintain a sufficient intellectual workforce has serious operational implications, it also carries significant costs that are not adequately captured in the military's COBRA results. Past experience and common sense dictate that the Navy will have to expend considerable financial resources to recruit, train, integrate and promote qualified engineers in an effort to replicate the award winning team at Corona. Depending on the position and technical expertise that must be backfilled, cost to replace the lost talent can range from \$70,000 to \$150,000 per year for 5-10 years. While the community believes the estimates are reasonable (if not conservatively low) they were excluded from the community-generated COBRA. And yet, even without these additional costs, the revised COBRA produced a payback of greater than 100 years by simply including widely acknowledged additional military construction and excluded contractor costs.

Mr. Chairman, NSWC Corona has an exemplarily track record of providing critical service to our nation's warfighters while simultaneously saving millions of dollars in the process. Risking this established, highly efficient national treasure for some illusionary benefit is both risky and not in our nation's best interest. I urge the Commission to consider the information provided here, as well as at the regional hearing, and reject the proposed closure of NSWC Corona.

Sincerely,



Frank Hall
Norco City Councilmember

103-06A – NMC30 – Community Input
Navy/MC – Naval Support Activity Corona - CA
BRAC COMMISSION – FY 2005
COFF: _____ DISPOSITION: Permanent



Project No. 20056

**Cost Study for the Structures of the
Measurement Science & Technology Laboratory
(MSTL)
and the
Joint Warfare Assessment Laboratory
(JWAL)
at NSWC Corona Division**

For Official Use Only

August 5, 2005

Rev. A

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Executive Summary of Structural Costs associated with the MSTL and JWAL

This report provides a conceptual assessment of the structure costs for the Measurement Science and Technology Laboratory (MSTL) and the Joint Warfare Assessment Laboratory (JWAL) and associated facilities, located at NAVSEA in Norco, CA. This assessment serves as a preliminary analysis of the structural components of the costs associated with moving these facilities to Pt. Mugu, and was done at the request of the Riverside County Transportation Commission (RCTC). All other elements and considerations of relocating the subject facilities are not a part of this estimate.

The estimate determined that the current cost to reconstruct the JWAL, MSTL and associated structures at Norco is approximately \$49 million, and to reconstruct these same facilities at the Pt. Mugu site is approximately \$59 million. The primary difference between these two sites is the requirement for specialized foundation treatment at the Pt. Mugu site.

This conceptual cost estimate was performed by first establishing the current year (2005) pricing, based on the existing facility configurations at Norco, CA. This conceptual estimate for the Norco facility configuration was then adjusted to reflect them being reconstructed at the Pt. Mugu site. In addition, based on input from a visit to the Pt. Mugu site, the adaptive reuse potential of several of the existing Pt. Mugu structures was also briefly considered.

In order to accomplish this task in the two week time frame that was provided, certain assumptions had to be made regarding key design elements and criteria for the structures at Pt. Mugu. The validation of some of the assumptions will require additional investigations at the Pt. Mugu site. Examples of these validations for the reconstructed facilities include performing detailed investigations for the foundations, mitigation associated with potential liquefaction, etc. Examples of investigations for the adaptive facility re-use option include seismic and current codes compliance, as well as other criteria deployed at the Norco site.

In addition to the assumptions made to complete the cost estimate, other site related issues were identified for the proposed relocation site that merit consideration and may impact the estimate as well as the functional operation of the facilities. These issues include: a high water table, the depth to bed rock and other foundation requirements, the potential impact from a tsunami event, the proximity of potentially conflicting sources of vibration such as aircraft operations that may be as close as 750 feet, rocket-assisted target launches that may impact the sensitive measuring equipment contained in the MSTL, and climatic conditions that may require additional care to protect the sensitive materials transferred into and out of the MSTL.

As stated above, this conceptual cost estimate only considers the cost associated with the structures themselves. As such, this cost estimate does not include costs for items

such as the relocation of personnel, retraining, base closure costs, environmental mitigation, hazardous waste removal, re-procurement of equipment and furnishings in lieu of moving items that have become obsolete (except cranes), relocation of equipment and furnishings, or tsunami related mitigation.

If adaptive re-use of some of the facilities at the Pt. Mugu site is considered, there could be a savings realized that would mitigate a portion of the relocation costs. Adaptive re-use would not be applicable for the MSTL structure; however it may be applicable to Lab Bldg. 517 and the MSTL storage facility. The adaptive re-use approach may be valid for the JWAL facility as well, but with greater uncertainty. The evaluation team did not have the opportunity to perform a detailed analysis of the proposed structure that would be used for the JWAL facility because it was unavailable at the time of the site visit due to on-going secured operations. Time constraints also did not allow for a seismic assessment, that would demonstrate that the existing structure would meet the unique design features for JWAL structure, if modified.

1. Introduction

The purpose of this report is to provide a conceptual-level comparison of structure costs of two Navy facilities – the Measurement Sciences and Technology Laboratory (MSTL) and the Joint Warfare Assessment Laboratory (JWAL) described in Part 2.0 – currently located at NAVSEA, Corona Division in the town of Norco in Riverside County that are being considered for relocation to Point Mugu in Ventura County (Figure 1).

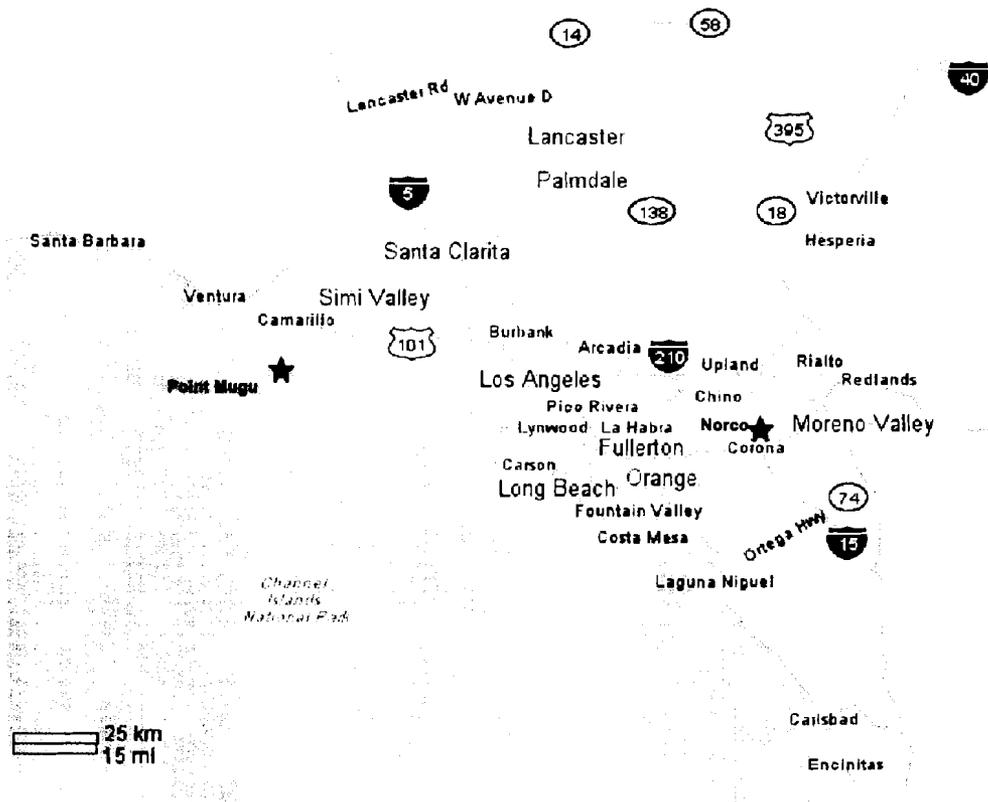


Figure 1-1 – Current location of MSTL and JWAL (Norco, California) and proposed new location (Point Mugu, California)

The team preparing this estimate visited the existing facilities in Norco, California, and the proposed new location in Point Mugu, California, reviewed construction drawings for the MSTL and JWAL, previously prepared cost estimates and awarded contract amounts, and briefly interviewed facility managers. The estimate in this report only covers the construction of new or upgraded facilities. It does not include any costs associated with the following: the release or relocation of personnel or additional training requirements if any, as well as purchasing, moving, set-up and calibration of testing equipment, or computer hardware, display screens or other data equipment and set-up. The general scope of this estimate is summarized in Table 1-1, following.

TABLE 1-1 – Cost Study Scope

Project Location	Existing structures -- Norco, CA (Riverside County) New location – Pt. Mugu, CA (Ventura County)
Project Scope	Provide conceptual cost estimates for the construction of new MSTL and JWAL facilities at NORCO and adjustments to the estimate to reconstruct them at Pt. Mugu. For Pt. Mugu existing facilities may be used for MSTL support facilities and JWAL facilities. A range of adjustments to the cost estimate for use of such existing facilities, has been also developed.
Project Duration	Start July 21 - Completion August 5, 2005
Key Project Dates	Site visit – Norco July 25, 2005, Site visit Pt. Mugu August 1, 2005 Internal (project team) text/cost review August 1, 2005 Bechtel review August 3, 2005 Review with client August 4, 2005
Estimate Scope	The estimate will include the capital construction cost and soft costs for replication of the MSTL and JWAL facilities at the Norco and Point Mugu locations. The following is a brief description of the two specialized lab buildings (and related facilities); MSTL 1- The measurement science/metrology lab, (MSTL). This is a Calibration Standards Lab, much like a NIST building (68 degrees plus or minus 1/2 to 1/4 a degree, plus vibration mitigation issues). The MSTL is currently located at Naval Surface Warfare Center, Corona Division in Riverside County and is proposed to be rebuilt at NAS, Point Mugu in Ventura County. The MSTL is 39,000 SF, with foundations built down into bedrock. 2- In addition to the MSTL building, but essential to the program, is Building 517. This is a 12,000 sf testing lab that houses the Instrument Calibration Program Laboratory. 3- There is outdoor storage for the MSTL, as well as a separate storage building. Due to the climate conditions at Pt. Magu, the recommended storage facility would be a 13,000 sf pre-engineered building. JWAL 1- Joint Warfare Assessment Lab (JWAL) currently located at Naval Surface Warfare Center, Corona Division in Riverside County at NAS, Point Mugu in Ventura County. The JWAL is 48,000 sq ft SCIF (40,000 sealed to the Top Secret Level with 7,000 sq ft of that super sealed to the Top Secret-Specialized Compartmentalized Information level.) Requirements include an uninterruptible power supply and the ability to withstand a 8.0 earthquake. Essentially, due to the shielding built into the walls, the entire JWAL becomes a TS/SCI level vault when the doors are closed. 2- In addition, there is an approved expansion of the JWAL; the planned military construction project (MilCon P-008) will add about 40,000 more sq ft of secure office and project room space at the TS/SCI level. The planned P-008 is set for \$10 million and will be added on to the current structure for a grand total of about 88,000 sq ft.
Type of Estimate	<u>Conceptual Estimate</u> to assist in establishing priorities for decision making and to aid in evaluating the potential cost of performing the tasks identified. These estimates cannot be relied upon to establish funding levels for individual tasks, as neither preliminary or detail design engineering has been performed in sufficient detail to provide quantities from which to estimate. Therefore, great caution should be used in utilizing these rough order of magnitude numbers for anything other than preliminary prioritization purposes.

2. Existing Facilities Description

The facilities at NAVSEA, Corona Division proposed for relocation are the Measurement Sciences and Technology Laboratory (MSTL), its related testing and storage buildings, and the Joint Warfare Assessment Laboratory (JWAL). These facilities are located within close proximity at the Norco, California base. (Figure 2-1.)

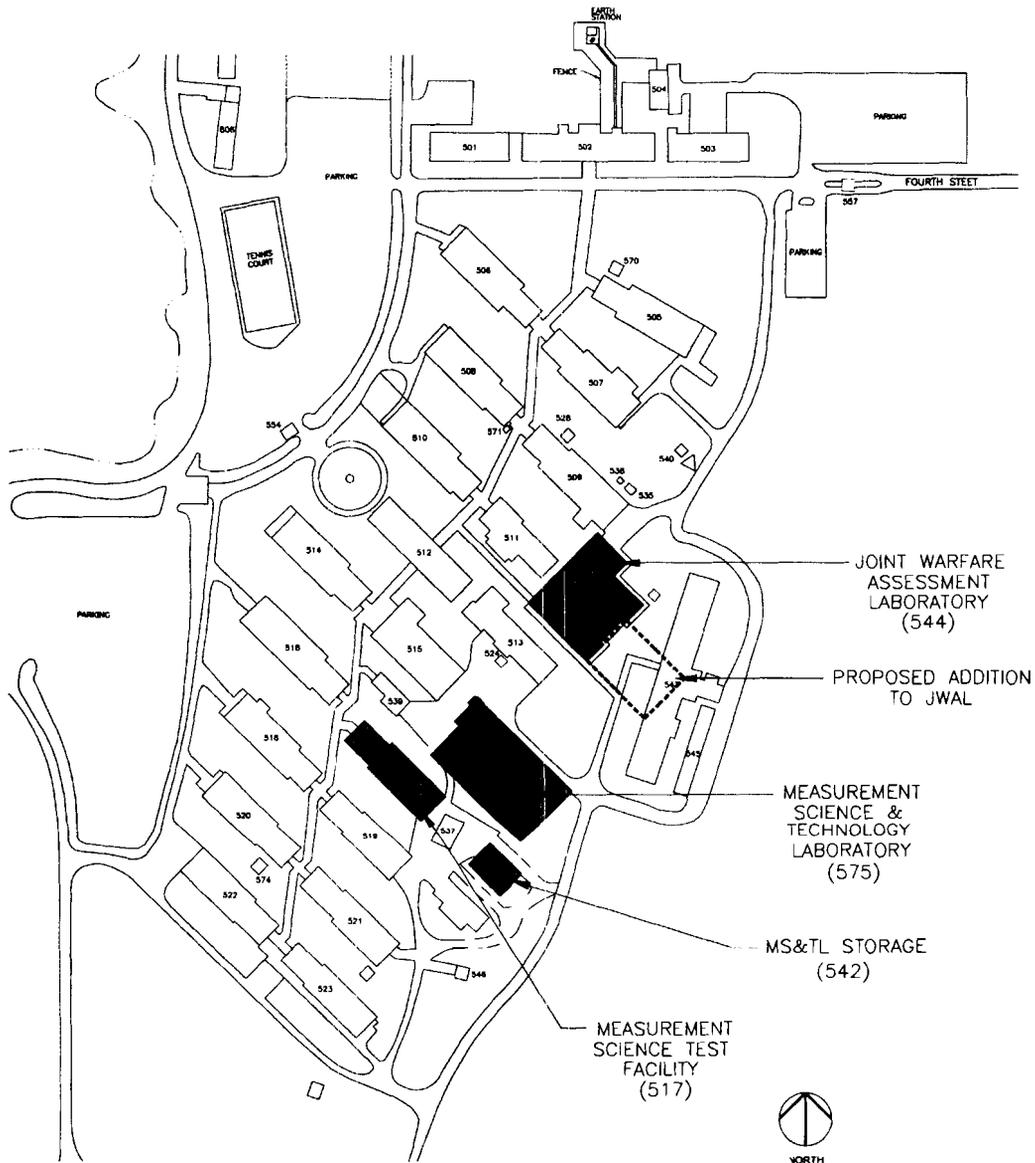


Figure 2-1 – Site Plan of affected facilities at NAVSEA, Corona Division, Norco, Riverside County

The following is a brief description of the buildings in question. Selected drawings for the primary facilities (MSTL and JWAL) are included in the Attachments at the end of

this report. NOTE: Each description below includes paving and site improvements within the facility description / scope; co-locating facilities on same site could result in integration of these requirements.

MEASUREMENT SCIENCE & TECHNOLOGY LABORATORY (MSTL) – BLDG 575:

The structure provides functionally configured facilities to house the measurement science, gage, optical/dimensional, force and electro-optical laboratory operations. The facility must be isolated from sources of both vibration and electromagnetic radiation. The facility houses a staff of approximately 45. The facility can be generally described as follows:

- Single story, steel frame building with high bays (up to 20 feet); concrete foundation, on bedrock; stud wall exterior with an Exterior Insulation and Finish System (EIFS); built-up roof over insulation and metal roof decking; approximately 39,000 gross square feet (base program - see below for additional requirements).
- Laboratories, warehousing and administration spaces
- Special crane systems using one monorail, two bridge and two jib cranes; large access doors into some laboratories
- Two deep concrete pits for special calibration machines
- Special mechanical system to control temperatures to ranges as restrictive as $\pm 0.5^{\circ}\text{F}$ and maintain humidity between 35% and 50% relative humidity; "clean-room" style air distribution requiring special interior partition framing
- Fire protections system, electrical system (including special electrical requirements such 480V power, etc.), tel/data system, security & surveillance systems, compressed air systems
- Vehicle loading/unloading area
- Paving, site utilities, site improvements

The MSTL currently utilizes paved outdoor space and approximately 10,000 SF of space in an adjacent building (Bldg, 542) for storage and will require approximately 12,000 SF of enclosed conditioned storage space to meet this requirement at the proposed new location.

MEASUREMENT SCIENCE TEST FACILITY - BLDG. 517:

This facility compliments the primary MSTL and tests procedures and processes developed in the MSTL. The required gross area is approximately 13,000 square feet. Unique features of this facility include:

- Does NOT require the same level of temperature, humidity, or vibration isolation as the primary MSTL
- Floor system must provide containment capability for spilled chemicals, such as mercury

- Fire protections system, electrical system, tel/data system and other systems (similar to MTSL, above)
- Vehicle loading/unloading area
- Paving, site utilities, site improvements

JOINT WARFARE ASSESSMENT LAB (JWAL)- BLDG. 544:

JWAL provides specially designed facilities for collaboration in the assessment of battle group performance through real-time secure communication and computer-based analysis tools. Key architectural components which facilitate this mission include the following:

- Entire building must be constructed to meet Director of Central Intelligence Directive (DCID) standards for SCI Level Space; one-foot thick cast-in-place concrete exterior walls with shielding
- Include a Protected Distribution System for data
- Redundant power supply (back-up generator)
- Re-configurable two-story theater, including 12 networked 10' display screens, 100 re-configurable computer work stations, accessible flooring, secure observation rooms
- Data vaults and SCIFs
- TLM Ground Station (12m satellite dish)
- Offices and conference rooms
- Fire protections system, electrical system, tel/data system and site utilities
- Vehicle loading/unloading area
- Paving, site improvements

The facility houses approximately 27 full-time employees, but must accommodate approximately an additional 150 engineers, scientists, programmers and support personnel during a Test Event. The existing facility is approximately 48,000 gross-square feet in area.

JOINT WARFARE ASSESSMENT LAB (JWAL) EXTENSION:

The proposed addition will provide space for the Performance Assessment Directorate (PAD) and will essentially extend the existing interior circulation and interior spaces. The facility will provide analysis and evaluation of performance of Navy tactical missile firings. Key architectural components which facilitate this mission include the following:

- Two-level steel-framed addition to Bldg. 544
- Level II Security (Open SECRET) throughout
- Offices and conference rooms; approximately 300 occupants

- Exterior – concrete walls; clay tile roof
- Approximately 39,000 gross square feet
- Fire protections system, electrical system, tel/data system and site utilities
- Paving, site improvements

3. Proposed Site Locations – Point Mugu

Two new construction sites and four existing facilities which are candidates for possible adaptive re-use were visited. The locations are shown in Figure 3.

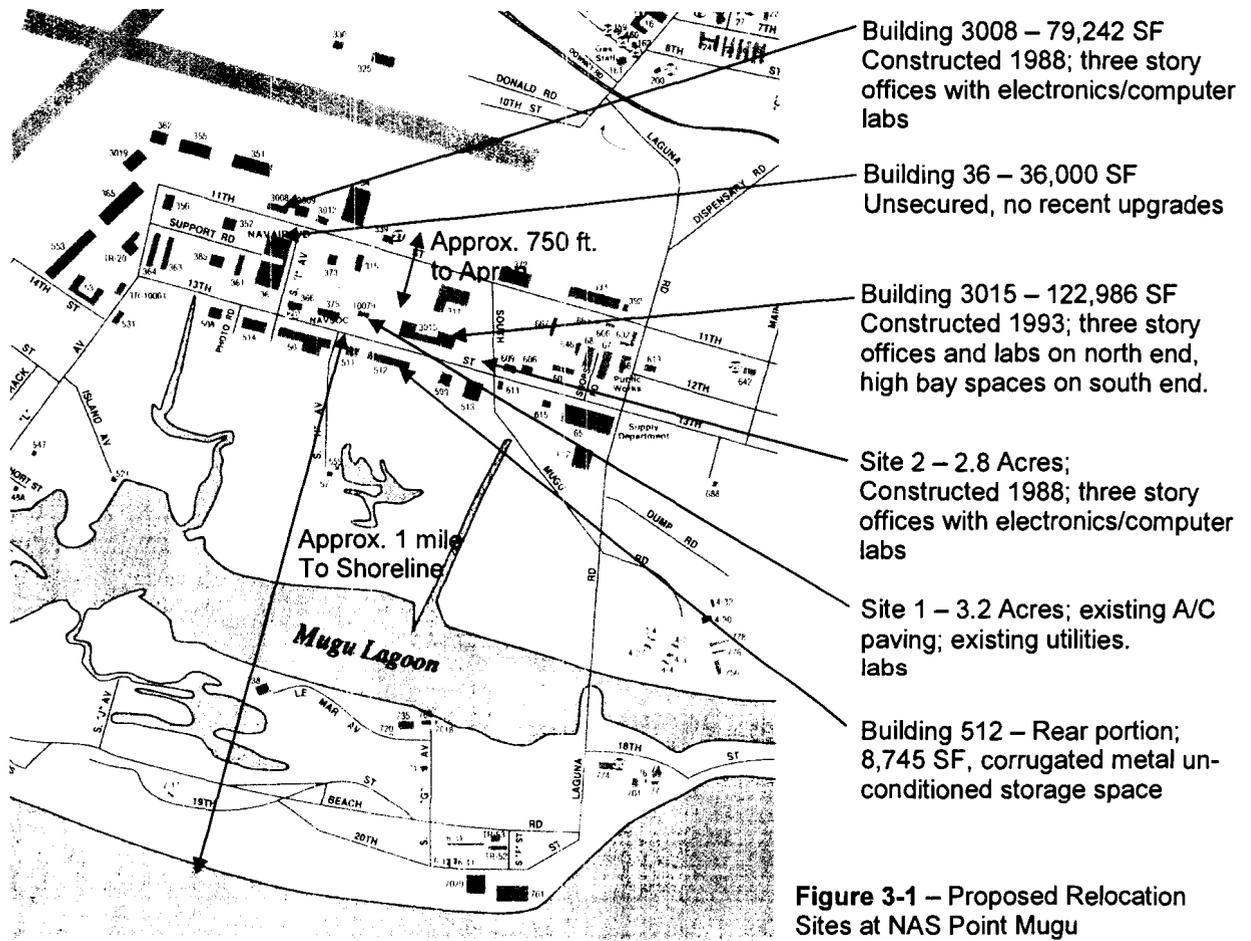


Figure 3-1 – Proposed Relocation Sites at NAS Point Mugu

The exteriors of the candidate buildings were observed, but no access was provided to the interior of these buildings, nor were plans or specifications provided.

4. Site Characteristics and Requirements

A comparison of the site-related characteristics at the NSWC Corona site and the NAS Point Mugu is shown in Table 2. This table was prepared assuming that the physical characteristics of the structures at Corona will largely be duplicated at Point Mugu. This table shows many of the more significant factors that need to be considered in performing a feasibility assessment for a particular site or comparing the merits of one site against another. Although the two sites are located in very different areas with respect to climate and geology, many of the attributes for the two sites are very similar and are not likely to create additional cost or design complexity. For example: Considering the highly variable and complex seismicity in the Los Angeles Basin the seismic design basis for the two sites is likely to be very similar in spite of the different soil classes and different basis for the determination of the seismicity. Of course, the site specific soil and ground water conditions and other design basis criteria will need to be established by a subsurface investigation program and other evaluation programs.

However, there is expected to be a marked difference in the foundation support conditions and the earthquake response of the soil during an earthquake at these two sites. The Corona buildings are supported on decomposed granite which is virtually incompressible and immune to earthquake effects. With these characteristics, it is possible to support all foundations, floors and equipment directly on the decomposed granite rock which helps to minimize vibration transfer from one portion of the building to another. The soil conditions at Point Mugu are anticipated to be much softer with a depth to bedrock estimated to be around 1500 feet. The upper soils are also expected to be either fills or sands below the water table that may be too soft to support the building foundations using shallow foundations and may also have the potential to be affected by the earthquake motion. Borings logs supplied from the adjacent Missile Systems Evaluation Laboratory (1989) show that the standard penetration blow counts in the sands and silts (a measure of soil strength and liquefaction potential) below the water table are quite low and therefore any structure will likely need deep foundations or ground improvement.

In order to address these soil settlement and seismic stability concerns for all planned structures and to maintain the soil-supported floors for the equipment to minimize vibration for the MSTL, a ground improvement methodology was selected rather than a pile supported foundation for the purpose of developing the estimate. This ground improvement methodology has been used successfully at similar sites such as the Mountain View power project in Redlands, California. Using ground improvement, the soil strength is increased and compressibility is decreased to approximately match the conditions at Corona. The technique selected is called vibro-replacement stone columns which consist of creating an open hole with a vibrating poker and then placing and compacting gravel as the poker is removed. This method replaces the loose soil with gravel and the vibration and compaction helps to densify the soil between the compaction points. With this technique, the foundation designs for both the MSTL and the JWAL can be adopted for use at Point Mugu. An added benefit of this method is that the soil improvement also increases the resistance of the soil against liquefaction.

Since the force machines in the MSTL have a more stringent criteria regarding settlement as a result of the long duration tests, during placement of the stone columns under the force machines cement will be added to further stiffen the soil. This will create Super Stone Columns for these critical components of the lab.

Another potential design factor, considering the coastal location of the Point Mugu site and the specific location of the site adjacent to the shore of the lagoon, is the potential effects of tsunamis, seiches and earthquake induced waves and the amplification of the water level. During communication with the Ventura County Office of Emergency Services, Dale Caranthan stated that the Maximum Probable water level that has been predicted for Ventura County was 10 m (33 feet) and this was based on consideration of past tsunamis along the Southern California coast. This water height is significantly greater than the assumed site grade of 11 feet. Mitigating this risk that could result in significant damage to the building along with the loss of the building contents is not included as part of this estimate.

Table 5-1 – Comparison of Site-Related Characteristics

Characteristic	NSWC - Corona	NAS Point Mugu	Considerations - Pt. Mugu
Site Elevation/Slope	EI. 659 to 669 ft./well sloped site grading	EI. 10 to 12 feet/ Flat	Possible tsunamis and local flooding
Local Geology	Decomposed granitic rock near surface. Site soil class - B	Fills and Quaternary Age sediments with thickness up to 1500 ft. Site soil class D or E.	Possible change in foundation concept and requirement to evaluate EQ effects.
Seismic Zonation	UBC Zone 4	UBC Zone 4	No change
Seismic Design Basis	Maximum Probable EQ (500 yr) – 0.54g	Maximum Probable EQ (500 yr) – 0.51g	Slight change due to soil class difference.
Surface Fault Rupture	No. Not in Alquist-Priolo Zone	No. Not in Alquist-Priolo Zone	No change
Liquefaction Potential	None	Significant earthquake level, high ground water table, fills and alluvial soils indicates liquefaction potential	Anticipate that liquefaction mitigation is required. Subject to site investigation and analysis.
Subsidence	None – on bed rock	Has not been observed	Not expected
Landslides	Not a site characteristic	Not a site characteristic	None required
Tsunamis, Seiches, EQ-Induced Flooding	None - Inland site	Coastal site with Maximum Probable Water Level of 10 m (33 ft).	Critical issue needing additional evaluation.
Local Site Flooding	None	Slight risk due to flat site and low lying site elevation.	Set door thresholds minimum of 18 inches above existing site grade
Depth to ground water	Greater than 25 feet	5 to 10 feet below ground surface	Construction dewatering impact for pit construction and site stability evaluation
General Climate	Relatively low humidity with average annual minimum temperature of 52 degrees F and average annual maximum temperature of 79 degrees F. Inland desert.	Moderately humid with average annual minimum temperature of 51 degrees F and average annual maximum temperature of 70 degrees F. Seaside atmosphere.	More consistent temperature pattern with lower and shorter peak temperature periods. Higher humidity and corrosive influence of sea air.
Ambient Vibration and Noise	Meets criteria of less than 0.001g at greater than 30 Hz. and less than 10 micro-inch at less than 30 Hz.	Impact of additional traffic, air operations, low frequency wave impact vibration and noise.	Evaluate ambient vibration and noise at Pt. Mugu and if necessary implement vibration isolation of equip in MSTL

5. Adaptive Re-Use of Existing NAS Point Mugu Structures

As described in "4.0 – Site Characteristics and Requirements", the vibration isolation requirements of the MSTL requires extensive site preparation and specialized foundation construction. Additionally, the need for high levels of temperature and humidity control necessitates specially designed HVAC systems. It has been previously determined (and is included as one of the basis of this cost study) that this will be a newly constructed facility. For the other program requirements, it has been suggested that existing surplus or to-be-surplus structures at Point Mugu can be adapted to meet the program requirements. As shown in Figure 3, several existing structures have been previously identified as potential candidates for retrofitting to meet the needs of these relocated programs. The exteriors of these buildings were observed on August 1, but no access was provided to the interior of these buildings, nor were plans or specifications provided. These structures are:

1. Building 36 – 36,000 gross square feet; one- and two-story office building; one of original base structures; not secure
2. Building 3008 – 79,242 gross square feet; three-story office and laboratory building including computer labs with accessible flooring; secure; built 1988
3. Building 3015 – 122,986 gross square feet; three-story office and laboratory building including computer labs with accessible flooring on north end, high bay laboratory and test spaces on south end; secure; built 1993
4. Portion of Building 512 – 8,745 gross square feet of high-bay, unconditioned storage space available at rear (west side) of building; not secure

The programs which are proposed to be accommodated in one or more of these structures include: JWAL (48,000 GSF), the JWAL addition (39,000 GSF), the Measurement Science Test Lab (13,000 GSF), and the MSTL conditioned storage space (12,000 GSF.)

Factors to be considered in the determination of the suitability of an existing structure, and the costs and practicality of an adaptive re-use scenario, include:

- Available area to meet program needs, including requirements for co-location of program elements
- Extent of modifications to the building systems required to meet current code requirements; this might include:
 - Life safety systems (including fire detection, alarm and suppression, smoke control, and exiting requirements)
 - UFC Accessibility requirements
 - UFC Anti-Terrorist requirements
 - Seismic upgrades

- Upgrades to building envelope, mechanical and electrical systems to meet current energy conservation and indoor air quality mandates
- Extent of modifications to the building systems required to meet program operational requirements; this might include:
 - Re-configuration of interior partitions to meet program requirements
 - Electrical and data systems upgrades (including classified data network and classified VTC)
 - Security upgrades to comply with DCID (including retrofitting to meet requirements for SCIF, which may involve construction of concrete- or steel-walled data vaults and other high security interior spaces within the existing structure, as well as retrofitting intrusion detection systems)

Due to security requirements surrounding the movement of classified devices between the facilities, the Measurement Science Test Lab and MSTL storage should be located within the same security perimeter as the MSTL. The proximity of Building 3015 to either of the identified new construction sites would facilitate a continuous security perimeter for these programs. Alternatively, these facilities should be co-located with the MSTL as new construction; both identified sites can accommodate the total gross area represented by this scenario.

Similarly, the JWAL and the JWAL Addition should be co-located. An additional parameter to be considered when selecting a candidate structure for adaptive re-use for the JWAL program element is the need for a two-storey clear space within the JWAL for the re-configurable theater, which is a key component of their operations. The existing structure which appears (based on visual observation from outside the building) to be most adaptable to this requirement is Building 3015; it is assumed creation of the requisite two-story auditorium space within building 3008 would necessitate removal of an intermediate floor and its supporting structure, with the addition of significant structural bracing.

Due to the non-contiguous locations and assumed extent of modifications and retrofitting required to accommodate both code and program requirements, Buildings 36 and 512 are not considered viable candidates for adaptive re-use for the re-located programs.

6. Assumptions and Exclusions

In addition to data provided by others, such as building plans, previous costs, and site information, various assumptions were used as the basis of this cost study. To provide further clarification as to the scope of this cost study, this section further lists specific exclusions which are not covered in the cost study but which may be cost factors in the relocation of these facilities. Both Assumptions and Exclusions which are the basis of this cost study are listed below:

Assumptions:

1. Costs are provided as a Conceptual Estimate to assist in establishing priorities for decision making and to aid in evaluating the potential cost of performing the tasks identified. These estimates cannot be relied upon to establish funding levels for individual tasks, as neither preliminary or detail design engineering has been performed in sufficient detail to provide quantities from which to estimate. Therefore, great caution should be used in utilizing these rough order of magnitude numbers for anything other than preliminary prioritization purposes.
2. For this study, it assumed that any new construction will replicate the layout and programmatic requirements represented by the existing facilities located in Norco.
3. In addition to the MSTL building (575) and JWAL building (544), the program includes facilities housed in building 517 (the testing lab) and 542 (MSTL storage). It is further assumed that additional inside environmentally controlled storage space must also be provided at Point Mugu for storage currently accommodated on the pavement area outside and behind the MSTL at Norco. The climate at Norco allows for this outside storage of certain bulk items while the higher humidity and brine environment of the Point Mugu will require the same items to be stored inside in a more controlled environment.
4. As advised by the staff at Point Mugu, the proposed new construction sites at Point Mugu are on federal property and are outside the Coastal Management Zone (CMZ), and are not tied by natural resources to the adjacent CMZ; therefore it is assumed the projects are not subject to Coastal Commission approval.
5. The staff at Point Mugu further advised the estimating team that neither proposed site encroaches on wetlands, other environmentally sensitive areas, or potential sites of cultural resources; it is assumed the subject sites would receive a Categorical Exclusion for purposes of NEPA documentation.
6. The site is designated by Point Mugu as safe for hazard of electromagnetic radiation to personnel (HERP).
7. Construction laydown areas are available adjacent both sites, as well as adjacent the structures proposed for adaptive re-use.
8. New cranes will be required in the replicated facilities: two jib cranes, two bridge cranes and one monorail crane.
9. The relocated facilities will replicate the level of security currently in use at Norco; each building or group of buildings will be fenced and have secure access gates.
10. Based on nearby borings (see Attachments) both proposed new construction sites have high water tables, and will require construction de-watering, high-performance waterproofing, and sump pumps.

Exclusions:

1. Costs associated with mitigation of potential tsunami impacts
2. Purchase, moving, set-up and/or re-calibration of equipment and computer / display systems
3. Costs associated with the release or relocation of personnel, training of new personnel
4. Interior furnishings and equipment
5. Future escalation costs beyond FY05
6. Environmental mitigation required by the construction process
7. Seismic retrofitting of existing structures to meet 8.0 strength event
8. Anti-terrorism upgrades of existing structures
9. Removal or mitigation for any hazardous materials encountered on the construction site(s) or Norco facility that must be mitigated prior to base turnover
10. Demolition and/or decommissioning of existing structures
11. Transition Team and other Base closure costs for the Norco facility
12. Schedule impacts, including any delays due to environmental assessment, permitting, etc.
13. Assessment of the existing equipment and any replacement costs (other than cranes).

7. Conceptual Cost Study

Cost Estimate Process and Methodology

This conceptual estimate was performed with a time constraint of two weeks. The following steps were used for this estimate;

- review of the general description of the buildings and mission requirements,
- site visit and staff interviews,
- listing of special operational requirements impacting the facility
- review and quantity take-off based on layout sketches,
- determination of foundation issues at Point Mugu,
- determination of site improvements at Point Mugu,
- unit cost estimate using costs from cost guides (Means, Marshall & Swift, etc.) and/or estimator's experience with current construction costs,
- cost allowances for scope not defined, but anticipated for this type of construction

- soft cost (engineering, construction management, inspection, etc.) estimate based on percentage of capital cost

Estimated costs are shown in the tables on the following pages. The costs for the five buildings at both sites are summarized on Table 7-1, Summary of Sites. There is a comparison of estimated costs vs. government estimates in Table 7-2, and an analysis of Adaptive Re-use of Existing Structures on Table 7-3.

NAVSEA Corona
Facility Relocation Cost Study

Table 7-1 Summary of Site Costs

Relocation of MSTL and JWal Structures
(\$ in 1,000's)

Building Location	City of Norco (FY 2005 Facility Estimate)					Point Mugu						
	MSTL	Lab Bldg 517	Storage	JWal	JWal Addition	Total	MSTL	Lab Bldg 517	Storage	JWal	JWal Addition	Total
Footprint Area SF	39,000	13,000	12,000	48,000	40,000	152,000	39,000	13,000	12,000	48,000	40,000	152,000
Costs by Division												
1.0 GENERAL REQUIREMENTS	incl 602	incl 175	incl 145	incl 493	incl 451		incl 3,180	incl 185	incl 191	incl 3,038	incl 3,019	
2.0 SITEWORK	\$ 1,671	\$ 292	\$ 278	\$ 4,284	\$ 3,285		\$ 1,682	\$ 296	\$ 316	\$ 4,295	\$ 3,296	
3.0 CONCRETE	\$ 82	\$ 37	\$ 48	\$ 120	\$ 96		\$ 82	\$ 37	\$ 48	\$ 120	\$ 96	
4.0 MASONRY	\$ 1,540	\$ 343	\$ 350	\$ 335	\$ 335		\$ 1,540	\$ 343	\$ 430	\$ 335	\$ 335	
5.0 METALS	\$ -	\$ 0	\$ 0	\$ 0	\$ 0		\$ -	\$ -	\$ -	\$ -	\$ -	
6.0 CARPENTRY	\$ 285	\$ 88	\$ 85	\$ 400	\$ 336		\$ 285	\$ 88	\$ 85	\$ 398	\$ 334	
7.0 THERMAL & MOISTURE PROT'N	\$ 55	\$ 24	\$ 14	\$ 666	\$ 660		\$ 45	\$ 24	\$ 14	\$ 666	\$ 660	
8.0 DOORS AND WINDOWS	\$ 1,031	\$ 185	\$ 39	\$ 2,600	\$ 2,519		\$ 1,079	\$ 190	\$ 39	\$ 2,600	\$ 2,519	
9.0 FINISHES	\$ 27	\$ 12	\$ 4	\$ 42	\$ 42		\$ 27	\$ 12	\$ 4	\$ 42	\$ 42	
10.0 SPECIALTIES	\$ -	\$ 0	\$ 0	\$ 0	\$ 0		\$ -	\$ -	\$ -	\$ -	\$ -	
11.0 EQUIPMENT (built-in)	\$ 5	\$ 3	\$ 0	\$ 27	\$ 3		\$ 5	\$ 3	\$ -	\$ 27	\$ 3	
12.0 FURNISHINGS (built-in)	\$ 226	\$ 62	\$ 87	\$ 380	\$ 380		\$ 226	\$ 62	\$ 87	\$ 380	\$ 380	
13.1 FIRE PROT'N AND DETECT'N SY	\$ 300	\$ 0	\$ 0	\$ 200	\$ 200		\$ 300	\$ -	\$ -	\$ 200	\$ 200	
14.0 CONVEYING SYSTEMS (built-in)	\$ 1,385	\$ 182	\$ 123	\$ 920	\$ 920		\$ 1,385	\$ 182	\$ 123	\$ 920	\$ 920	
15.1 MECHANICAL - HVAC	\$ 458	\$ 145	\$ 58	\$ 151	\$ 133		\$ 452	\$ 145	\$ 58	\$ 151	\$ 133	
15.2 MECHANICAL - PLUMBING	\$ 1,076	\$ 205	\$ 119	\$ 1,899	\$ 1,549		\$ 1,076	\$ 205	\$ 116	\$ 1,865	\$ 1,526	
16.0 ELECTRICAL	\$ 8,742	\$ 1,753	\$ 1,352	\$ 12,516	\$ 10,908	\$ 35,271	\$ 11,364	\$ 1,773	\$ 1,514	\$ 15,036	\$ 13,462	\$ 43,149
SUBTOTAL	\$ 699	\$ 114	\$ 88	\$ 1,001	\$ 873	\$ 3,571	\$ 909	\$ 115	\$ 98	\$ 977	\$ 875	\$ 3,571
Design Engineering	\$ 175	\$ 26	\$ 20	\$ 250	\$ 218	\$ 723	\$ 227	\$ 27	\$ 23	\$ 226	\$ 202	\$ 723
Design Engineering Support during Const	\$ 437	\$ 88	\$ 68	\$ 626	\$ 545	\$ 2,848	\$ 568	\$ 89	\$ 76	\$ 752	\$ 673	\$ 2,848
Construction Management	\$ 87	\$ 18	\$ 14	\$ 125	\$ 109	\$ 355	\$ 114	\$ 18	\$ 15	\$ 150	\$ 135	\$ 355
Inspection	\$ 250	\$ 75	\$ 75	\$ 250	\$ 250	\$ 825	\$ 400	\$ 125	\$ 125	\$ 400	\$ 400	\$ 825
Permits	\$ 10,390	\$ 2,074	\$ 1,617	\$ 14,768	\$ 12,903	\$ 41,752	\$ 13,582	\$ 2,147	\$ 1,851	\$ 17,541	\$ 15,747	\$ 50,868
SUBTOTAL	\$ 1,748	\$ 351	\$ 203	\$ 2,503	\$ 2,182	\$ 8,750	\$ 2,273	\$ 355	\$ 227	\$ 3,007	\$ 2,692	\$ 8,750
Contingency	\$ 12,140	\$ 2,430	\$ 1,820	\$ 17,270	\$ 15,090	\$ 48,750	\$ 15,855	\$ 2,502	\$ 2,078	\$ 20,548	\$ 18,439	\$ 59,422
TOTAL	\$ 12,140	\$ 2,430	\$ 1,820	\$ 17,270	\$ 15,090	\$ 48,750	\$ 15,855	\$ 2,502	\$ 2,078	\$ 20,548	\$ 18,439	\$ 59,422
Unit Costs	\$ 224	\$ 135	\$ 113	\$ 261	\$ 273	\$ 313	\$ 291	\$ 136	\$ 126	\$ 313	\$ 337	\$ 313
Capital (Const only)												

Notes:

1. These estimates cannot be relied upon to establish funding levels, as preliminary design engineering has not been performed in sufficient detail to provide quantities and define scope.
2. Security issues affecting the construction costs were not addressed as the security requirements are not known. It is assumed that the additional cost due to security would be similar at both sites.

NAVSEA Corona
Facility Relocation Cost Study

Table 7-2

Relocation of MSTL and JWAL Structures

(\$ in 1,000's)

Building Location	City of Norco (FY 2005 Facility Estimate)								Point Mugu								
	Lab Bldg			Lab Total	JWAL		JWAL Total	Norco Total	Lab Bldg			Lab Total	JWAL		JWAL Total	JWAL Total	
	MSTL	517	Storage		JWAL	Addition			MSTL	517	Storage		JWAL	Addition			
Footprint Area SF	39,000	13,000	12,000		48,000	40,000				39,000	13,000	12,000		48,000	40,000		
Historical/Budget Construction Costs	(1999 est)					(2004 est)											
Capital Costs	\$ 6,350	NA	NA			9,080											
Design Note 2	\$ 508	NA	NA			340											
Contingency	\$ 320	NA	NA			430											
Const Spprt/CM/Insp/Permts	\$ 400					1,362											
Escalation Note 3	\$ 1,970					673											
TOTAL	9,548					11,885											
SF Costs Capital and Escalation	\$ 213					\$ 244											
New Construction mid 2005																	
Capital Costs	\$ 8,742	\$ 1,753	\$ 1,352	\$ 11,847	\$ 12,516	\$ 10,908	\$ 23,424			\$ 11,364	\$ 1,773	\$ 1,514	\$ 14,651	\$ 15,036	\$ 13,462	\$ 28,498	
Design/Const Spprt/CM/Insp/Permts	\$ 1,648	\$ 321	\$ 265	\$ 2,234	\$ 2,252	\$ 1,995	\$ 4,247			\$ 2,218	\$ 374	\$ 337	\$ 2,929	\$ 2,505	\$ 2,285	\$ 4,790	
Contingency (rounded)	\$ 1,750	\$ 350	\$ 200	\$ 2,300	\$ 2,500	\$ 2,180	\$ 4,680			\$ 2,270	\$ 360	\$ 230	\$ 2,860	\$ 3,010	\$ 2,690	\$ 5,700	
TOTAL (rounded)	\$ 12,140	\$ 2,420	\$ 1,820	\$ 16,380	\$ 17,270	\$ 15,080	\$ 32,350	\$ 48,730		\$ 15,850	\$ 2,510	\$ 2,080	\$ 20,440	\$ 20,550	\$ 18,440	\$ 38,990	\$ 59,430
SF Costs Capital (Const only)	\$ 224	\$ 135	\$ 113		\$ 261	\$ 273				\$ 291	\$ 136	\$ 126		\$ 313	\$ 337		

Notes:

1. The historical costs are based on information from the FY 2000 and FY 2005 Military Construction Program.
2. Design costs for the 1999 Measurement Science Laboratory were not available; we used 8% of the capital cost.
3. Escalation is based on the Means Cost Index from 1999 to 2005.
4. Cost differences appear to be in electrical systems, communications, LAN, and sitework.
5. These estimates cannot be relied upon to establish funding levels, as preliminary design engineering has not been performed in sufficient detail to provide quantities and definitize scope.

Table 7-3 Adaptive Re-use of Existing Structures

(all costs in \$1000s)		Point Mugu				
		MSTL	Lab Bldg 517	Storage	JWAL	JWAL Addition
Footprint Area	SF	39,000	13,000	12,000	48,000	40,000
New Construction Costs	(estimated)	\$ 13,630	\$2,130	\$1,740	\$18,050	\$16,150
Adaptive Re-use Costs	Note 1	NA				
Credit for use of existing facilities	Note 4	Note 8	<\$1,300-\$1,000 M>	<\$1,100-\$500 M>	<\$8,000-\$5,000 M>	<\$8,000-\$5,000 M>
Demolition costs	Note 5		\$50 - \$100	\$10 - \$40	\$150 - \$400	\$150 - \$300
Foundation Improvement	Note 6		\$0 - \$50	\$0 - \$50	\$500 - \$1,500	\$500 - \$1,500
Interior Refurbish	Note 7		\$200 - \$400	\$40 - \$100	\$2000 - \$5,000	\$2400 - \$4,000
Design/Const Spprt/CM/Insp/Permts			\$170-350	\$150-300	\$500-1,000	\$400-800
Adaptive Re-use cost	Note 6		\$1,630- \$2,410	\$1,200-\$2120	\$15,510-\$23,260	\$13,980-\$20,130
Construction vs Adaptive Reuse Cost			<\$900>-\$100	<\$900>-\$0	<\$4,900>-\$2,900	<\$4,600>-\$1,600

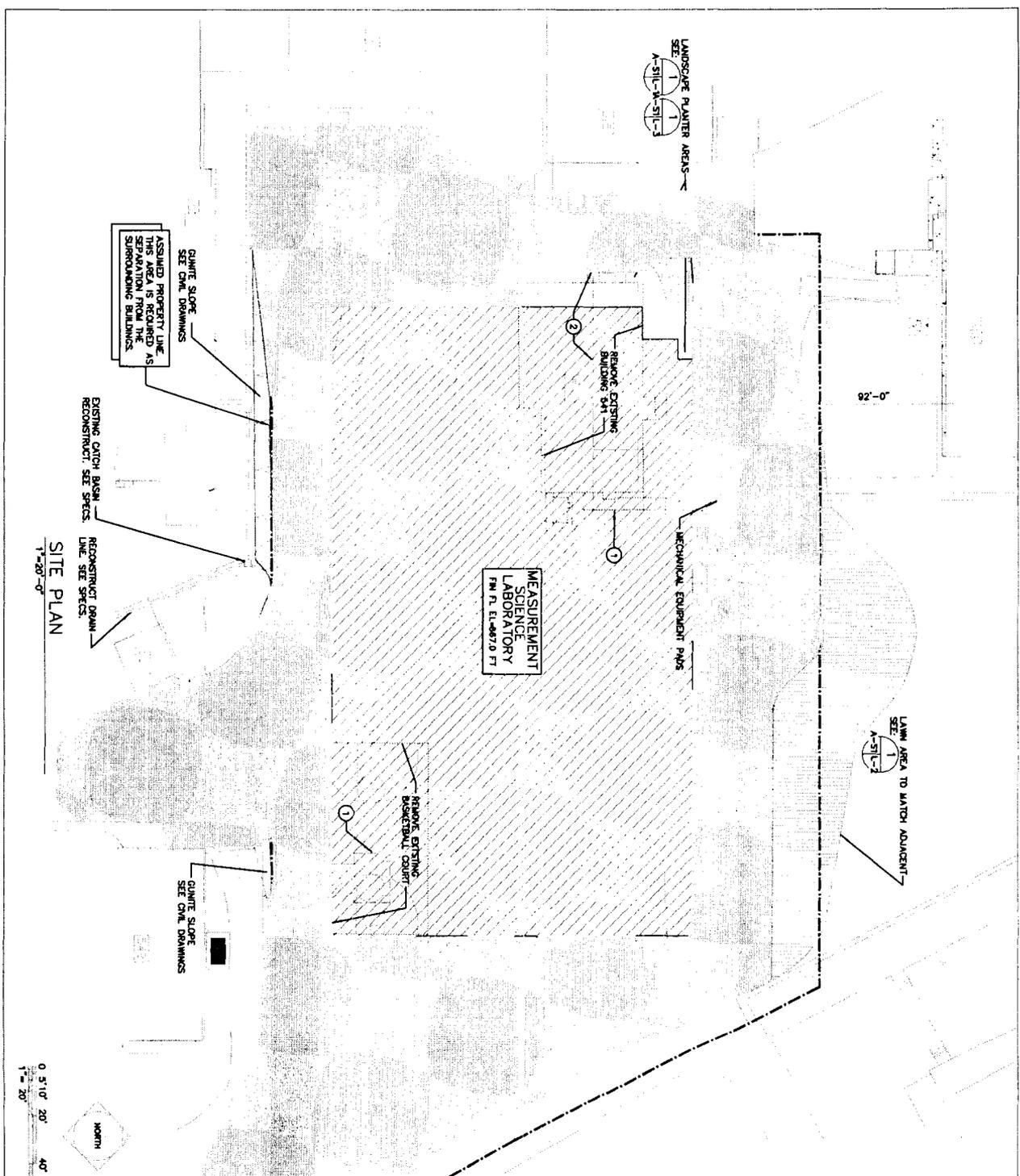
- Notes:
1. We did not have access to the interior of the buildings under consideration..
 2. These costs are conceptual in nature as we only know the year the buildings were built, the gross square footage, and current function. These estimates are indicative in nature, not for funding purposes.
 3. We have excluded costs for seismic upgrades.
 4. Assume reuse of site improvements, utilities, building shell, portions of the interior.
 5. Demolition will be dependant on final configuration of building.
 6. Improvement of the existing foundations may be required; the JWAL foundation may need improvement due to the added weight of the structure.
 7. Interior refurbishment includes improvements to the structure frame; floors, walls, and ceilings to insure performance specifications are met, plumbing, mechanical, electrical, communications and security.
 8. Due to the vibration requirements of the MSTL, an existing structure cannot be refurbished to the required specification.
 9. Costs are based on use of building 3015, built in 1993. We assume there will be no upgrades required to meet current building codes.

References

1. Geology and Ground Water Appraisal of the Naval Air Missile Test Center Area, Point Mugu, California, Geological Survey Water-Supply Paper 1619-3, 1963.
2. Final – Integrated Natural Resources Management Plan (INRMP) Naval Base Ventura County, Point Mugu, California; Tetra Tech EM, Inc. March 2002.
3. Telephone Communication: Dale Caranthan, Ventura County Sheriff's Department, Office of Emergency Services (805 654-2551)
4. Advanced Warfare Assessment Concept Development – MILCON)-171
5. Facility Requirements for Navy and Marine Corps Calibration Laboratories – NAVAIR 17-35FR-06 – dated 1 June 2003
6. Final Request For Proposal for Measurement Science Laboratory – FY2000 Project P-007 – dated 25 April 2000
7. Basis of Design for Weapons Testing and Evaluation Facility P-171 – dated 9 May 1990
8. Form DD 1391, FY 2000 Military Construction Program, Navy, Measurement Science Laboratory cost Estimate
9. Form DD 1391, FY 2005 Military Construction Program, Navy, Warfare Assessment Laboratory Addition, Cost Estimate

Cost Study for the Structures of MSTL AND JWAL

Drawings



NOTE:
 1. FOR SITE UTILITY PLAN, SEE CIVIL AND PLUMBING DRAWINGS
 2. FOR TEMPORARY SECURITY FENCING AND ACCESS TO SITE, SEE CIVIL DRAWINGS

LEGEND

- NEW PAVED AREA SEE CIVIL DRAWINGS FOR EXACT CONFIGURATION AND SLOPES
- FACILITY TO BE DEMOLISHED
- NEW TURF AREA. SEE LANDSCAPE AND CIVIL DRAWINGS FOR EXACT CONFIGURATION AND IRRIGATION REQUIREMENTS
- CONCRETE SToop OR LOADING DOCK
- ELECTRICAL TRANSFORMER AND CONCRETE PAD WITH BOLLARD PROTECTION SEE A-311(A-11) 5' x 5'-0" O.C.
- QUINTE SLOPE
- FOUNDATION DRAINAGE
- 4" PIPE TO DRAIN OUT TO DAYLIGHT AT GRADE

RECORD DOCUMENT

19 JULY 2002
 RECORD DRAWINGS

19 JULY 2002
 P007-AST

DATE: 19 JULY 2002
 DRAWING NO.: 8156546
 SHEET NO.: 119

AS-1

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 NAVAL FACILITIES ENGINEERING COMMAND
 SOUTHWEST DIVISION
 SAN DIEGO, CALIFORNIA

P-007 MEASUREMENT SCIENCE LAB
 NAVAL WARFARE ASSESSMENT STATION
 CORONA, CALIFORNIA

ARCHITECTURAL SITE PLAN

DESIGNER: []
 CHECKER: []
 PROJECT LEADER: []
 FIELD PROJECT: []
 DESIGN MGR: []
 BRANCH MGR: []

REVISIONS

DATE: []
 APPROVED DATE: 7/19 CBB AS-BUILT
 BY: []
 DESCRIPTION: []

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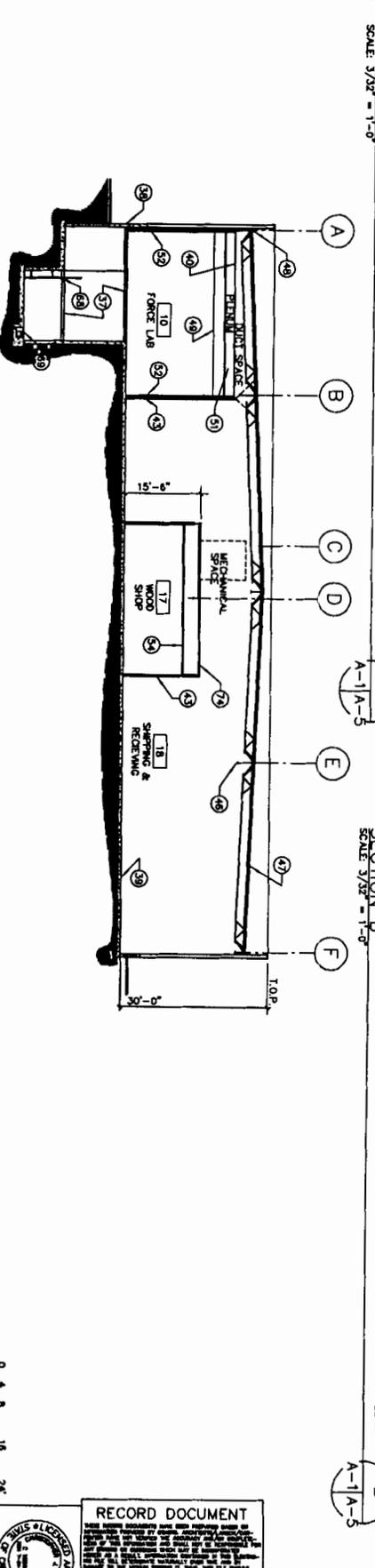
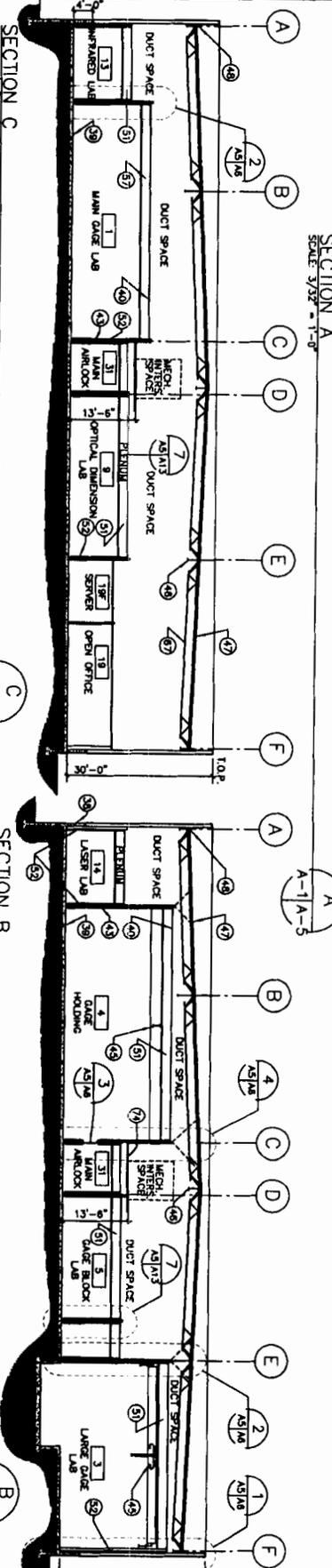
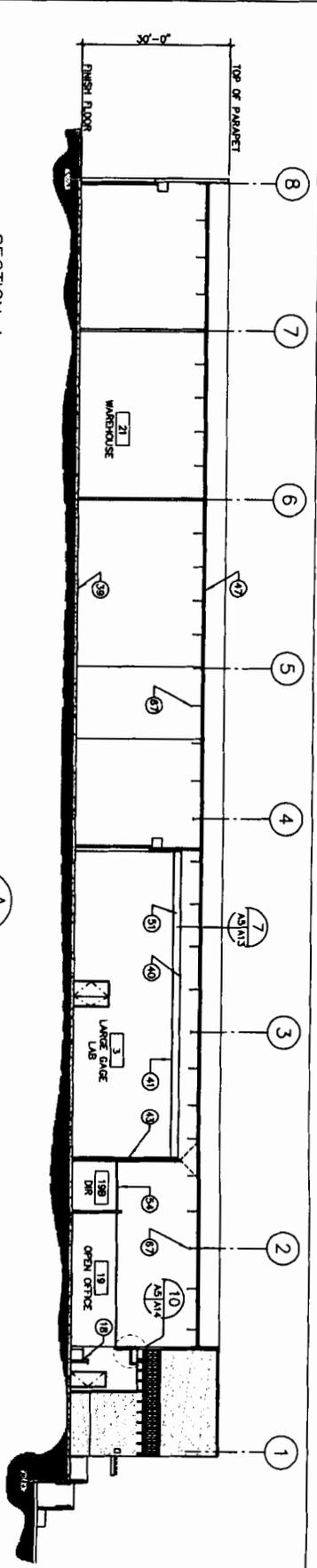
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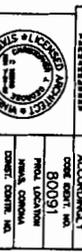
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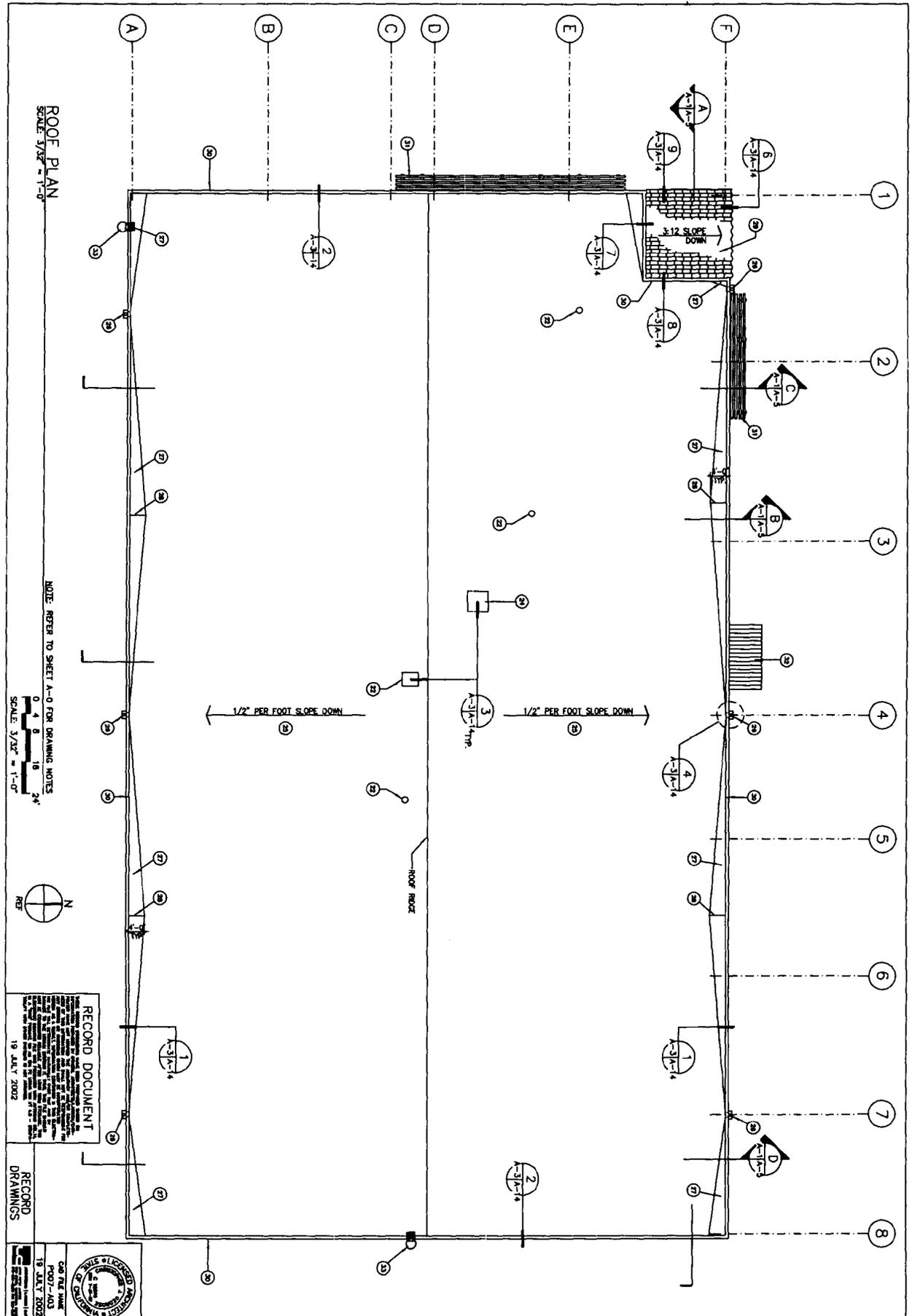
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 SAN DIEGO, CALIFORNIA

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P-007 MEASUREMENT SCIENCE LAB
 NAVAL WARFARE ASSESSMENT STATION
 CORONA, CALIFORNIA

DESIGNER	C. REDDIE	SATISFACTORY TO	DATE
DRAWN	C. REDDIE	APPROVED	DATE
CHECKED	A. YODERMAN	APPROVED	DATE
PROJECT LEADER		APPROVED	DATE
PREPARED BY		APPROVED	DATE
REVISIONS		BY	DATE

REVISIONS			
NO.	DATE	BY	DESCRIPTION



ROOF PLAN
SCALE 3/32" = 1'-0"

NOTE REFER TO SHEET A-0 FOR DRAWING NOTES
SCALE 3/32" = 1'-0"



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BY FOR COMMANDER NAVFAC

ROOF PLAN

REVISIONS

REVISIONS

REVISIONS

REVISIONS

REV.	DESCRIPTION	DATE	BY

ALL REINFORCING SHALL BE PLACED IN ALL LOAD-BEARING CONCRETE WALLS TO BE CAST AND REINFORCED WITH #4 @ 12" O.C. FOR WALLS. TYPICAL REINFORCING AND TYPICAL DETAILS SHALL BE AS SHOWN ON PLANS.

CONCRETE FOUNDATIONS SHALL BE CONCRETE UNDER COLUMN CONTINUANCES.

FOR TYPICAL FOUNDATION DETAILS REFER TO SHEETS S-4 AND S-9 FOR STEPS IN FOOTING ELEVATIONS REFER TO F-5-11.

HEAVY SOLID LINE INDICATES CONCRETE WALLS OF THICKNESS AS SHOWN ON PLANS.

REFERENCE SHEETS C-12 & F-13 FOR CHWD TO BE INSTALLED IN CONCRETE.

REFERENCE SHEETS A-6 & A-7 FOR LOCATIONS OF WOOD MARKERS AND CAPILLARY WATER BARRIER REQUIRED BELOW ALL SUB-ON-GRADE.

GRAPHIC SCALE
 IF SHEET IS LESS THAN 36" X 48" IT IS A REDUCED PRINT-
 SCALE REDUCE ACCORDINGLY

1/8" = 1'-0"

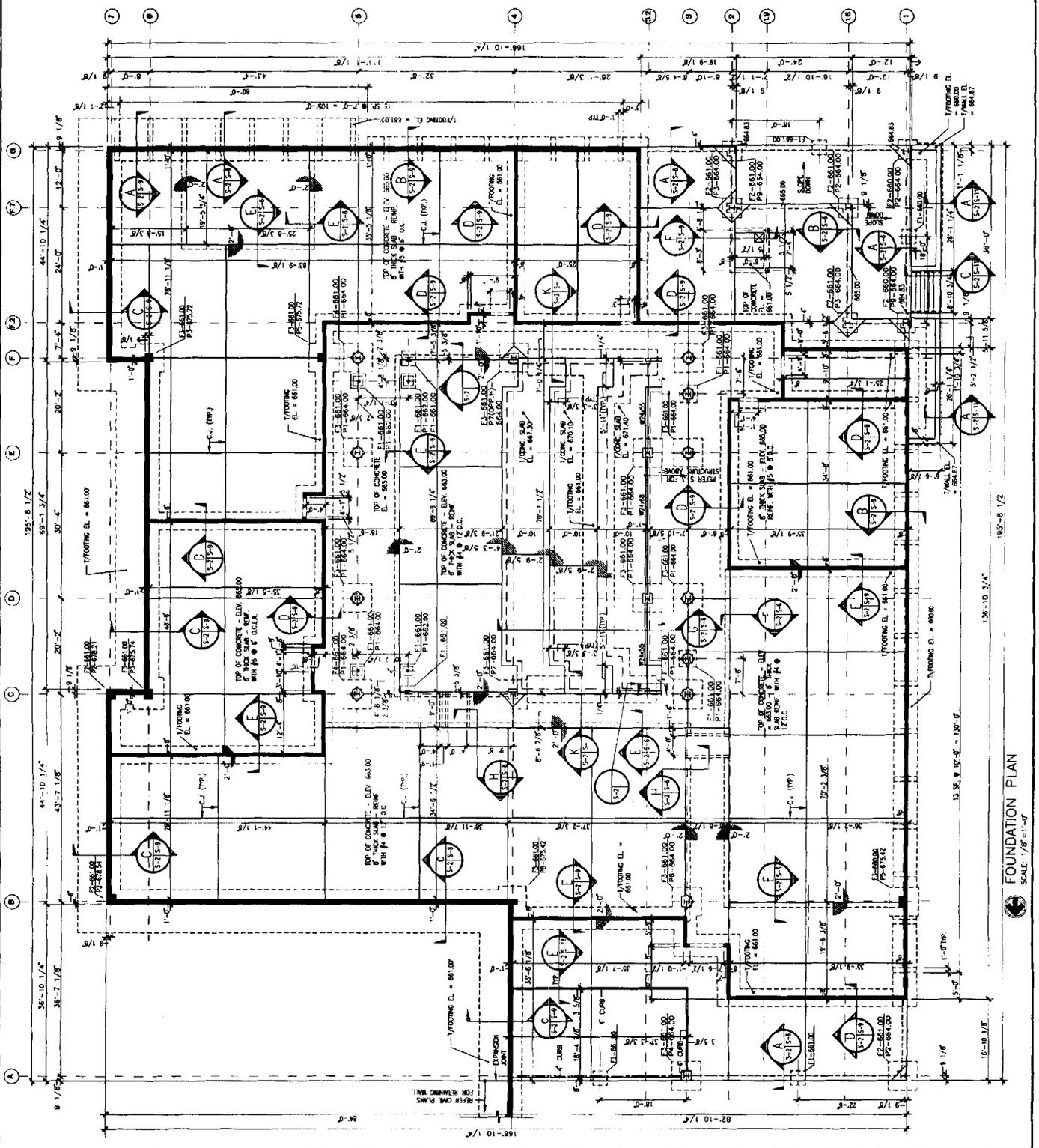
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DEPARTMENT OF THE ARMY
 U.S. ARMY CORPS OF ENGINEERS
 WASHINGTON, D.C. 20315

PROJECT: WEAPONS TESTING AND EVALUATION FACILITY (P-171)
 FOUNDATION PLAN

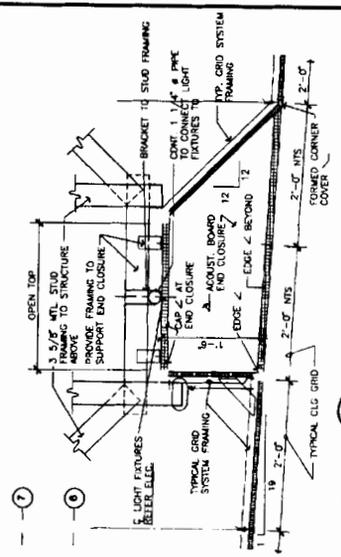
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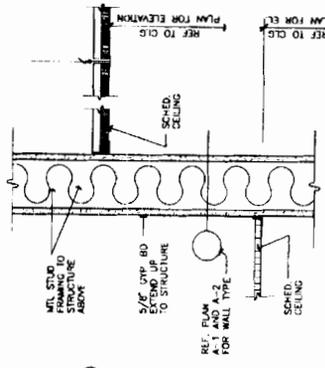


FOUNDATION PLAN
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NO.	REVISIONS	DATE	APPROVED



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SCALE 1 1/2\"/>



03 SUSP. CLC. TERMINATION
SCALE 3\"/>

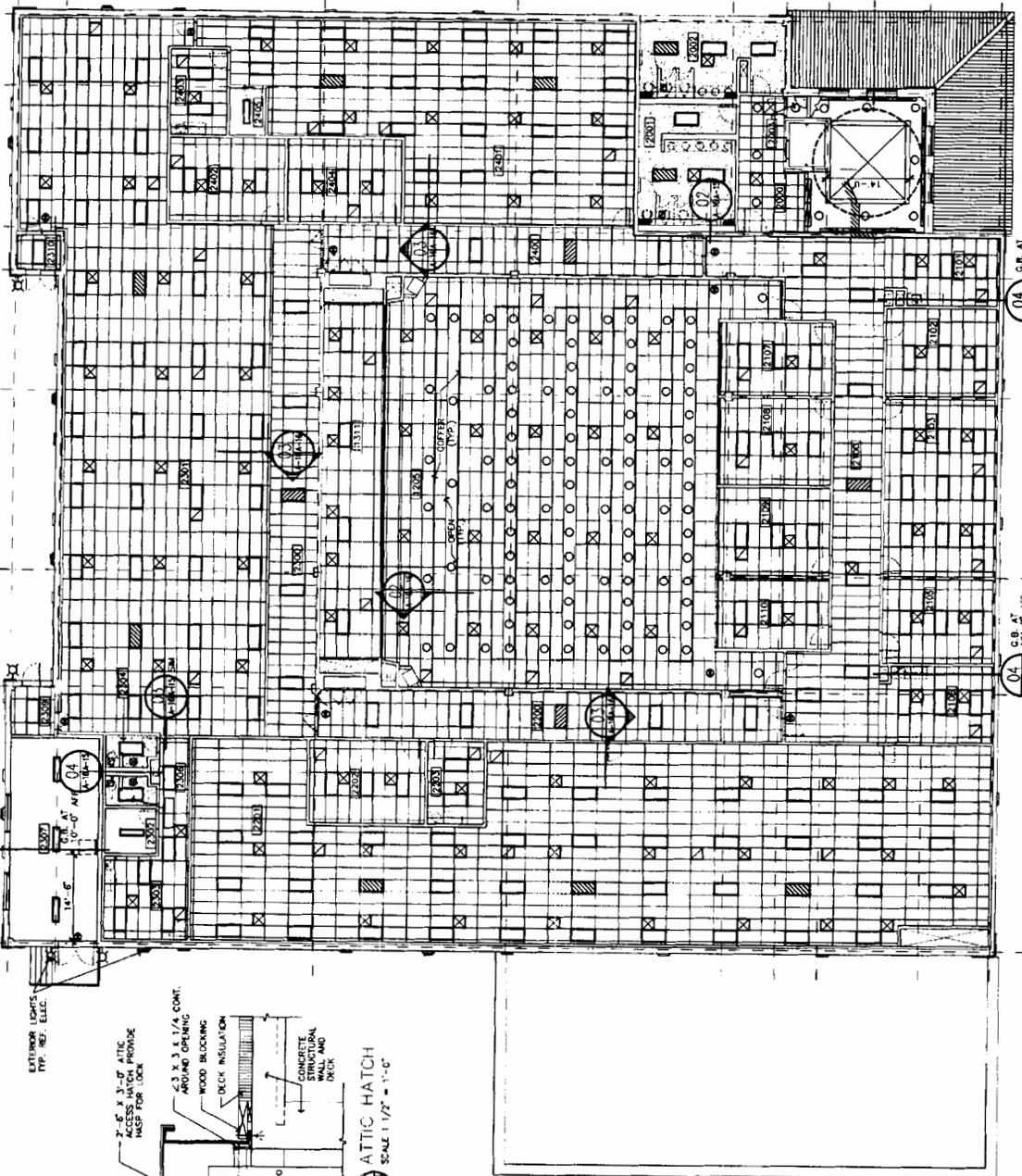


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1214 15TH AVENUE, SUITE 100
DENVER, COLORADO 80202

PROJECT: WEAPONS TESTING AND EVALUATION FACILITY (P-171)
SECOND FLOOR REFLECTED CEILING

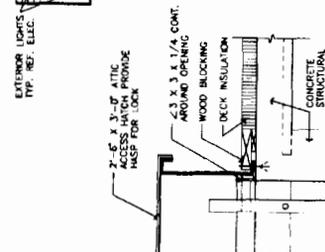
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CHECKED BY: 6380918
SCALE: AS SHOWN



LEGEND

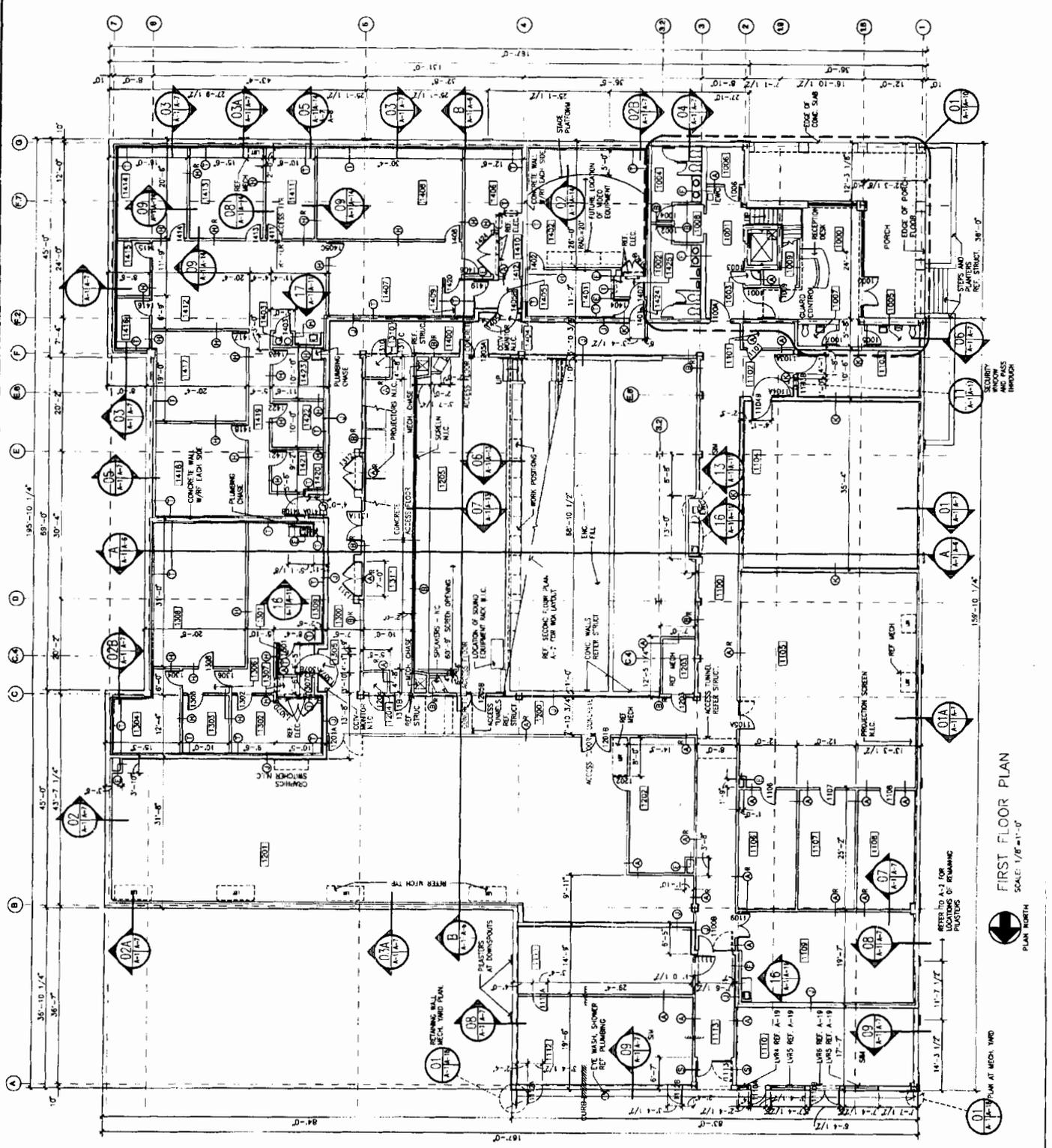
- RECESSED FLUORESCENT
- EMERGENCY LIGHTS
- STRIP FLUORESCENT LIGHTS
- INCANDESCENT IN MID
- POT D.B. OR STUD CEILING
- DIFFUSER
- RETURN AIR
- EXIT SIGN
- EXTERIOR LIGHTS

01 REFLECTED CEILING PLAN - SECOND FLOOR
SCALE: 1/8\"/>



04 ATTIC HATCH
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