

ATTACHMENT 1 - SPECIFICATIONS

GENERAL DESCRIPTION OF THE PROJECT

The following are the main characteristics of the work to be executed at the Colombian National Police Hangar 2, located at Guaymaral, Cundinamarca.

The works include, but are not limited to, the construction of a concrete platform, a pumps shed, as well as hydraulic and electrical installations on the west side of the Colombian National Police Hangar 2 at Guaymaral Airport.

It is understood that the Contractor shall verify the measurements and become familiar with the terrain and the existing conditions before sending his proposal. In this statement of work, guide measures are given for the Contractor to check the drawings and the construction quantities chart and to check the physical conditions on site. In no way do these figures commit the Embassy to pay additional quantities if the resulting measures on site vary from the information given by the US Embassy.

DETAILED DESCRIPTION OF THE PROJECT

The following are the main features of the work for which all costs are included:

1. PRELIMINARIES

The Contractor shall make the applicable verifications in order to certify the designs given to them are adequate for this installation and shall guarantee the correct execution of the works, fulfilling the standards of the applicable codes before the start of the construction process.

All works are to be constructed pursuant to the NEC, RAS, ICONTEC, EIA, AISC, INVIAS and NSR-10 and each shall be applied according to applicability. The Contractor shall guarantee that the project fulfills all the rules established by the Ministerio del Medio Ambiente and the Departamento Administrativo de la Aeronáutica Civil.

1.1 Campsite and temporary facilities

The contractor shall build a temporary campsite in galvanized sheets and/or wood, or supply and install a container. This campsite is used primarily for office management and auditing, warehousing and storage (of materials that may suffer loss or damage from exposure to the elements), dressing room for field personnel (provided with all the essentials for personal hygiene, comfort, ventilation, and protection against the weather).

The location of this campsite will be in a place coordinated by the contractor, the commander of the base and the Contracting Officer's Representative (COR). The contractor will be responsible for the safety of items left in this place and must remove the campsite upon completion of the work, leaving the area under the same conditions as before the works began.

Temporary restrooms

The contractor shall provide portable toilets for both physiological needs and hygiene or otherwise they shall be made of materials similar to those of the campsite. Construction of septic tanks or pouring of residual waters produced by personal hygiene or by work elements shall not be allowed.

Temporary facilities

It is required to prepare a map of the campsite location, fencing, and temporary services (water, electricity, telephone, etc.) before beginning installation, for approval by the COR. All these facilities shall be removed by the contractor with the COR's approval before finalizing the work. The site shall be left as found prior to the start of the work with grass, sidewalks, etc. This dismantling along with the installation shall be quoted a total price and shall be included in the total project value.

Temporary services

The eventual provision of any service by the end user to the contractor shall be of unconditional; aid and subject to eventual temporary suspension. Failures or permanent suspension will not lead to any financial claim and/or

delays or similar justification by the contractor. The contractor shall provide alternative means for these situations.

Site security

The Contractor shall supply security for the construction site and the camps. Neither the US Government nor the final user shall be responsible for the payment of the security services or for the elements left at the construction site.

1.2 Temporary enclosure

The workplace must be completely isolated from the areas surrounding the lot or workplace. Similarly, if materials storage is built, it should be closed in the same way. To this end, an enclosure of synthetic canvas and wooden poles every 2 meters should be built, tempered with wires at the top, middle and bottom. There will be installed supports in the access door on each side and in the changes of direction. This enclosure will have a single double-hinged access for machinery, vehicles and personnel entrance. While the works are in progress, the Contractor shall ensure that the fence is maintained and repaired so that it is always in suitable condition.

1.3 Localization and replanting

This item refers to the location and replanting for the various stages and elements of the project, using surveying instruments to lift and locate precisely, according to the architectural layout, all the elements to be built. The building area is indicated in drawing 2 plus the over-wide and connections. This work must be performed by a qualified professional who, in addition to the plans, should establish levels. Everything will be referenced in securely anchored wooden bridges.

The contractor shall supply all materials required to establish the planimetric and altimetric benchmarks, such as stakes and field books, etc. The COR may review the location of the axes. However, this does not exonerate the contractor from his/her responsibility for errors in locating or leveling any portion of the work. Prior to locating and laying out the work, the necessary datum or tie points, both horizontal and vertical, as well as the boundaries of the terrain to be occupied must be defined and approved.

The temporary BM and reference axes are to be placed at sites where they do not interfere with the execution of the work and need not be removed, so as to permit their subsequent control at any point during the course of the work. No marks made with paint of any type, scratches, nails, centering, etc. will be permitted on any current building or structure. Once the layout and location are complete, the contractor shall submit a scheme for approval, including the location of existing structures and vegetation.

Note: The contractor shall submit the field book and shop drawings with definitive levels of the grade and subgrade lines to the COR for approval before starting work.

2. EARTHWORKS

2.1 Excavation

The contractor shall make the excavations necessary to execute the works and shall be prepared to excavate in any type of material, using the appropriate methods, equipment and tools. When starting to excavate, the contractor shall have on hand the study of aerial, surface or underground interference, in order to avoid damaging pipes, boxes, wiring, posts, hoses, wells or other elements or structures existing in the work area or adjacent to it. Should the excavation interfere with sewers or pipes, the contractor shall build at his/her cost, adequate support or protection for these installations.

The depth of the excavations and fills shall vary according to the works to be executed and the calculations done by the contractor. The excavated material shall not be stored at the top of the excavation. It shall be lifted immediately to the trucks and transported to an authorized dump located outside the Base.

The contractor shall provide the excavation sites, signs, caution and provisional demarcation. The demarcation is done with three yellow plastic tapes of 8 centimeters thickness resting on temporary sleeping well-secured to the floor or placed on concrete mobile bases, to prevent unauthorized persons, aircraft, vehicles, and animals from suffering accidents. All drains, sink tops and catch pits of utility network should be kept free to prevent them from becoming clogged or damaged.

Any over-excavation caused by a cave-in, deficiency of the material existing in the zone or other reasons, shall be the contractor's responsibility, who shall fill at his cost the over-excavation with granular material previously approved, until the required excavation section has been set.

Excess material from excavation and cleanup shall be removed based on the above regarding cleanup. The contractor is responsible for the management of surface water and groundwater evacuation and otherwise, as well as the provision and maintenance of drainage and pumping systems required to stabilize slopes and prevent water from entering excavations.

The minimum depth of excavation to the platform shall be 0.90 m.

Within this item is included the relocation of an existing monument from the work area to an area indicated by the police.

2.2 Subgrade compaction

In all areas the soil at the bottom of the excavation shall be compacted before starting the filling, using self-propelled mechanical equipment and/or manual labor. Density should be equivalent to a deformation of not over 2 mm between one load and the following with the compaction equipment and/or equivalent to the non-marking of the footsteps of a person with a body weight exceeding 75 kg. The selection of compaction equipment shall be approved by the COR and shall conform to the characteristics of plasticity of the material to be compacted.

If during the process of compaction of the subgrade material, there are failures or soft spots, these should be replaced promptly by excavation and fill as appropriate, except that if in the opinion of the COR, the failure is due to over-compaction and/or misuse of compaction equipment, in which case the replacement of material shall be executed by the contractor.

2.3 Geotextile

The contractor shall supply and install a non-woven geotextile layer of polypropylene long fiber with a density greater than or equal to 204 g/m², type NT-2000 of Pavco or equivalent that shall be approved by the COR. The minimum overlap shall be 0.60 m unless the strips are sewn, in which case it may be reduced to only 0.30 m. The non-woven geotextile should cover the entire bottom of the excavation, up the edges of the excavation, as indicated in drawing 8.

2.4 Filling material

This item includes the supply, spreading and compaction of filling material that includes Granular Base and stone layer with stone type "Rajon" and a seal of the sub-base. Therefore, it includes the provision of all labor, materials, equipment and performing of all work necessary to carry out the required compacted filling work. Before starting the filling, the ground that shall serve as base must be completely free of vegetation, organic soil and construction waste materials and must be compacted. The surfaces shall not have flood or stagnant water areas.

Materials for fillings shall be obtained from sources authorized by all applicable environmental regulations and by law, to be selected by the contractor and approved by the COR. At least 7 days before the contractor proposes to begin the work of filling, he/she shall submit for the Embassy's consideration all sources of materials and operating permits as well as representative samples and results of laboratory tests. The supply of samples and testing shall not be for additional payment.

2.4.1 Fill in stone (Pedraplen)

This work consists of the preparation of the supporting surface of the pedraplén and the placement and compaction of stone materials, in accordance with the plans and cross-sections of the project and the instructions of the COR.

The materials to be supplied in the construction of the pedraplén originate from approved sources and shall be from boulders or rocks which are healthy, compact, resistant and durable. The maximum size shall be 20 cm. and the minimum 10 cm. The stones shall be tested by Los Angeles machine test, gradation E according to INV-E-

219 test, and the material used in the construction of the pedraplén should not have a wear greater than 50%. After completed and approved by the COR, the pedraplén shall be sealed with a layer of Sub-base SGB-1 type with minimum thickness of 5 cm. The total thickness of the pedraplén included the seal in SGB-1 shall be 35 cm.

2.4.2 Granular base

A layer of granular base shall be supplied, spread and compacted according to gradation indicated below, compacted with a density equal or greater than 100% of the maximum density obtained in the laboratory using the Modified Proctor test and a CBR of 80%. The total base fill thickness is 40 cm.

LIMIT GRANULOMETRY

SIEVE	1 ½"	1"	¾"	3/8"	#4	#10	#40	#200
PASSING% BG-1	100	70-100	60-90	45-75	30-60	20-45	10-30	5-15
PASSING% BG-2		100	70-100	50-80	35-65	20-45	10-30	5-15

The liquid limits and plastic index of the material as well as its physical characteristics and origin shall be submitted for approval by the COR, as required by the INVIAS. This material shall not have plasticity.

3. CONCRETE PAVEMENT

3.1 Concrete Platform

This work involves the construction of one (1) concrete platform for washing of helicopters and should be executed in accordance with the following specifications:

- Helicopter UH-60L (Black hawk). Other helicopters that will use the platforms are the UH-1H – II, and MI 17.
- Frequency of use = 1 parking daily average, 12 months per year, for 15 years.
- Empty weight = 5216 Kg (11500 Lb).
- Maximum weight = 10659 Kg (23500 Lb).
- Total length = 19.76 m (64 ft 10 in).
- The slope (pumping) on each platform shall not exceed 2% (Aeronautical Regulation of Colombia –RAC-6.2.2.7.).
- Any other one that applies for the project.

The construction of concrete platforms includes the supply, framing, placing, curing, leveling, grooving, and finishing in Portland cement concrete with flexural strength over 41 Kg/cm² with nominal thickness 20 cm. The concrete shall be poured by strips (chess pour system is not allowed).

In all cases this item includes all activities and provisions necessary to shape the hard concrete required with the exception of supply and set-up of reinforcement steel in another item.

The contractor shall follow the criteria for the mix design for concrete made on-site as required by code NSR-10 *Concrete platforms shall have the same level of the existing concrete channel curb. Pavement finish shall be slotted with distance less or equal to 1 cm.*

The curing shall be done with a white humidity sealer (Antisol) or equivalent approved by COR.

The contractor shall submit for Embassy approval the final construction drawings showing in detail the exact size of structural and reinforcement elements, and the distance between each surrounding element, especially the location of the existing concrete boxes. The platforms shall be done according to the architectural drawings supplied, according to the rulings established in NSR-10.

This work includes laboratory tests required. Six (6) beams shall be used as samples for testing each concrete casting, or for five (5) m³ maximum, in order to test two (2) beams after 7 days, two (2) beams after 28 days and leaving the remaining 2. The results of laboratory tests should be submitted to the COR in a timely manner.

3.2 Reinforcement steel for transfer dowels

This item includes provision and installation of all reinforcement steel for dowels in 1” diameter smooth rods, 50 cm length and embedded 25 cm in each slab for the platform with distance of 30 cm between them. These dowels shall be installed at half the thickness of the slab.

3.3 Contractions and constructions joints

Construction joints shall be done by interruption between concrete casts. This joint shall also include dowels as indicated in drawings 6 and 7.

Contraction and constructions joints shall be done by cutting hardened concrete with diamond disc, with depth equal or over ¼ of the total thickness of the slabs. Joints shall be cut within 14 hours.

The joints layout shall be completed as indicated in drawing 2 y 3. Joints shall be filled with elastic sealant resistant to fuels, Masil Carburante Sikaflex 15 ML SI or equivalent, including support drawstring, Sikarod or equivalent (joint filler). Adherents and other material, as well as procedures, shall be recommended by the manufacturer.

3.4 Concrete reinforcement of existing boxes and wells

This item includes the construction and extension of the walls in the existing boxes and reinstallation of frames, concrete lids in Portland cement with flexural strength over 41 Kg/cm^2 so that the lids are leveled with the new concrete platform, allowing the respective future inspections of the existing boxes.

3.5 Protection of existing pipes

This item includes protection of concrete with compression strength over 210 Kg/cm^2 , of existing pipelines that carry the electrical connections, compressed air and water to the existing wash points of helicopters. Reinforcing steel to protect the pipelines shall be in four corrugated rods 3/8" diameter rod with corrugated strips in 1/4" in diameter at a distance of 0.20 m. each. The protection of each tube is a square section of 20 cm. x 20 cm., 5 cm thick in concrete inside a bed of river sand on which the corresponding pipeline must be located. View details on drawing 8.

In the event the contractor damages the pipelines, he/she shall repair them and leave them in perfect condition at no cost to the embassy.

3.6 Concrete box-culvert.

The contractor shall build two (2) box-culverts as is indicated in the detail of the plane No 5. The concrete shall be of $f'c=21\text{MPa}$ and the cover of prefabricated covers of 1 m. of length. The location is indicated in the plane No. 1. The existing channel shall be demolished for the construction of this structure.

4. PUMPS SHED

4.1 EARTHWORKS

4.1.1 Location and replanting

The specifications applicable under paragraph 1.4 in this attachment 1 to the contract shall apply to paragraph 4.1.1 and what is indicated in drawing No. 1.

4.1.2 Excavation to foundation

The specifications applicable under the paragraph 2.1 in this attachment 1 to the contract shall apply to paragraph 4.1.2 and what is indicated in drawing No. 3

4.1.3 Subgrade compaction

The specifications applicable under the paragraph 2.2 in this attachment 1 to the contract shall apply to paragraph 4.1.3 and what is indicated in drawing No. 3

4.1.4 Filling material

Filling material shall be supplied, spread and compacted as sub-base material type SGB-1 or SGB-2, in layers of not more than 0.15 m thick, compacted with a density equal to or greater than 95% of that obtained in laboratory on the same material using the Modified Proctor test. The total filling thickness is 60 cm.

4.1.5 Vapor Barrier

Once the fill material has been completed (gravel cushion), a steam boom ('Polisec' or similar) should be fitted over the whole area, with an extra 40 cm. raised up at the ends. Interior overlap joints should be at least 15 cm. wide, and should be fixed or sealed in place using adhesive tape or similar at least 5 cm. wide and compatible with the membrane.

The steam boom itself should be in polyethylene at least 0.152 mm. (6 mils.) thick, or some other equivalent material which has the same characteristics and features. The contractor should supply a representative sample and technical details of the product that is to be installed, for approval.

4.2 STRUCTURES

This item consists in the construction of the structure in concrete for the foundation, columns, and beams and the metallic structure for support of the roof in metallic tiles.

The concrete structure, metallic structure and other constructions shall be built and installed according to the standards contained in the NSR-10 code. The designs shall be reviewed by the Contractor, verifying the fulfillment of these standards. If it is found that design changes shall be made in order to fulfill the standards, these changes shall be taken into account when the proposal is prepared, in such a way that when the project is executed, it is built totally according to the current norms.

This activity includes the execution of the corresponding laboratory tests as required. The Contractor shall take 6 sample cylinders for concrete resistance tests per pouring or per each 5 m³, in order to test 2 cylinders at 7 days, 2 cylinders at 28 days and leave 2 cylinders as proof samples. The results of the laboratory tests shall be given at the right time to the Embassy Representative.

4.2.1 Foundation in concrete

The contractor should build the foundation according to the plans supplied to the Embassy with no variation to the designs without the approval of the Embassy.

The footings and foundation beams shall be built based in the structural plans supplied, with 21 Mpa concrete.

This activity includes compaction of the subgrade, filling and pour concrete.

4.2.2 Reinforcement steel

The Contractor shall supply and install the reinforcement steel indicated in the plans in the qualities (420 Mpa and 240 Mpa according to plans) and diameters indicated for all the structures that require it. This activity includes the supply, forming, transportation and installation of the reinforcement steel.

4.2.3 Concrete Slab E= 10 cm.

These works include the construction of a 10 cm. thick concrete slab or plate, with 21 Mpa resistance; any difference of more than 3 mm. above or below this specification will be repaired by default (by finishing or passing a polishing machine), and such costs will be assumed by the contractor.

This slab must have an electro-welded grid with a 4.5-mm. rim, with spaces every 15 cm. on both sides; the grid will be located on the middle of the slab. It will be finished using a mason's float. The curing must be done with a white humidity sealer (Antisol) or similar. The joints must be filled with a joint sealer.

Within this item the construction of sidewalks in the 4 flanks should be included.

4.2.4 Cyclopean concrete foundation

This item consists of constructing cyclopean concrete foundation, in order to adhere to the positions and dimensions stipulated in the approved structural plans for the project. Included is the supply of all materials,

labor, facilities and equipment that might be required. The contractor will supply and install all straightedges which might be necessary for restraining and shaping the concrete, and will lay all reinforcement steel that might be needed, in accordance with the approved structural plans. 40% of rock of 15-20 cm. average size and 60% of concrete with a resistance of at least 21 Mpa. will be used. The entire construction process should comply with NSR-10 requirements, specifically Chapters C.1 - General Requirements, C.3 - Materials, C.4 - Durability Requirements, C.5 - Concrete Quality, Mix and Laying, C.6 - Straightedges, Embedded Pipe work and Construction Joints, and C.7 - Reinforcement Details, all in accordance with Chapter C.2 - Definitions.

4.2.5 Metallic structure

The steel structure shall be built according to the architectonic and structural plans supplied, and according to the standards contained in the NSR-10 code. These designs cannot be modified without the authorization of the Embassy.

The designs shall be reviewed by the contractor, who will verify compliance with these standards. If it is found that design changes are necessary in order to fulfill the standards, these changes shall be taken into account when the proposal is prepared, in such a way that when the project is executed, it is built totally according to the current norms.

This item includes the construction of the complete structure for the metallic roof, formed by columns, beams, struts, diagonals and all the other elements and accessories necessary for its assembly and installation. Before the steel structure cast, the contractor shall submit for Embassy approval the construction plans, a description of the assembly system, characteristics of bolts and welding, quality of the steel, paint catalogues, etc.

The steel structure shall be painted with anti-corrosive (thickness of 3 mils) and two layers of enamel (thickness of 3 mils each), with Pintuco quality for exteriors and the color chosen by COR. These paints shall be applied for aggressive atmospheric conditions using a compressor.

4.2.6 Roof beam

These works include the construction (Equipment, forming, placing, leveling and smooth finished) of 15x20 cm. concrete roof beam, with 21 Mpa resistances; these beams must have a rebar as is indicated in each drawing.

4.3 MASONRY

Walls will be made of top-quality materials, as indicated for each item. Block dimensions will be uniform, with well-finished edges and even surfaces. Pieces will be cut mechanically. Walls will be built in the places indicated on the plans, and of the thickness and with the appearances likewise shown on the plans. Joints should not be larger than 1.2 cm. or smaller than 0.7 cm. In the case of visible masonry, joints will be fluted. Deviation from the vertical for a wall three meters high or less will be 3 mm. either way.

4.3.1 15 x 20 x 40 Concrete Block Wall

This work includes building dividing and frontage walls with the dimensions and in the places shown on the plans. Walls should be made of structural concrete blocks, with vertical perforation $F'm = 100 \text{ Kg/m}^2$. They should have vertical reinforcement, and cells should be injected with $F'cr = 120 \text{ Kg/cm}^2$ fluid injection mortar. This should be applied with the reinforcement and to the layout shown on the plan. As a minimum criterion, the best finish should be on the outer face. Minimum block size will be 15 x 20 x 40 cm. with sticking mortar in the proportion 1:3.

All masonry and stands will be painted with "Sika Color C" paint or similar, and the color will be chosen by the COR.

4.4 PAINTING AND FINISHES

4.4.1 Outdoor Painting

Outdoor painting will be done on the masonry. The work includes supplying and applying three coats of "Sika Color C" quality paint or equivalent of a color defined with the COR. Edges and expansion joints are included.

4.4.2 Interior Painting

Interior painting will be done on masonry, so as to guarantee a smooth, even surface. Three coats of “Sika Color C” quality paint or equivalent paint should be applied of a color defined with the COR. Edges and expansion joints are included.

4.5 METALLIC CARPENTRY

4.5.1 Windows

This item includes the supply and installation of two (2) windows, each one 1.50 m wide and 0.60 m high with grill bank type with 9 mm. bars and frame in angle of 1½ inch.

4.5.2 Doors

This item includes the supply and installation of two (2) metallic doors in steel sheet gauge 20 with a width of 1.50 m and a height of 2.10 m. The frame shall be in cold rolled sheet gauge 18. Includes lock with its keys and pins. Includes door bumps.

The metal carpentry will include two coatings of anti-corrosive painting and two coatings of finishing painting of a color defined by the COR.

4.6. ROOF

4.6.1 Covering in architectural tile type

This item includes the supply and installation of Metallic shingles in Arquitectonic tiles “Acesco” Type, (0.03m x 3.66m) following designs. They will be installed following manufacturer recommendations.

Manufacturer paint must have a nominal thickness of 25 micros, and a minimum adhesion of 95. This item includes the molding, joints, connections, and necessary locks to assure the joints. There will be no overlaps. Attachments must be made by means of screws and with neoprene seals. Once the cover is installed, the cover must be submitted for the necessary test to corroborate that there are no leaks. The shingles will be placed over metallic belts following structural designs; the attachment must be done with galvanized screws with hexagonal heads, metallic washers, and neoprene seals.

4.6.2 Water Channel

The contractor must provide for supply and installation of water channel including all the accessories and following the installation instructions, using Water channel PVC Raingo type or equivalent.

5. HYDRAULIC INSTALLATIONS

5.1 External network for water supply and distribution

Consists of supply and installation of the external water system for supply and distribution of potable water to the storage tank and from storage tank to water points in wash rack area. This includes valves at the beginning and at the end of the connection piping.

The pipe will be buried at a depth of 0.60 meters minimum. For the installation, the corresponding excavations must be done; a width of 0.30 meters additional to the exterior diameter of the pipe is satisfactory.

The excavation must be examined at the bottom to avoid hard objects such as rocks, or any other material that can puncture piping. The pipe must be installed over a 0.05 m sand bed, locked in sand and at least another 0.05m of fill before placing the fill-in.

Once the piping is installed, the ditch must be filled to protect piping. Initial fill-in material must be fine and can be selected from the excavation or a material that is deemed adequate by the COR. It shall be filled with this material, compacting carefully around piping until reaching 0.15 m over it. Over this layer the ditch can be finished with a fill product coming out of the excavation, as long as no big rocks that could affect piping will be included. In pipe installation, care shall be taken in cleaning the pipes, especially in surfaces that will be joined.

The piping set-up will be in P.V.C pressure pipes for work pressures no less than 200 PSI (RDE 21). The pipe brand must be quality certified by ICONTEC and the installation completed in accordance with norms and recommendations of the manufacturer. All direction, reduction, valves, plugs changes, where the flow generate

forces over the piping, must be anchored with concrete blocks, placing a polyethylene membrane between concrete and piping to protect it from abrasion.

It is convenient that accessories have the greatest part of their external wall in contact with concrete; nevertheless, concrete must not wrap completely the pipe or accessory.

Before doing the hydraulic test, the ditch must be filled-in leaving joints exposed; if it is necessary to cover joints, their location must be marked.

Tolerance for acceptance: NAS will accept piping installation, in accordance with check results done during construction and in accordance with specified tolerances for hydraulic tests.

Test to be done: The pipe must be tested by hydrostatic tests, in accordance with indications in correspondent specifications.

Hydrostatic test for Distribution Pipes: When distribution pipes for each building are finished, the system shall be tested by hydrostatic test.

After the installation is finished, Contractor must wait 24 hours to do the test, following these steps:

- Open highest valves to allow exit of air existing inside piping
- Fill piping completely with water
- Once the pipe is filled with water, close all open valves
- Close water inlet and connect the pump to the system. It shall have a register, retention valve and indicator gauge between 0 and 200 PSI
- Pump water until reaching a pressure of 150 PSI
- Close the register completely and wait 1 hour
- If the indicator gauge remains at 150 PSI, the test is approved but if the indicator gauge is less than 150 PSI, contractor must proceed to find the leak and do the respective repair.
- Once the leak has been repaired, contractor shall wait 24 hours and do the test again

5.2 Pumps

The contractor shall supply, install, and demonstrate proper start-up and functioning of two (2) water pumps of 2 HP each, which shall be used to pump water from the water storage tank to water point in the wash rack area. These pumps shall guarantee a minimum flow according to the designs to be submitted to the COR for approval, prior to performing the installations. The installation of the pumps shall include all necessary materials and accessories required for the proper and optimal functioning and operation of the pumps. The pipes to connect the pumps shall be in galvanized iron.

5.3 Hydro-pneumatic equipment

The contractor shall provide, install and demonstrate proper start-up and functioning and operation of (1) hydro-pneumatic equipment that shall be used to ensure a constant pressure of the all hydraulic system.

The equipment shall be a factory pre-assembled, automatic system with the 2 synchronized Pumps and included one (1) 200 liter pressurized tank with membrane and built in sheet metal, floats, pressure gauges, and one (1) Control Panel. The working pressure shall be between 40-60 psi and a flow of 80 GPM. A start-off switch shall be installed at the washing point to operate hydraulic system.

5.4 Washing point

The contractor shall provide, install and demonstrate proper start-up and functioning of two (2) water points that shall have a pressure between 40-60 psi and a flow of 80 GPM.

Each water point shall include a ball valve, a ¾-inch hose 20 m. long with manual reel and a gun with variable flow trigger for controlled flow. These accessories shall be for heavy-duty work.

The contractor shall submit catalogs and technical spread sheets for all the materials to be used during the construction project.

6. ELECTRICAL INSTALLATIONS

Electrical Standard Scope

Any electrical installation which shall be done by the contractor shall comply with the following electrical standards: NTC 2050 last upgraded version including but not limited to chapters 1,2,3,4 and section 645, NEC 250 last version upgrade, NTC 3471/UL 67, EIA/TIA 607, EIA/TIA 568-569 last upgraded version, ANSI/IEEE C62.41-C62.45, NEPA 780, NTC 4552, IEEE-80, IEEE-77 and RETIE last upgraded version. The contractor shall include in his proposal catalogs and technical sheets of materials, parts and elements to be used in the project. The awarded contractor shall employ an Electrical/Electronics Engineer, who shall manage and control the execution of the electrical work and shall also sign the installation conformity and material conformity acts requested in RETIE. The contractor shall include in his proposal the curriculum vitae of the proposed engineer.

IMPORTANT

The required civil work for the underground raceway system shall include the costs for repairing the affected areas during the project execution (sidewalks, pavements, green areas and concretes among others). The awarded contractor shall comply with civil and electrical Colombian Constructions standards even if the affected areas do not.

The contractor shall submit catalogs and technical spread sheets for all the materials to be used during the construction project. Lack and/or omission of such technical information shall render the proposal invalid and the proposal shall not be considered during the awarding process.

6.1 Main circuit branch

The contractor shall provide a quote for supply and installation of a new electrical feeder, which shall connect the new wash rack shed. This new feeder shall connect the existing panel board in Taller NDI (labeled as LTD2,2) and the new panel board, such as is located in attached drawing No. 4. The estimated distance is 40 meters; however the contractor shall verify this measurement during the pre-proposal site visit, adjusting it if necessary. The new main circuit branch shall be by a tetra-pole system THHN/THWN AWG 4X No.6+ TX No.8. The contractor shall quote for supply and installation of a set of industrial three-pole breakers, thermo-magnetic trigger with a current protection capacity of 3X15A to be installed on each of the electrical panel boards, which are part of this contract. The new set of breakers shall be brand new and manufactured by a recognized vendor, such as Merlin Gerin, ABB, Siemens or equivalent. In all cases the units to be provided shall be RETIE-certified. The main circuit branch shall be labeled according to the existing maintenance schema.

6.2 Metallic piping (attached on walls)

The contractor shall provide a quote for supply and installation of a piping system, which shall be made-up of a single metallic pipe, EMT type and gauge of 1 inch. The contractor shall also include in his offer the elements, parts and accessories required to install the pipe according to NTC 2050. This work includes metallic boxes and associated isolated grounding. The new piping system shall be placed along (attached on wall) the ceiling (suspended) if required. The new piping system shall be labeled every 1.5 meters (marking labels shall be defined during project execution). The total length of the proposed system is 30 meters; however the contractor shall verify this measurement during the pre-proposal site visit, adjusting it if necessary. The metallic segment ends in a metallic junction box, which shall be placed on the hangar's façade; this is required to connect an underground PVC line.

6.3 Underground piping (PVC)

The contractor shall provide a quote for supply and installation of a piping system, which shall be made-up of a single PVC pipe with gauge of 1 inch. The contractor shall also include in his offer the elements, parts and accessories required to install the undergrounded pipe according to NTC 2050. This work includes concrete

boxes (40cmX40cmX40cm). The new PVC piping system shall be placed between the sidewalk of Hangar façade and the new concrete junction box, which is shown in the drawing No. 4. The new piping system shall be laid 35cm from soil level. The awarded contractor shall include a safety tape according to standard CS273. The safety tape shall be placed 30 cm from soil level. The total length of the proposed system is 10 meters; however the contractor shall verify such measure during the pre-proposal site visit, adjusting it if necessary.

6.4 Junction boxes for secondary circuit (lamps)

The contractor shall quote for supply and installation of metallic junction boxes, which shall be placed according to distribution presented on drawing No. 4. The new junction boxes shall be made of metal with dimensions of 10cmX10cmX10cm.

6.5 Secondary circuit- Electrical wiring

The contractor shall quote for supply and installation of the new cabling system for each of the new circuits on the new facilities. The expected wiring shall be type THHN/THWN AWG 3XNo.12. The information regarding wire's caliber is attached in the annexed document "Electrical calculations.pdf"

6.6 Secondary circuit- raceway and ducts

The contractor shall quote for supply and installation of a metallic raceway, which shall be placed along the wall. The raceway system shall be made-up of a metallic raceway, metallic piping and by a segment of a metallic ladder (see item "Distribution raceway backbone from communication system to new communication rack" for more details).

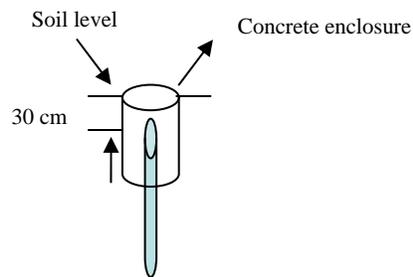
The metallic piping shall be made-up of EMT pipes and unless stated otherwise in plans, the piping gauge will be ¾ inches. The new system shall run on ceiling and/or walls, suspended or fixed along or embedded, such as shown in annexed plans. EMT accessories and installation devices such as anchor are subject to be included in the proposal.

6.7 Fluorescent lamps 1X15W, saving bulb

The contractor shall quote for supply and installation of fluorescent saving bulbs 1X15, such as shown in drawing No. 4. The contractor should submit samples to COR before installation is done. The new lamps shall include the electrical access service point (tube type EMT ¾", cabling and light switch toggle type) appliances, and accessories for correct installation. The new lamps shall have a light switch, which shall be installed 120cm from finished floor. The number of lamps per light switch is also presented in annexed plans. The contractor shall include in his/her offer the materials and labor required to install each unit, including the electric piping, cabling and light switch toggle type.

6.8 Grounding system

The contractor shall ground the new panel boards from the grounding bar located in the General Panel Board. The grounding lines shall be type THHN/THWN AWG No. 8 (See item "Secondary circuit branches"). Ground lines connected from the new distribution panel boards shall be installed in a radial way, avoiding looping. The awarded contractor shall observe the NTC 2050 standard and RETIE. The awarded contractor shall guarantee the absence of parasite current flows (60Hz) in the grounding lines. If this phenomenon happens, the awarded contractor shall adopt the countermeasures to correct and prevent the situation (this shall be included in the proposal). The grounding work includes the installation of a grounding electrode placed below the proposed new panel board (It shall be grounded 30 meters from soil level). The grounded electrode shall have an inspection enclosure 30 cm, such as shown in Picture No. 1. The grounded electrode shall connect the panel board through an isolated feeder THHN/THNW AWG No. 8. The electrodes shall be caliber 5/8", 2.44 length, and copper 99%. If current soil conditions do not allow obtaining the required impedance value as requested on this SOW (10 Ohms), the contractor shall conduct a grounding analysis in order to diagnose the type of soil treatment to improve the expected value of impedance.



The grounding system shall be certified as follows:

- Official resistance value according to Standard IEEE 142-4.1.2
- Electrode Material according to Standard NEC 250-52-c (2)
- Pipe type Electrode Size according to Standard NEC 250-52-c (3)
- Distance between placed electrodes NEC 250-56
- Connections Quality NEC 250-70
- Grid Conductors Gauge NEC 250-50-(d)
- Ground Connector Gauge NEC 250-66
- Wires Quality NEC 250-50
- PT NEC Interconnection NEC 250-68
- Accessibility to Electrode NEC 250-68
- Main grounding bus bar EIA/ TIA 607-5.4
- Circulating current IEEE 1100 Table 4.3

6.9 Lightning system

The contractor shall supply and install a protection lightning system that shall have one down spout line in copper which shall be connected to the grounding electrode (depicted in previous section). The down line, which connects a Franklin electrode placed in the roof, shall be made by bared copper wire AWG No. 2. The contractor shall install a passive electrode Franklin type, 0.6 meters high, solid rod, with a minimum gauge of 16mm. The union elements between rods, bars, wiring and down spouts shall comply with IEEE-837. The down spouts shall be made of galvanized pipes, one inch, and shall be embedded in the façade. The grounding connection and unions shall be done with exothermic soldering.

6.10 MARKING

The electrical works shall be marked by means by labels, and directories and electrical plans shall be placed on site. The vendor shall provide a fire extinguisher according with NFPA regulations, type ABC, including signaling icon and wall marks. Once the vendor finishes the works, he shall provide as-built plans including electrical diagrams, wiring gauges, pathways. Technical information from each installed device shall be included.

6.10.1 Warranties

The contractor shall quote for preventive maintenance service on-site during the warranty period of one year, which shall include three preventive maintenances of the pumping and hydro-pneumatic systems.

6.10.2 Grounding lines' labeling

The grounding lines running from the main distribution panel board shall be marked. These marks shall be done in solid plastic, 5cmX3cm, fonts colored in red and background colored in yellow.

6.10.3 Panel board labeling

The main distribution panel board, the breaker on the substation's main panel board, the new distribution panel board for each module (building) and their breakers shall be marked. All marks shall be done in solid plastic, fonts colored in white and background colored in black. The following dimensions are expected:

10cmX5cm, for the main distribution panel board
5cmX3cm, for each distribution panel board
5cmX3cm, breaker on the substation; main panel board

All panel boards shall have their own single diagram, load diagram and all circuits shall be labeled.

6.10.4 Junction boxes labeling

The new junction boxes shall be marked by using a metallic mark, size 3cmX4cm and low relief.

6.10.5 Metallic enclosures

All metallic enclosures shall be labeled by using solid plastic marks, fonts colored in white and background colored in black. The contractor shall also use safety signaling for the panel boards' doors.

6.10.6 Marking codes

The texts and fonts to be used in the project shall be submitted by the awarded contractor in order to get the COR-NAS's approval.

6.10.7 Main circuit branch cabling

The wiring to be used for phases shall be labeled by color tapes in yellow, blue and red, with neutral colored in white and grounding in green. The main circuit branch shall be labeled by using solid plastic marks, size 10cmX5cm, fonts in white and background in black. The font size is selected on site. The new labels shall be placed on the new junction boxes.

6.10.8 Secondary branch cabling

For cabling gauge bigger than (AWG No4, 2, 1/0, etc) or equal to AWG No. 6, the contractor shall observe the same protocol depicted in the previous item. For cabling gauge such as AWB No. 8, 10 and 12, the contractor shall use colored cabling in red, yellow and blue for each phase (not repeating each others), neutral in white and ground in green. The secondary circuits shall have plastic moorings, holding the cabling every 1.5 meters. The secondary branches shall be labeled by solid plastic marks, size 10cmX5cm, fonts in white and background in black. The font size is selected on site. The new labels shall be placed on the new junction boxes

6.10.9 Indoor buildings cabling

The contractor shall use colored cabling in red, yellow and blue for each phase (not repeating each others), neutral in white and ground in green. The contractor shall install solid plastic marks on faceplates. The marks shall have the following dimensions 3cmX1cm, fonts colored in white and background colored in black.

7.1 OTHER REQUIREMENTS

7.1.1 List of Personnel

Prior to initiation of the work, a list of personnel to be employed at the site shall be submitted for review to be able to obtain access to work area. The information required includes full name, identification card number, place and date of birth, home address and, in some cases, a valid government certificate of good conduct and photographs. The US Government and the Base shall reserve the right to admit or withdraw personnel from the work site for reasons of security and/or due to the quality of the work.

7.1.2 Vehicles and Machinery

All vehicles and machinery or equipment that would schedule to enter the work area shall be itemized on a list submitted well enough in advance to be verified and to obtain an entry permit. This list shall include type of vehicle, plates, complete name and ID number and place of issue of the driver. The Contractor shall take into account the time used by vehicles and personnel in order to enter and exit the work area.

7.1.3 Industrial Safety Person

The Contractor shall have permanently on site a person specialized in industrial security who will be dedicated to ensure that the workers are constantly complying with the security standards of personnel and equipment, scaffolds and other installations or structures.

7.1.4 Apparel

All personnel shall be equipped with an overall of the same design and color, or long pants and T-shirt with sleeves of the same type and color, boots, hardhats, gloves and any security elements required for their particular activity, such as face masks or shields, gloves, boots, ear plugs, etc. Use of these items at the work site is mandatory. Likewise, each employee shall wear a laminated recent photo identity card indicating his/her name and identification card number, position, and Contractor name.

7.1.5 Cleaning and Debris Removal

The Contractor shall have personnel cleaning the construction site and nearby zones daily. The unit prices for all items, without exception, include the costs of cleaning up, loading and removal of all materials resulting from the building work. The Contractor will take these materials to an authorized dump, where the interests of the base, third parties and the environment will not be affected (the Contractor shall follow the parameters established in Resolution 541/94 and subsequent modifications). Material from excavations shall be deposited in such a way as to avoid blocking the entrance to the site at all times or occupying public roads while the material is being loaded into trucks for removal.

7.1.6 Materials and Finishes

The Contractor shall include new materials of first quality design for prolonged and heavy duty use. The Contractor shall ensure good materials and excellent finishes. All the colors and finishes shall be submitted to the US Government Representative for approval prior to purchase and installation.

The Contractor shall leave on site a stock of materials like bulbs, fuses, terminals or pipes that have been fitted, representing three (3) % of the total quantity, for future maintenance purposes. These items shall be handed over duly packed, identified and listed.

7.1.7 Food, Transportation and Lodging

The Contractor is responsible for food, transportation and lodging for personnel off Base.

7.1.8 Information of Important Events

The Contractor shall inform the Contracting Officer's Representative of special events or works, such as the pouring of concrete, tests and the like, giving the Contracting Officer's Representative at least seventy-two (72) hours notice so he/she can be physically present.

7.1.9 Site Description

Before beginning preliminary works, the Contractor shall complete a site description with photographs and an account of the actual conditions of roads, sidewalks, surrounding buildings, etc. This report shall be signed by the commander and Contractor. This report is for the purpose of documenting the actual status of the area before the work is performed. This report will be used to compare the site after the work is finished. Three identical copies must be furnished: one for the user (Colombian National Police), one for the Contractor, and the final one for the US Government. If the Contractor caused any damage to the work site or other private or public property, he/she shall do all the repairs prior to the contract closeout; these repairs are without cost to the US Government. At the end of the project, a closing review and memorandum should be done with the participants, with a signed copy furnished in the final report.

7.1.10 Inventory of Removed Elements

The Contractor shall dismantle, list, and submit the reusable elements of the work site to the final user (Colombian National Police). A signed copy of this list shall be given to the user and the Contracting Officer's Representative.

7.1.11 Protection of Elements in the Work Area

Areas, equipment, and elements at the work site or in areas nearby shall be protected from damage or deterioration. The Contractor shall assume the cost of any repair or replacement required because of improper use or carelessness on his part or on the part of his workers.

7.1.12 Security of the Construction Site

The Contractor shall supply security for the construction site and the camps. The US Government and the final user will not be responsible for the payment of the security services nor for the elements left at the construction site.

7.1.13 Nearby Zones

The nearby zones must be left in the same or better conditions as found prior to construction (with grass, gravel, sidewalk, floor finishes, etc as applicable). Furthermore, repairs shall be done to faults, scratches, damage and anything else which the Contractor and the US Government might note in the building and neighboring constructions for ensuring that the work is made ready and handed over correctly. The Contractor shall dismantle and remove all preliminary facilities, camps, sites, etc. before the final handover, eliminating all debris and extra materials.

7.1.14 Underground Interferences Study

The Contractor shall have on hand a study of all aerial, surface, underground or engaged interferences provided by the CNP, so as not to damage pipes, boxes, wiring, posts, hoses, wells or other elements or structures existing in the work area or adjacent to it. Should the excavation interfere with sewers or pipes, the Contractor shall build adequate support or protection for these installations and/or develop a new route, subject to prior approval by the US Government Representative. The Contractor shall keep all drains, caps and catch pits clear in public utility networks near excavation sites to prevent their obstruction or damage.

NOTE

- All work must be done without interfering with the operations and circulation in the area.

The following drawings are enclosed:

01. General location wash rack and Shed.
02. General plan wash rack.
03. Shed structural
04. Hydraulic and electric
05. Details construction platforms.

"FIRM AND PROJECT INFORMATION "

Firm Information		NIT NUMBER:	
NAME	ADDRESS	TELEPHONE/FAX	E-MAIL ADDRESS

Owners, Partners and Principal Officer

NAME	POSITION	TELEPHONE	ENGLISH COMMUNICATION (Ability to understand, write and read)

Legal Representatives and backups

NAME	POSITION	TELEPHONE	ENGLISH COMMUNICATION (Ability to understand, write and read)

Project Director, Superintendent and key technical Personnel for this project

NAME	POSITION	TELEPHONE	ENGLISH COMMUNICATION (Ability to understand, write and read)

Subcontractors for this project (if it does not apply indicate it in the chart)

NAME	ACTIVITY TO PERFORM	% DEL PROJECT TOTAL	TELEPHONE	ADDRESS AND CITY

Suppliers for this project

NAME	MATERIALS TO SUPPLY	% DEL PROJECT TOTAL	TELEPHONE	ADDRESS AND CITY

Requirements of the Offeror and Owners/partners:

DESCRIPTION	YES	NO	NOTES
Has all licenses and permits required by local law to perform?(Chamber of Commerce, Merchandise Register, Professional Licenses, etc.)			
Meets local insurance requirements (Prestaciones Sociales, ICA, Sena, etc.)			
Has the ability to obtain a performance and guarantee bond and payment bond, or adequate performance security, such as irrevocable letters of credit or guarantees issued by a reputable financial institution. Include Information			
Has adverse criminal record?			
Has political or business affiliation which could be considered contrary to the interests of the United States.			

I certify that the information is accurate and verifiable

Signature of the Legal Representative _____
Name of the Legal Representative _____

Date _____
Id Number _____

Artículo 289 del Código Penal Colombiano: "El que falsifique documento privado que pueda servir de prueba, incurrirá, si lo usa, en prisión de uno (1) a seis (6) años."

"FIRM EXPERIENCE"

Indicate the experience of the firm in similar projects performed in the last ten (10) years. Include maximum 10 projects. **Do not include certifications or contract copies.** In the case we needed we will require it afterwards.

	1	2	3	4	5
NAME OF THE CLIENT (CONTRACTING PARTY)					
CLIENT ADDRESS					
CLIENT TELEPHONE NUMBER					
CLIENT POINT OF CONTACT					
<hr/>					
CONTRACT NUMBER					
TYPE OF CONTRACT (* 1)					
NAME OF THE CONTRACT OR PROJECT					
PROJECT LOCATION					
<hr/>					
PROJECT STARTING DATE					
PROJECT FINISH DATE					
WAS THE PROJECT FINISHED ON TIME (Explain if needed)					
<hr/>					
SQUARE METERS OR UNITS (Indicate unit measurements)					
CONTRACT COST IN PESOS					
CONTRACT COST IN MONTHLY MINIMUM SALARIES					
<hr/>					
INDICATE IF IN THIS PROJECT YOU WERE THE PRIME CONTRACTOR , SUBCONTRACTOR OR ASSOCIATE					
INDICATE THE PERCENTAGE OF PARTICIPATION OF YOUR FIRM IN THIS PROJECT					
<hr/>					
BRIEF DESCRIPTION OF ACTIVITIES BEING PERFORMED					
COMPARISON OF THE WORK PERFORMED WITH THIS SOLICITATION (* 2)					
<hr/>					
BRIEF DESCRIPTION OF TECHNICAL PROBLEMS ENCOUNTERED AND THE WAY THEY WERE SOLVED					
METHOD OF ACQUISITION (Public solicitation, private or non competed) award criteria					
COST/PRICE MANAGEMENT HISTORY (any cost overruns and under runs, and cost growth and changes)					
<hr/>					
HAVE YOU HAD ANY CONTRACT TERMINATIONS IN THE LAST TEN (10) YEARS?					
REASONS FOR TERMINATIONS (for contractor convenience ó for default or other)					

(*1) Consulting, construction, design, work oversight, delegated administration If you are not a company explain if you were the superintendent, director or other.

(*2) En here you should indicate which activities performed are similar to the work being contracted.

I certify that the information is accurate and verifiable

Signature of the Legal Representative _____ Date _____
 Name of the Legal Representative _____ Id Number _____

Artículo 289 del Código Penal Colombiano: "El que falsifique documento privado que pueda servir de prueba, incurrirá, si lo usa, en prisión de uno (1) a seis (6) años."