Transplant Plan:

I. DETERMINATION OF FEASIBILITY:

Objective:

1. To review the specifications, requirements, and procedures of the devegetation process and to ensure quality and maximum survival rate of salvation plant material as indicated on drawings and as specified.

Procedures:

1. Identify plants as listed on the inventory plan by walking clearing limits with Project Engineer.
2. Verify that plants listed on the transplant plans are in a salvageable condition. Clarify any discrepancies with the Project Engineer. Revise salvage status list, plant quality list, and contract price as required.
3. Contractor shall ensure the existing colored tags remain intact. Tags must be permanent and securely attached TO NORTH SIDE OF PLANT with aluminum wire provided. Identification numbers shall be legible and permanent.
4. Color photographs of the trees and saguaros identified for transplant will be taken directly before transplant. An identifiable-scaled object will be included to aid in determining overall size. Photos and an accompanying revised inventory of transplanted trees and saguaros will be submitted to the Project Engineer 2-weeks following final transplant operations. Location will be noted. Linear feet height, including number of arms will be noted for each saguaro. Linear feet height will be noted for each barrel cactus. Total caliper inch measurement of each boxed tree along with box size will be noted. Total quantity/species of collected stock will be noted.
5. Final location of each saguaro, tree, and collected stock will be per Landscape Plan.
6. Mechanical and hand equipment to be used for salvage process:
    1. John Deere 310 4x4 Backhoe
    2. 2,000-Gallon Water Truck
    3. 500-Gallon Water Wagon
    4. 24’ 2-Ton Flatbed Truck
    5. 24’ 2-Ton Saguaro Truck w/ Hydraulic Cradle
    6. ½-Ton 4x4 Pickup Truck
    7. Chainsaws, Shovels, Picks, Pruning Loppers, and Banding Crimpers/Shears
7. No nursery stock will be required for the salvage scope of this project. All material will be salvaged from onsite and not purchased separately from an offsite nursery.

II. PRUNING:

Objective: To remove foliage proportionate to root system eliminated by boxing and provide an aesthetic framework of branches that preserves the size and features of the tree or shrub being salvaged.

Procedures:

1. If a branch that has the aluminum identification tag is to be pruned, the aluminum tag must be relocated to a branch on **THE NORTH SIDE** of the plant that will not be pruned with a minimum diameter of 1".
2. Remove branches such that a total of about 25-30 percent of the original foliage is removed. **DO NOT REMOVE MORE THAN 30 PERCENT OF THE TOTAL CANOPY**.
3. **EXTREME CARE SHOULD BE TAKEN TO MAKE PROPER CUTS WITHOUT DAMAGING BARK RIDGE OR BRANCH COLLAR.**

III. DETERMINATION FOR BOX SIZES:

Objective: To determine the box size that will maximize the chances of survival of the tree or shrub but will still be within economic constraints

Procedures:

1. After pruning and assessing soil conditions, determine size of box to be used.
2. Write the box size on flagging tape to alert boxing crew.
3. Locate all boxed plants in the nursery with same north orientation in which they grew. (The north orientation must be placed on the boxes prior to removal.)

GENERAL GUIDELINES FOR BOX SIZE:

Box Size	Trunk Caliper
24"	0-2.5"
30"	2.5-3.5"
36"	3.5-5"
42"	5.5-7.5"
48"	7-9.5"
54"	9-11.5
60"	11-13.5"
72"	15-17.5"
84"	18-20"

IV. SIDE BOXING:

Objective: To preserve an intact root ball to be enclosed be four tapered box sides with minimum damage to the root system.

Procedures:

1. Measure and mark the box outline on the ground surface to facilitate digging.
2. Trenching around the plant to expose root system with minimal disturbance.
3. Carefully cut roots flush with side of the root ball as they are encountered. **DO NOT TEAR OR SHRED ROOTS.**

4. As digging of the trench progresses, gradually cut the root ball inward to accommodate the taper of the box.
5. Finish soil level shall be 6” from top of box so as to maximize water-retaining capacity.
6. Attach box sides around root ball. Box sides shall be constructed with exterior grade plywood or lx, non-toxic pine #3 supported by 2x material. 72” and larger box sides shall be constructed entirely from 2x material. No fiber or particleboard will be permitted.
7. Secure box sides with steel banding (**MINIMUM DEMENTIONS ¾” X .028**).
8. Pack dirt tightly into any space between box sides and root ball. Do not add additional soil above original root ball height on the trunk.
9. Water settle thoroughly to eliminate all air pockets and repack dirt as needed.
10. Plants should be left side boxed and watered extensively for a minimum of three weeks. Tree root ball shall be thoroughly saturated with each watering. Allow root ball to dry between watering. After root ball has dried, the next watering shall occur within 2 days.

V. PLACING SUPPORTING TOPWOOD:

Objective: To minimize movement of plant and it’s root system by anchoring securely to box and to reduce loss of soil during transportation and handling.

Procedures:

1. Measure 2x4 or 2x6 wood to fit width of the box and cut to size.
2. Place wood on each side of trunk. Nail wood to box sides**. DO NOT NAIL SUPPORTING TOP WOOD INTO TRUNK OF TREE.**

VI. BOTTOMING

Objective: To cut the remaining roots while minimizing loss of soil from the bottom of root ball.

Procedures:

1. The box may be tipped in any direction corresponding with the box sides. Consideration should be given to low branches, or other obstacles that would impede topping. Trench size may need to be increased on the side the box is tipped.
2. Place steak at a safe distance from the trench in the direction plant is to be tipped. Attach “Come Along” or tractor to one end of chain. Wrap other end of chain around box and secure**. DO NOT ATTACH CHAIN OR ANY OTHER DEVICE TO PLANT ITSELF**.
3. **GRADUALLY** tip box and undercut beneath root ball. Cut tap roots cleanly as encountered.
4. Depending on soil conditions, pre-assemble bottoms may be feasible
5. As box is tipped, nail bottom boards to box sides. Repack/replace any lost soil as each bottom board is placed. **DO NOT DISTERB ROOTBALL**. When tree is fully tipped and bottom is completely covered, nail (2) 2x boards perpendicular to others.
6. Place banding underneath cross members and return box to its original orientation.

7. Place banding alongside and over top of box using a minimum of two (2) bands per box face.
8. Once the bottom is in place, **THE PLANT MUST REMAIN IN PLACE FOR 1-WEEK** prior to moving to nursery to determine if the plant survived to bottoming process.

VII. REMOVAL & TRANSPORTATION:

Objective: To move boxed plant to holding area without damaging box or plant.

Procedures:

1. Label each box with permanent, non-fading marker, label original north orientation, plant tag number, side box date and bottoming date.
2. Using backhoe or front loader, place chain around box and secure to bucket of machine. **DO NOT ATTACH CHAIN OR ANY OTHER DEVICE TO PLANT MATERIAL ITSELF**. Tilt bucket and lift out of hole. Lift out of hole.
3. Care shall be taken to avoid damage to plant or breaking of branches while plant is being moved.
4. Place all plants, both boxed and direct transplants in the nursery in the same north orientation in which they grew.
5. Care should be taken to properly compact soil around the roots of plants that are directly transplanted in the nursery to ensure that there are no air pockets or voids.
6. All plant material shall be placed in an orderly manner in the nursery accessible from at least one direction.

VIII. SAGUAROS:

Procedures:

1. Saguaros will be placed in the nursery. Additionally, some saguaros have been identified per the contract documents as being moved once and will be moved to a new final location as identified on the Landscape Plan. Saguaros will be moved on a cradle and will be planted with the same north orientation as they originally grew. Treat all wounds and root cuts with a thorough coat of soil sulfur dust (non-granular). **SOIL SULFER DUST MUST ADHERE TO THE APPLICATION AREA.**
3. A root ball of at least 24” shall be retained on all Saguaros.
4. Extreme care should be taken to assure all saguaros are transplanted in such a manner to retain the natural balance of the plant, heavy, large arms shall be considered.
5. All Saguaros shall be watered thoroughly fifteen days after transplanting to remove air pockets and assure proper soil compaction.
6. Temporary bracing will be required on saguaros 7’ in height and taller.

IX. SMALL CACTI – COLLECTED STOCK:

Procedures:

1. Barrel Cactus, Cholla, Prickly Pear, etc., will be dug bare-root and replanted at the nursery site.
2. All cacti will be planted with the same north orientation as they originally grew.
3. All small cacti materiel that is bare rooted shall be watered thoroughly fifteen days after transplanting to remove air pockets and assure proper soil compaction.
4. Care should be taken to properly compact soil around the roots of plants that are directly transplanted in the nursery to ensure that there are no air pockets or voids.

X. NURSERY HOLDING SITE:

Objective: To create an organized, accessible, and secure nursery that provides ease in care and maintenance of plant material.

Procedures:

1. All plant material shall be relocated to the nursery location for storage of salvaged saguaros, collected stock – small cacti, and boxed tree material.
2. Locate all saguaros, collected stock – small cacti, and boxed trees in the nursery with the same north orientation in which they grew. The north orientation must be placed on the box prior to removal. The north orientation will be identified on all saguaros and collected stock – small cacti with a ½" diameter spot of white paint.
3. Tree boxes and saguaros shall be placed to allow tractor access from at least one direction for ease of removal at the time of replant.
4. Provide a gravity fed drip irrigation system, and attach to trees. Water source will be onsite backflow attached to an existing hydrant.

XI. NURSERY SETUP PLAN:

Procedures:

Irrigation setup is followed as soon as the salvage schedule is complete, the trees have been moved to the nursery site, and a temporary water supply has been provided.

Irrigation Supplies are as follows:

- 2 inch PVC Pipe Schedule 40, this is the main water line
- Reducers from 2 inch to 1 inch, Preferably 2x2x1 PVC schedule 40 T's
- 1 inch PVC Pipe Schedule 40, this pipe is used for risers
- 1 inch PVC Ball Valves Slip
- Reducers From 1 inch to ¾ inch, this way one can go from 1inch PVC Ball Valves to ¾ inch poly ethylene tubing
- 1/8 inch spaghetti tubing (Part number T185)
- Type N sprayers (LCP shape N sprayer)

Irrigation Layout:

- A 2 inch mainline must be installed at least 1 foot underground where nursery is to be setup.

- 1 inch risers set in place level to the surface of the box
- Risers are to be installed at the beginning of each line and the ball valve set on the riser ¾ of the way up only if the line consists of 20 trees or less
- All poly tubing must be on the boxes stretched out from the first tree to the last tree of each tree line, and tied down closest to the tree trunk.
- Depending on the size of the tree a number of sprayers will be set at each corner.
- The drip emitter distribution tubing that will be hooked into the poly tubing to the sprayer will be long enough in order to be moved around in case some areas in the box are not receiving as much water.

Nursery Maintenance Activities:

The following items will be performed weekly:

- Watering of trees and cacti as needed.
- Removal of weeds in and around boxed trees and cacti.
- Removal of dead branches and dead trees.
- Irrigation repairs.
- The pick up of any trash and misc. debris.
- Notify Project Engineer of any sudden changes having to do with the health of a tree, saguaro, or small cacti.
- Complete and submit necessary reports as required per contract documents to project engineer.