REVISED DRAFT ACCIDENT PREVENTION PLAN AND SITE SAFETY AND HEALTH PLAN

NIAGARA FALLS AIR RESERVE STATION (NFARS) TREE REMOVAL ACTIVITIES

CONTRACT NO. W912DR-20-D-0012

Prepared for:

US Army Corp of Engineers
Baltimore District
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Baltimore, MD 21201

Prepared by:

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November 2023

a. SIGNATURE PAGE

This Accident Prevention Plan (APP) was developed by Tidewater, Inc. for activities at the Niagara Falls Air Reserve Station (NFARS), located in Niagara Falls, New York. The signatures below indicate approval of the plan and agreement to following the procedures described therein.

(1) Prepared by:

Nick Wyckoff Junior Scientist Tidewater Inc. Cell (203) 952-2933	Date

(2) Concurrence by:

Keith Fields, PE, PMP Project Manager Tidewater Inc. Cell (614) 778-2618	Date

(3) Approved by:

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ACRONYMS/ABBREVIATIONS:

ACGIH	American Conference of Industrial Hygienists
AED	Automatic External Defibrillator
AHA	Activity Hazard Analysis
ANSI	American National Standards Institute
APP	Accident Prevention Plan
BGS	Below Ground Surface
CAMP	Community Air Monitoring Program
CFR	Code of Federal Regulations
COR	Contractor Officer Representative
CP	Competent Person
CPR	Cardio Pulmonary Resuscitation
CSMP	Cold Stress Monitoring Plan
EAB	Emerald Ash Borer
EC	Emergency Coordinator
EWP	Excavation Work Plan
GFCI	Ground Fault Circuit Interrupter
HAZWOPER	OSHA Hazardous Waste and Emergency Response
HSMP	Heat Stress Monitoring Plan
ISEA	International Safety Equipment Association
LHE	Load Handling Equipment
NFARS	Niagara Falls Air Reserve Station
OSHA	Occupational Safety and Health Administration
PM	Project Manager
PPE	Personal Protection Equipment
QC	Quality Control
SOH	Safety and Occupational Health
SOW	Scope of Work
SDSs	Safety Data Sheets
SHM	Safety and Health Manager
SSHP	Site-specific Safety and Health Plan
SSHO	Site Safety and Health Officer
USACE	United States Army Core of Engineers
WBGT	Wet Bulb Globe Temperature

b. BACKGROUND INFORMATION

(1) Contractor

The contractor for this project is the Tidewater, Inc.

(2) Contract Number

USACE Baltimore District Contract No., W912DR-20-D-0012

(3) Project Name

The project involves conducting tree removal and disposal activities at the Niagara Falls Air Reserve Station (NFARS) located in Niagara Falls, New York.

(4) Brief Project Description, Description of Work to be performed, and Location

Project Description

Tidewater Inc. has prepared this Accident Prevention Plan (APP), Site Safety Health Plan (SSHP) and subsequent attachments for tree removal activities at NFARS. The SSHP is included in Appendix A. The current project, described in the Excavation Work Plan (EWP), involves tree removal and disposal activities within the Site 3 Landfill at NFARS. The tree removal and disposal involves contracting a professional arborist, The Davey Tree Expert Company (Davey Tree), to perform the removal and disposal of select trees infested with Emerald Ash Borer (EAB), removal of the tree stumps, and a Community Air Monitoring Program (CAMP).

Project Locations

NFARS is located in the Towns of Niagara and Wheatfield, Niagara County, New York, approximately 15 miles north of Buffalo. The installation adjoins the Niagara Falls International Airport to the north, and both encompass approximately 958 total acres. NFARS and Niagara Falls International Airport are bounded by Lockport Road to the north, Porter Road to the south, Packard Road to the west, and Walmore Road to the east. The NFARS installation and Niagara Falls International Airport are bisected by Cayuga Creek with NFARS encompassing 547 acres on the north side of the Creek. The Site 3 Landfill is located in the Northeastern portion of NFARS.

(5) Phases of work

Phase 1: Tree removal, disposal, and CAMP Air Monitoring

- Perform site preparation activities including locating the trees to be removed, and vegetation removal surrounding trees to be cut down (to allow workers to access the base of all trees).
- Evaluating landfill cap conditions and making note of any issues documenting prior to tree removal.
- Remove all selected trees.
- Dispose of tree cuttings at offsite location capable of handling cuttings infested with EAB.
- Remove stumps associated with trees removed to a depth of no greater than 6 inches Below Ground Surface (BGS) to protect integrity of soil cap.

- Perform CAMP air monitoring during stump removal activities to ensure VOC and particulate contamination is not exceeding set criteria.
  - A Camp Air Monitoring Plan can be found in the EWP
- Adjust site operations accordingly.

Phase 2: Site Restoration

- Removal of all debris generated from tree removal and stump grinding prior to adding soil cover.
- Application of additional topsoil cover to establish the original grade of the landfill cap.
- Seeding to establish permanent soil cover.
- Any soil disturbed during tree removal operations will be restored to ensure the continued integrity of the landfill cap (See EWP sections 8.0 and 9.0).

(6) Activity Hazard Analysis

The Activity Hazard Analysis and control measures for the tasks planned are provided in Appendix B. Work phases that require an Activity Hazard Analysis (AHA) include the following:

(1) Mobilization and Demobilization
(2) Tree and Stump Removal and Disposal
(3) Site Maintenance and Restoration

Anticipated Hazards

Tools and Equipment: Hazards present while using tools and equipment are generally associated with improper tool handling and inadequate maintenance. Management of these hazards requires rigorous maintenance of tools and equipment and effective training of employees in the proper use of these tools. Electrically powered tools have inherent physical hazards. Most equipment will create vibrations during operation. Proper safety procedures will be implemented during their operation.

Large power tools and equipment should be lifted properly to prevent back injuries. Safety glasses with side shields, ear protection, and safety-toed boots will be worn while operating powered tools or equipment.

Electrical cords must comply with EM 385-1-1, Section 11 and will be listed by UL or other nationally recognized testing laboratory and shall have unbroken insulation and should not be exposed to water or other liquids. A ground fault circuit interrupter (GFCI) outlet or cord must be used at all times. All electrical equipment must be inspected, and color coded as per the Assured Grounding and Bonding Program (EM 385-1-1: Section 11) if GFCIs cannot be used as stated above.

Slips, Trips, and Falls: All sites present slip and trip hazards. This site may have wet muddy areas and uneven terrain that pose slip hazards. Employees should be cognizant of slip hazards and avoid walking over muddy/marshy surfaces whenever possible. Good housekeeping principles will apply.

Cold/Heat Stress: Cold/Heat stress (frostbite, hypothermia/heat exhaustion, and heat stroke) may be a hazard depending on the weather conditions encountered at the time of scheduled activities. Workers should dress appropriately and remain aware of changing weather

conditions while at the Site. Cold stress will be more of a factor during this project due to the time frame and location of this project.

Exposure to sun, even in the winter, for short or long periods can result in minor to severe sunburn. Chronic exposure to the sun can cause cancer (melanoma lesions). When possible, stay out of direct sunlight by seeking shade. Wear and reapply liberal amounts of sunscreen to protect skin, especially the face, from direct sunlight. Sun/safety glasses that are polarized with ultraviolet light protection should also be used.

Biological Hazards: Potential biological hazards associated with working at the site include snakes, insects, and poison ivy. While no specific biological hazards have been identified or communicated by the host, Tidewater Inc employees and their subcontractors will be instructed to maintain awareness for biological hazards in their surroundings, especially when initially entering the work site. If any such hazards become known during the course of the project, the Site Safety Health Officer (SSHO) will make the appropriate changes in this APP and communicate the dangers/concerns to the workers. Workers will exercise caution when traversing the site to avoid insects, snakes, and poison ivy. No significant populations of any of the referenced potential biohazards have been identified at the work site.

Serious and/or threatening chemical and physical hazards frequently overshadow any potential exposure to biological hazards. However, specific biological hazards can cause injury and even death. Therefore, when appropriate, such hazards will be identified and evaluated in conjunction with all other actual or potential hazards associated with an operation, and steps taken to control exposure. Procedures as prescribed in the First Aid Book will be properly implemented. Paramedics will be summoned for workers exhibiting symptoms of allergic reaction to a biological hazard.

The following chemicals may be brought onto the Site during the Site work:

- Gasoline and Diesel: Gasoline and Diesel will be used for site vehicles and equipment. Excluding chainsaws, all machinery will be filled at offsite filling stations.
    - All gasoline will be stored in no larger than a 5-gallon safety can with a spring-loaded lid to prevent any spills.

Safety Data Sheets (SDSs)
Copies of SDSs (formerly known as Material Safety Data Sheets) for the above listed chemicals will be kept on-site at the point of storage during the field activities. The SDSs will be reviewed during the initial tailgate safety meeting with all site personnel. The handling and storage requirements outlined on the SDSs will be followed for each chemical.

c. STATEMENT OF SAFETY AND HEALTH POLICY

Safety and Health Policy Statement

It is the policy of the Tidewater Inc. Team to provide a healthy and safe environment for all of its employees. We do this by fostering a strong safety culture, integrating safety into every

aspect of work planning and execution. Incidents resulting in injury, illness, or property damage are preventable and safety takes precedence over short-term gains. The Tidewater Inc. Team has established a health and safety program and management system to prevent accidents and enable managers to provide employees with direction on health and safety issues. Each employee is responsible through personal example to establish a climate in which everyone shares a concern for their own safety and that of their fellow workers.

The Tidewater Inc. Team constantly improves its safety goals by auditing past projects and adding lessons learned to new projects. The Tidewater Inc. Team records all accidents and injuries and near misses to determine areas for improvement on future projects. All recorded incidents and accidents are reviewed by the Safety and Health Manager (SHM) to determine if adjustments need to be made to the company health and safety program.

The primary objective of this project is to remain accident and injury free throughout the duration of work. All work will be conducted in full compliance with standards of the Occupational Safety and Health Administration (OSHA), the USACE Safety and Health Requirements Manual EM-385-1-1where appropriate, and applicable local, state and federal regulations.

The Tidewater Inc. Team has established procedures that provide direction on health and safety issues for all employees. These procedures are periodically evaluated to ensure that they are kept up to date.

The Tidewater Inc. Team disciplinary program provides procedures and guidance for addressing problem performance. Disciplinary actions for misconduct or unsatisfactory health and safety performance include verbal and written warnings and suspension without pay. A serious violation of safety or health rules or engaging in conduct that creates a safety or health hazard may be considered a serious offense and may result in immediate termination.

This APP was developed in compliance with USACE EM 385-1-1, 30 Nov 14; APPENDIX A: MINIMUM BASIC OUTLINE FOR ACCIDENT PREVENTION PLAN.

For this project, Tidewater Inc. has adopted Tidewater's written health and safety plans and programs.

d. RESPONSIBILITIES AND LINES OF AUTHORITY

(1) Employer's Ultimate Responsibility for Implementation of the SOH Program

The Tidewater Inc. Team bears the ultimate corporate responsibility for the implementation of the Safety and Occupational Health (SOH) Program.

Overall personnel responsibility for the Tidewater Inc. Team health and safety programs and policies lies with the SHM. Specific responsibilities of the SHM towards health and safety efforts include:

- Ensuring resources are available to implement the program.
- Reviewing and approving all policy update(s).
- Develops, implements, and manages corporate safety and health program.
- Provides current safety guidelines and procedures.
- Develops checklist and ensures frequent project safety audits.

- Oversees medical surveillance, respiratory protection and Health & Safety training programs for all applicable corporate employees.
- Assesses incident reports.
- Coordinates and conducts safety training efforts.
- Approves all project health and safety plans.
- Interacts with OSHA and/or state regulatory officials as required.

The Project Manager (PM) has the ultimate responsibility for implementing the Tidewater Inc. Team's SOH Program at the project level. Specific responsibilities of the PM include:

- Read and review the Construction Safety Standards and become knowledgeable of local, state and federal regulations.
- Is responsible to see that an analysis is made of the plans and specifications and a study made of the site to determine the exposure to accidents which may develop.
- Require that subcontractors comply with safety requirements.
- Be responsible when visiting the job site to report to the Superintendent all unsafe acts and conditions observed.
- Review all accident reports.
- See that all site safety record keeping is maintained by field management.
- If a temporary office is established at the job site, provide the job site with the necessary safety forms, posters, reports, regulations and literature.
- Conduct a minimum of one safety inspection of the job site and file a written report.

The SSHO is responsible for the implementation of the company SOH Program. Specific responsibilities of the SSHO include:

- Make available all necessary personal protective equipment, job safety materials, fire extinguishers and first aid equipment.
- Instruct the site employees that safe practices are to be followed and safe conditions maintained throughout the job.
- Provide new employee safety and health orientation for all workers on the project.
- Inform the workers they are not to take chances - rather they are to follow proper and safe procedures at all times.
- Instruct workers regarding their safety responsibilities and job safety requirements.
- Require that all subcontractors adhere to all safety regulations.
- Review all accidents with site personnel and ensure that lessons learned are shared and discussed.
- Hold weekly safety meetings and require subcontractors to hold daily "Tailgate Safety Meetings."
- Train all members of your crew on hazardous/toxic chemicals which are new to the job before they are exposed to them.
- Make sure that appropriate hazard warning labels are present on all containers containing hazardous/toxic chemicals or substances.
- Obtain copies of subcontractors' accident reports and perform a proper incident investigation report.

- Inspect the job site for health and safety hazards on a daily basis during tailgate meeting.
- Identify and assign other competent persons for work activities as needed.

(2) Key Personnel

Position	Name	Phone Number
PM	Keith Fields	(614)-778-2618 cell
SSHO	Hans White	(916)-402-3308 cell
Alternate SSHO	Udi Dias	(240)-217-1153 cell
SHM	David McCall	(740)-504-9714 cell

PM: The PM has overall responsibility for completion of the project in accordance with contract and regulatory requirements. The PM is responsible for planning and oversight of the project activities and acts as an interface between the field staff and corporate office. The PM has ultimate responsibility for the implementation of the project tasks and the safety and health of project workers. The PM is responsible for development of an EWP, field implementation, and laboratory analyses. The PM is also responsible for the completion of site operations in accordance with the approved plans and field work orders. The PM is responsible for the preparation of submittals, coordination of schedules, cost tracking, and serves as the primary contact with the Client. The Tidewater Inc. Team PM is Keith Fields, Tidewater Inc., 3761 Attucks Drive Powell, OH 43065; 614-792-2896 (office); 614-778-2618 (cell); keith.fields@tideh2o.net.

SSHO: The SSHO has the authority to ensure compliance with the site safety and health requirements, local, state and federal regulations and all aspects of the SOH Program including; activity hazard analyses, air monitoring, use of personal protective equipment (PPE), decontamination, site control, standard operating procedures used to minimize hazards, safe use of engineering controls, the emergency response plan, and spill containment program. The SSHO has full authorization to stop work and demand corrective action based on the non-compliance with the level of safety required by the plans. The SSHO is also responsible for preparation and maintenance of records by performing a daily safety and health inspection and documenting the inspection results on the daily log or tailgate meeting form. The Tidewater Inc. Team SSHO is Hans White. The alternate SSHO is Udi Dias

Safety and Health Manager: The SHM is responsible for the development, implementation, and oversight of the APP and overall management of the health and safety program for the project. The SHM provides oversight to the SSHO. The SHM coordinates any modification to the APP with the SSHO. The SHM is responsible for the evaluation of air monitoring data and recommending engineering controls, work practices, and PPE. The SHM reviews accident reports and results of daily inspections. The SHM for this scope of work is David McCall, Tidewater, 3761 Attucks Drive, Powell, OH 43065, 740-504-9714; david.mccall@tideh2o.net.

(3) Competent and/or Qualified Persons Training

The SSHO has the 30-Hour OSHA Safety in Construction certification. Both the SSHO and alternate SSHO are certified in Cardiopulmonary Resuscitation (CPR)/First Aid.

(4) Competent and/or Qualified Persons and Proof of Competency

The Tidewater Inc. Team has identified the following Competent Person (CP)(s) to serve on the Project Sites:

- Hans White– CP and SSHO
- Udi Dias- Alternate CP and SSHO

The SSHO and alternate SSHO are also certified in First Aid and CPR. Resumes and qualifications for Mr. Hans White and Mr. Udi Dias are located in Appendix E.

Other CP for specific work activities may be identified and assigned at a later date. Qualifications will be submitted at that time.

(5) Tidewater Inc.'s Risk Management Process

The Tidewater Inc. Team will use approved AHAs as part of a total risk management process.

(6) Pre-Task Safety and Health Analysis

The Tidewater Inc. Team performs a safety and health analysis prior to the performance of each task. This analysis is documented on the project AHAs, which are located in Appendix B of this APP.

The Tidewater Inc. Team requires the following analysis prior to performing each project task:

- Task description
- Hazard identification
- Risk and likelihood of occurrence
- Engineering controls
- Environmental monitoring for the hazards
- Personal protective equipment
- Training requirements
- Documentation on Activity Hazard Analysis form.

(7) No Work Shall Be Performed Without Designated Competent Person on Site

It is the Tidewater Inc. Team's policy that no work shall be performed unless the designated competent person is present on the job site. The Competent Person applies to the SSHO and alternate SSHO, another other as identified.

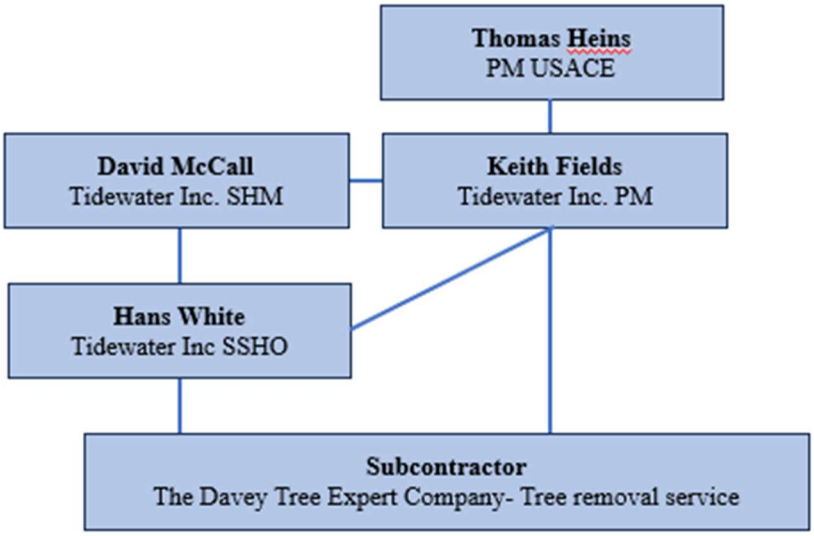
(8) Policies and Procedures Regarding Non-Compliance with Safety Requirements

The Tidewater Inc. PM, SSHO, or designated competent person shall stop work activities for non-compliance with this APP or the SSHS plan, or if site conditions become unsafe. Site work activities can resume only after the issue has been resolved. In most instances, the resolution occurs at the site level. The ultimate responsibility for resolution of conflicts lies with the PM.

The Tidewater Inc. PM, SSHO or designated competent person shall also suspend participation of an individual project team member from site activities for violation of any provision of this APP.

(9) Lines of Authority

The Tidewater Inc. Team's organizational approach shown below provides a single point of contact and accountability to USACE providing effective and efficient program management with minimal government oversight. Our PM will be supported at a program-level by quality control (QC), and contracts management, to ensure resources are available and committed to contract and task order requirements.



(10) Procedures for Holding Managers and Supervisors Accountable for Safety

The Tidewater Inc. Team's policy is that managers and supervisors are ultimately accountable for safety at the job site. They are responsible for ensuring that all personnel adhere to the requirements stipulated in this APP.

Safety performance will be evaluated as part of each manager's and supervisor's annual performance review. Poor safety performance will result in reduced merit compensation for the manager or supervisor.

e. SUBCONTRACTORS AND SUPPLIERS

(1) Identification of Subcontractors and Suppliers

An initial list of subcontractors is provided below. This list will change and be updated periodically.

Subcontractor	Service Provided
The Davey Tree Expert Company	Tree removal specialists (Arborists)

The Tidewater Inc. Team requires its subcontractors and suppliers to work in a responsible and safe manner. Subcontractors and suppliers are required to adhere to the guidelines and provisions contained in this APP and OSHA 29 Code of Federal Regulations (CFR) 1926 when performing activities at the project sites.

(2) Safety Responsibilities of Subcontractors and Suppliers

All subcontractors are required to provide their own Safety and Health Plan; it will be reviewed by the PM and SSHO. (If no plan submitted, the subcontractor will follow Tidewater Inc. Safety and Health Plan.) The subcontractor's Safety and Health Plan will only be accepted if they are equal to or exceed the requirements of the Tidewater Inc. Team's SOH Program. If a subcontractor submits a Safety and Health Plan and it is approved by the PM and SSHO, it will be attached to the SOH Program as an Appendix with concurrence of the SHM.

Subcontractors First Violation of a Rule or Regulation
A subcontractor employee who is cited for a first-time notice of a Safety/Health Violation Notice shall be immediately removed from the project site and shall not be permitted to return to work for a period of at least 24 hours, missing the next full workday.

Subcontractors Second Violation of a Rule or Regulation
A subcontractor employee responsible for a repeat offense or receiving a second Safety/Health Violation Notice shall be immediately and permanently removed from the project site for the remainder of the contract period.

f. TRAINING

(1) New Hire SOH Orientation Training at the Time of Initial Hire

All employees will receive orientation to the Corporate Health and Safety Program by the Corporate Health and Safety Manager or his designate and will be notified of any additions or changes to the program. This includes office safety, office evacuation, and specific safety discussion geared toward that person's specific job description.

In addition to the above, all project personnel must receive training and acknowledge understanding of the contents of this APP prior to performing work at NFARS Personnel will attend a site safety orientation prior to starting work on-site. This training shall include a review of the project tasks and responsibilities, hazards expected to be encountered, and means of hazard control. Specifically, the following subjects will be discussed at site project safety orientation:

- Requirements and responsibilities for accident prevention and the maintenance of safe and healthful work environments.
- General safety and health policies and procedures and pertinent provisions of EM 385-1-1.
- Employee and supervisor responsibilities for reporting all accidents.
- Provisions for medical facilities and emergency response and procedures for obtaining medical treatment or emergency assistance.
- Procedures for reporting and correcting unsafe conditions or practices.
- Job hazards and the means to control/eliminate those hazards, including applicable AHAs.
- Specific training as stipulated in the sections below.

(2) Mandatory Training and Certifications that are Applicable to This Project

40-HR OSHA Hazardous Waste and Emergency Response (HAZWOPER): The Tidewater Inc. Team conducting intrusive onsite efforts must have taken the initial 40-Hour OSHA HAZWOPER and continue to receive the annual 8-HR OSHA HAZWOPER refresher training.

30-HR OSHA Safety in Construction: The SSHO and his alternate must have received training in safety in construction in accordance with 29 CFR 1926 include a 30-Hour Construction Safety class, and an average of at least 8-hours of documented safety training (formal, on-line, or self-study) every year.

First Aid and CPR: A minimum of two personnel trained in First Aid and CPR shall be on-site/available at all times. One of the personnel will be the SSHO and the other will be the Davey Tree Expert Company Foreman. All Davey Tree employees will be certified in First Aid and CPR. Certifications can be found in Appendix E.

Personal Protective Equipment (PPE): All personnel shall be trained in the appropriate use of PPE.

(3) Periodic Safety and Health Training for Supervisors and Employees

The SSHO shall conduct daily "tailgate" safety meetings prior to the commencement of field work to review the day's activities, the relevant AHAs, establish safe working procedures for anticipated hazards, and provide pertinent health and safety training and motivation. These meetings shall be documented, including the date, persons in attendance, subjects discussed, and name of individual who conducted the meeting. A copy of the safety meeting form is located in Appendix F.

The SHM or designated person shall conduct supplementary safety and health training for all the Tidewater Inc. Team personnel, including supervisory personnel.

(4) Requirements for Emergency Response Training

The SSHO is responsible for management of emergency activities that may include responses to medical, fire, or injury occurrences. Prior to commencement of work at Niagara Falla ARS, during the site safety orientation, the SSHO shall review actions to be taken in the event of an emergency, the location of emergency equipment to include fire extinguishers and first aid kits, and the identity and location (route) to the designated medical facility. The SSHO shall be responsible for ensuring that emergency services are called in the event of an emergency. If the SSHO is unable to perform these duties, his designee will assume these responsibilities.

g. SAFETY AND HEALTH INSPECTIONS

(1) Safety Inspections

General Safety Inspection: The SSHO shall inspect the project location prior to commencing work and at least daily thereafter. Hazards identified or unsafe work practices shall be identified and corrected. Inspection results will be communicated to workers. All inspections shall be documented on the Site Safety Inspections are part of the daily Tailgate Meeting form, Appendix F.

Deficiencies: Deficiencies will be recorded on the Site Safety Inspection Checklist and a designated health and safety deficiency log. Specifically, the SSHO shall record the date the deficiency was identified, a brief description of the deficiency, and suggested corrective action. Once the deficiency has been resolved the SSHO shall record the date the deficiency was corrected, what actions were taken, and the personnel responsible for correcting the deficiency.

(2) External Inspections/Certifications

No external inspections/certifications are required for this project.

h. MISHAP REPORTING and INVESTIGATION

Mishap reporting and investigation is essential to preventing incidents and controlling hazards. Thorough investigations, paired with effective remedial actions, can eliminate future injury, property damage, lost time accidents, and mission interruption. Concern for employee and customer safety and well-being drives the accident investigation program. Investigation results are used to enhance the Tidewater Inc. Team Program through a Lessons Learned program, additional safety training, and modifications to processes and procedures. Mishap reporting and investigations will be conducted in accordance with Tidewater Inc. policy.

(1) Exposure Data

The SSHO will be responsible for collecting and recording the number of man hours worked on the site by skill trade. This data will be compiled and submitted to the PM on a daily basis. The PM is responsible for submitting this information to the Client Representative per contract requirements.

(2) Mishap Investigations, Reports, and Documentation

In the event of an injury or illness, work is to be stopped until the cause of the incident has been determined and appropriate action has been taken. Any injury or illness, regardless of severity, is to be reported on accident report forms. The SSHO shall notify the PM, SHM, and USACE Safety Manager of the accident as soon as possible but not more than twenty four (24) hours after the incident.

The SSHO shall thoroughly investigate all accidents. The investigation should determine what happened and how it happened, the results, immediate corrective action and any relevant information. The PM shall submit the findings of the investigation along with corrective actions to the Client as soon as possible but no later than twenty-four (24) hours following the accident. The Tidewater Inc. Team will implement corrective actions as soon as possible.

The Tidewater Inc. Team will strive to identify the root cause of each accident, to effectively select corrective actions to prevent mishap recurrence. The identified causes and corresponding corrective actions will be documented. The Safety Office will schedule Safety Concern Meetings to be held for all warranted accidents and incidents at which time a discussion will be conducted with the PM and SSHO, Affected Department Manager and Supervisor, Safety Manager and involved employee. Corrective actions to prevent future accidents or incidents from reoccurring will be discussed and pertinent findings and corrections will be implemented.

The Safety Office will record the ‘lessons learned’ through accident investigation, where appropriate.

If the lessons learned have internal application only, the Safety Office will use the information to improve hazard awareness, prevent accidents, and better implement the Safety Plan. Lessons learned will be discussed during safety meetings and personnel certification training. Lessons learned may also stimulate the revision of policies, procedures, and work practices, and will be a standard agenda item for the safety committee meetings.

(3) Mishap Notification

The Tidewater Inc. Team's employees will immediately report each incident, injury, illness, and near miss to the SSHO and their supervisor. The SSHO and/or supervisor will direct actions at the scene of the incident, to assure evidence preservation, thorough investigation, and compliance with applicable company policies, EM 385-1-1, and applicable provisions of 29 CFR. Telephone notification of all mishaps, including reportable property damage, will be made to USACE by the PM.

The following accidents that have, or appears to have, any of the consequences listed below require immediate notification and investigated in depth to identify all causes and to recommend hazard control measure in accordance with EM-385-1-1Section 1.D.4:

- Fatal injury/illness*;
- Permanent totally disabling injury/illness;
- Permanent partial disabling injury/illness;
- One (1) or more persons hospitalized as inpatients as a result of a single occurrence*;
- $500,000 or greater accidental property damage;
- Three (3) or more individuals become ill or have a medical condition which is suspected to be related to a site condition, or a hazardous or toxic agent on the site;

*Requires notifying OSHA in accordance with 29 CFR 1904.39 within 8-hours when their employee(s) is fatally injured as a result of a work-related incident; or within 24-hours when 1 or more persons are hospitalized as inpatients, there is a loss of an eye, or there is an amputation as a result of a work-related incident.

In addition to the above, any mishap occurring in any of the following high hazard areas shall be immediately reported. These mishaps shall be investigated in depth to identify all causes and to recommend hazard control measures.

- Electrical – to include Arc Flash, electrical shock, etc.;
- Uncontrolled Release of Hazardous Energy (includes electrical and non-electrical);
- Load Handling Equipment (LHE) or Rigging;
- Fall-from-Height (any level other than same surface), and
- Underwater Diving.

Also, the following will be reported:

- Property damage (exceeding $5,000 is recordable);
- Days Away Injuries;
- Days Away Illnesses;
- Restricted/Transfer Injuries.

The Accident Investigation and Reporting Form ENG 3394 is located in Appendix G.

i. OCCUPATIONAL RISK AND COMPLIANCE PLANS

Below we provide plans to provide Accident Prevention, Activity Hazard Analyses, and Occupational Risk and Compliance for the range of activities required under this contract.

(1) Fatigue Management Plans (01.A.20)

THE Tidewater Inc. Team does not intend to implement a Fatigue Management Plan as the following criteria for employee work-hours would not be applicable:

(1) Exceed 10-hours a day for more than 4 consecutive days;

(2) Exceed 50-hours in a 7-day work week;

(3) Exceed 12-hours a day for more than 3 consecutive days, or

(4) Exceed 58-hours a week for sedentary (to include office) work

(2) Emergency Response Plans

Plan Procedures (01.E.01)

The purpose of this emergency response plan is to minimize hazards to human health or the environment from fires, explosions, or any unplanned sudden or non-sudden release of hazardous substances to air, soil, or surface water.

The provisions of this emergency response plan must be implemented immediately whenever there is a fire, explosion, or release of hazardous substances that could threaten human health or the environment.

Responsibilities of the Emergency Coordinator (EC)

The SSHO will act as the Emergency Coordinator (EC) at the project site. The EC has the responsibility for coordinating all emergency response measures, and initiating materials and equipment purchases. Qualified backup ECs will be designated so an EC will either be located on the site or on call (available to reach the site to respond to an emergency within 60 minutes). The EC has the authority to commit the resources required to implement this emergency response procedure.

The EC is responsible for being thoroughly familiar with:

- The APP and emergency response plan
- All operations and activities associated with the project
- The emergency signals and evacuation routes
- The location of all operation-specific records
- The physical layout of the facility and location of emergency equipment.

Obtaining Emergency Services

To obtain emergency services, the EC will first investigate the severity of the emergency/injury. If the emergency/injury requires outside emergency services, the EC will immediately contact the appropriate emergency services. The PM and Government Representative will next be notified of the emergency and the impending arrival of emergency services.

Communications

A communication network will be set up to alert site personnel of emergencies and to summon outside emergency assistance. Where voice communication is not feasible, an alarm system (e.g., sirens, horns) will be set up to alert employees of emergencies. Radio communication may also be used to communicate with personnel if necessary. Where phone service is not

readily available, radios or portable phones will be used to communicate with outside agencies. Site personnel will be trained on the use of the site emergency communication network. Emergency phone numbers will be posted at the phone or radio used for outside communication. The PM/SSHO/EC is responsible for establishing the communication network during work activities, and for explaining it to all site personnel during the site safety briefing. The Tidewater inc. Team will consult with AFCEC/USACE daily to obtain current Base entry/exit points.

Emergency Contacts and Notifications

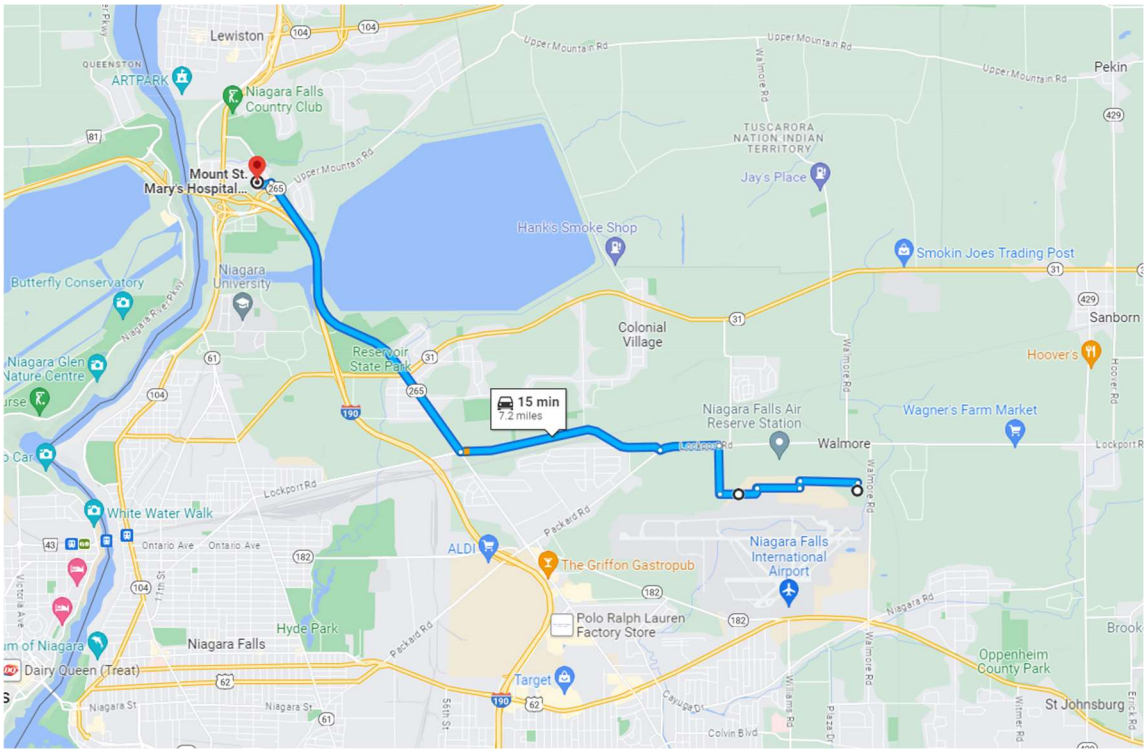
The name, telephone number, and location of police, fire, and other emergency response agencies will be available on site at all times. If emergency personnel are called to the site, efforts should be made to accommodate their operations at the site. Emergency telephone numbers for this project are presented below. In the event of a medical emergency, personnel will notify the appropriate emergency organization and will take direction from the SSHO. In the event of a fire, explosion, or spill at the site, the SSHO will notify base first responders and the appropriate federal, state, and local agencies.

Emergency Telephone Numbers		
Emergency Services		
First Responders		911
Poison Control Center		(800) 523-2222
National Response Center		(800) 424-8802
OSHA Referral		(800) 321-6742
NFARS Fire Department		(716) 236-2086
AFCEC		
Lindsay Mairs	AFCEC Emergency Contact	Cell: (716) 243 6227
Tidewater Inc. *Team*		
Keith Fields	PM	Cell: (614) 778-2618
Hans White	SSHO	Cell: (916)-402-3308
Udi Dias	Alternative SSHO	Cell: (240) 217-1153
David McCall	SHM	Cell: (740) 504-9714

Emergency Medical Treatments and First Aid

A first aid kit and fire extinguisher will be stored on each site as appropriate. The first aid kit will contain the American Red Cross first aid manual or equivalent. A minimum of two personnel trained and certified in adult first aid, CPR, and blood borne pathogens, in accordance with 29 CFR 1910.1030, will be on-site at all times that work is being performed. If an injured individual requires further attention, the individual will be immediately transported to the nearest hospital. A hospital route map to the closest Emergency Room is presented below for each site. The hospital route maps give directions to the nearest medical facility. If necessary, the worker will be decontaminated prior to transport to the facility; if the injury is serious, decontamination may be delayed pending emergency treatment. As explained earlier, this site is not considered acutely toxic and should not prevent the implementation of emergency medical care.

Fire:	**911**
Ambulance:	**911**
Hospital:	**1-716-297-4800 (Emergency Department)**
Directions to Hospital:	**Mount St. Mary's Hospital**
	5300 Military Road
	Lewiston, NY 14092



Directions to Mount St. Mary's Hospital Emergency Room **7.1 miles, 12 minutes**

- **Head south on Kinross Street toward Langley Street 0.4 Miles**
- **Turn left on Hulby Street 194 Feet**
- **Turn right on Hulby Street 0.2 Miles**
- **Turn right onto Kirkbridge Drive 144 Feet**
- **Turn left on to Wagner Drive 0.4 Miles**
- **Turn left onto Blewett Drive 0.4 Miles**
- **Turn right on to Tuscarora Road 0.4 Miles**
- **Turn left onto Lockport Road 0.4 Miles**
- **Turn right onto Joris Ct/Lockport Rd 1.8 Miles**
- **Turn right onto NY-265 N/Military Rd 3.0 Miles**
- **Turn left 0.1 Mile (arrived)**

Operations Shutdown

Under certain extreme hazardous situations, the SSHO and Project Personnel may temporarily suspend operations while a hazard is corrected or controlled. During operation shutdown, all

personnel will be required to evacuate the work zone and support areas as necessary. The SSHO will have ultimate authority for operations shutdown and restart.

Procedures for Plan Review and Amendment

This emergency response plan will be reviewed and amended as necessary if either one of the following happens:

- The plan fails in an emergency
- The site changes in its design, construction, operation, maintenance, or other circumstances that materially increases the potential for fires, explosions, or releases of hazardous materials or hazardous material constituents, or changes the response necessary in an emergency
- The EC changes
- The plan had to be implemented because of a site emergency and lessons learned can be incorporated.

Changes to this Emergency Response Plan will be made by the EC, SSHO, and/or SHM if any of the above mentioned occurs. Revised copies of this Emergency Response Plan shall be distributed to applicable personnel.

Spill Plans

Notification of Spills and Discharges

If a spill occurs and humans or the environment are threatened, the SSHO will immediately notify USACE. After spill response activities are completed, a Spill Report will be issued to the Contractor Officer Representative (COR). This spill report will identify the cause and extent of the spill, any resulting contamination danger, and the corrective actions taken by the Tidewater Inc. Team and emergency personnel.

Required Equipment

The following equipment will be kept at the site at all times to provide for the means to clean up an unexpected spill or discharge:

- 5 gallon bucket
- Spill kit including absorbent pads and booms
- Shovel.

The equipment required may vary depending on the nature and extent of the work performed.

Spill Control

If a spill occurs at the site, the following actions will be immediately taken by the site project personnel, including SSHO:

- Notify the PM and USACE
- Control sources of ignition
- Contain the spill
- Do not allow anyone to touch or approach the spilled material without wearing the appropriate PPE
- Keep combustibles away from the spilled material

- Place the spilled material and affected soil in a five gallon bucket or container for disposal
- Conduct any other actions as needed.

Firefighting Plan (01.E.01)

In the event of a fire or explosion the site will be evacuated, and personnel will gather at the emergency assembly area. The local fire department as well as the NFARS Fire Department shall be summoned by the PM/SSHO/EC in the event of a large fire. Personnel shall only attempt to contain or control a fire if: it is in the incipient stage (a small fire); they are properly equipped with a suitable fire extinguisher; and only if it is safe to do so (i.e., no additional hazards exist).

Smoking will not be permitted on-site.

Emergency Services Information (01.E.05)

To obtain emergency services, the EC will first investigate the severity of the emergency/ injury. If the emergency/injury requires outside emergency services, the EC will immediately contact the appropriate emergency services.

The PM and USACE will be notified next of the emergency and the impending arrival of emergency services.

The SSHO shall have full-time access to a cellular telephone while on-site.

Prior to the start of work, the SSHO and project personnel will confirm that the Emergency Phone numbers, and Hospital information remain appropriate. These numbers shall be posted at the worksite immediately adjacent to site access gate.

(3) Site Sanitation /Housekeeping Plan (02.B)

Housekeeping

Regular cleaning will be conducted in order to maintain safe and sanitary conditions in the workplace. All general trash, garbage and waste from the operation excluding landfill waste will be collected daily, placed in closed containers and transported to an approved landfill or disposal site as needed. Any landfill waste that is exposed will not be removed from the NFARS Site 3 Landfill.

Aisles and passageways shall be clear of tripping hazards and material shall be stored in such a manner that it does not present a hazard to personnel. Paths of emergency egress shall be kept unobstructed and clear at all times. Electrical panels, fire alarm stations, and fire extinguishing equipment shall never be blocked.

Any oil, grease, and chemical will be handled in the same manner as above.

Restrooms

Chemical (Portable) Toilets

The Tidewater Inc. Team will provide a chemical toilet(s). A chemical toilet(s) will be placed on-site in an easily accessible location, and in a stable position. We anticipate less than 15 personnel at any one time will be onsite, therefore only one chemical toilet will be required. When more personnel are utilized onsite additional chemical toilets (at the prescribed

quantity/# of personnel) will be deployed for use. Sufficient paper supplies and hand sanitizer will be available to allow personnel to sanitize their hands.

When in place, the Tidewater Inc. Team shall establish provisions for routinely servicing and cleaning chemical toilet(s) and disposing of the sewage before placing it back into operation. The method of sewage disposal and the placement location selected shall be in accordance with Federal, state, and local health regulations.

Drinking Water

An adequate supply of potable water will be provided in or near all work areas for both drinking and cleansing. Potable water shall be obtained from sources approved by Federal, State, or local health authorities and shall be dispensed by means which will prevent contamination. The use of a "common" drinking cup is prohibited, and receptacles will be provided for disposal of paper cups. Any portable container used to distribute drinking water shall be clearly marked “DRINKING WATER” and may not be used for other purposes.

All outlets dispensing non-potable water must be conspicuously labeled: "CAUTION -- WATER UNSAFE FOR DRINKING, WASHING, or COOKING".

Waste Disposal

All general trash, garbage and waste from the operation excluding landfill waste will be collected daily, placed in closed containers and transported to an approved landfill or disposal site as needed. Any landfill waste that is exposed will not be removed from the NFARS Site 3 Landfill.

Any oil, grease, and chemicals will be handled in the same manner as above.

(4) Medical Support (03.A)

On-Site Medical Support

At a typical project, no on-site medical support will be provided beyond first aid and CPR care. In the event medical support is required, emergency services will be summoned. A first aid kit complying with the criteria contained in (American National Standards Institute/ International Safety Equipment Association) ANSI/ISEA Z308.1 will be maintained onsite (03.B.03). All employees who work where there is a first aid kit shall receive a tool box training on the content and use of the kit supplies.

Off-Site Medical Arrangements

Accidents or incidents requiring medical assistance shall be immediately reported to the SSHO.

Prior to the start of work, the SSHO and project personnel will confirm that the Emergency Phone numbers, and Hospital information remain appropriate. These phone numbers will be posted in a conspicuous location at the project site. Copies of this APP Plan will be provided to emergency units, as appropriate, prior to the start of work. The designated medical provider shall also be identified, with a route to the provider’s location also noted.

First Aid/CPR

At least two personnel shall be trained in First Aid and CPR shall be on-site at all times to provide initial on-site medical support should it be necessary.

Hans White	FA/CPR Training Received: 8/25/2022
Udi Dias	FA/CPR Training Received: 5/24/2022

(5) Blood-Borne Pathogen Program (03.A.05)

At a typical project, no on-site medical support will be provided beyond first aid and CPR care. In the event medical support is required, emergency services will be summoned. However, employees designated as responsible for rendering first aid (e.g., SSHO) are included in the Tidewater Inc. Team's BBP program in accordance with 29 CFR 1910.1030. The Blood-Borne Pathogen Program can be found in Appendix H.

(6) Exposure Control Plan (03.A.05)

Those designated as responsible for providing first aid (e.g., SSHO) are included in Tidewater Inc. Team's Exposure Control Plan and are required to read this document as a part of the Blood-Borne Pathogen training.

(7) Automatic External Defibrillator (AED) Program (03.B.04)

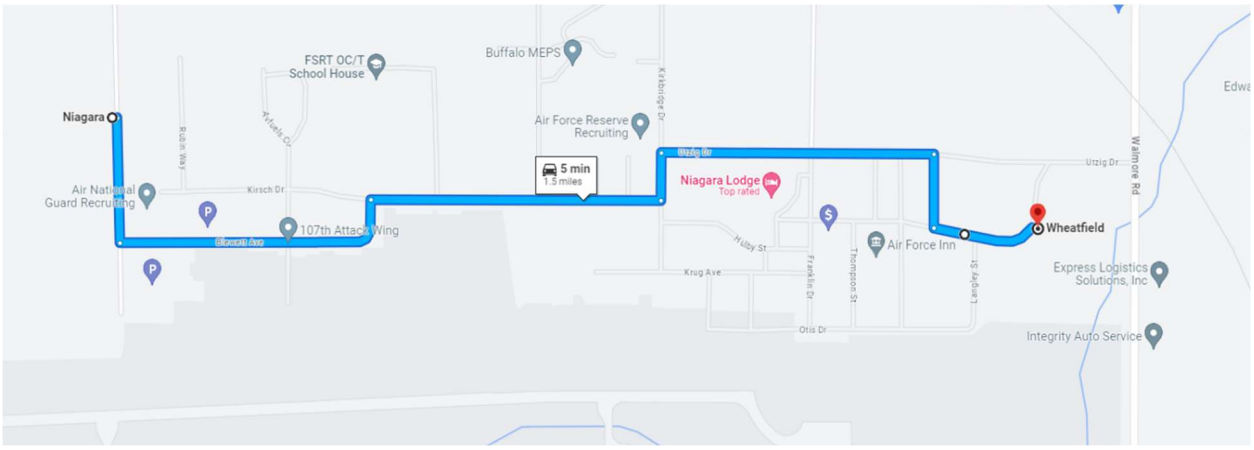
An Automatic External Defibrillator (AED) will not be available for this contract; therefore, an AED Program will not be in place.

(8) Site Layout Plan (04.A)

Site Layout Plans are not required since the Tidewater Inc. Team does not intend to intend to implement construction of temporary structures or facilities under this contract.

(9) Access and Haul Road Plan (04.B)

Tidewater Inc. Team has proposed the below on base haul route for material transportation.



(1) **Head southwest on Kinross Street toward Langley Street 0.1 Mile**
(2) **Turn right toward Utzig Drive 489 Feet**
(3) **Turn left onto Utzig Drive 0.4 Miles**
(4) **Turn left onto Kirkbridge Drive 318 Feet**
(5) **Turn right onto Wagner Drive 0.4 Miles**
(6) **Turn left onto Blewett Drive 0.4 Miles**

(7) <u>Turn Right onto Tuscarora Road. 0.4 Miles</u>

(10) Hearing Conservation Program (05.C)

The Tidewater Inc. Team and its subcontractors have participated in Hearing Conservation training. The hearing conservation program can be found in Appendix I.

(11) Respiratory Protection Plan (05.G)

The Tidewater Inc. Team activities are not expected to require any type of respirator. Therefore, a Respirator Protection Plan will not be implemented.

(12) Health Hazard Control (06.A)

Personal Protective Equipment

Work Clothing: Employees shall wear clothing suitable for the weather however minimum requirements for work shall be short-sleeve shirt, long pants (excessively long or baggy pants are prohibited) and safety toe work shoes.

Eye and Face Protection: Eye and face protection shall be worn as determined by an analysis of the operations being performed. However, safety glasses with side shields will be worn for all work, as a minimum eye protection.

Hearing Protection: Hearing protection must be worn by all those exposed to high noise activities.

Head Protection: Hard hats shall comply with ANSI Z89.1 and shall be worn by all workers when a head hazard exists.

High Visibility Apparel shall comply with ANSI/ISEA 107, Class 2 requirements at a minimum and shall be worn by all workers exposed to vehicular or equipment traffic. Section 05.F of EM-385 provides specific situational requirements.

Gloves of the proper type shall be worn by persons involved in activities that expose the hands to cuts, abrasions, punctures, burns and chemical irritants.

Machine Guards and safety devices. Equipment must have appropriate guards and safety devices in place and operational.

The Tidewater Inc. Team personal protective equipment program will comply fully with OSHA requirements published in Subpart I of 29 CFR 1910. The individual supervisors and the SSHO will conduct the workplace hazard assessment, which will be re-assessed at a minimum annually or as necessary due to updates and changes in the environment or equipment.

The workplace hazard assessment (i.e., AHAs) and pertinent OSHA standards will guide the selection of protective equipment and clothing, which will be provided by the Tidewater Inc. Team and its subcontractors to protect their employees. The suitability of selected PPE will be re-evaluated as needed.

Employees required to use PPE to perform assigned work tasks will receive PPE training. The Tidewater Inc. Team will maintain the written certification of training conducted, as required by OSHA. The training includes:

- When PPE is necessary
- What PPE is necessary
- How to properly don, doff, adjust, and wear PPE
- The limitations of the PPE (including warning labels)
- The proper care, maintenance, useful life, and disposal of the PPE.

Each affected employee will demonstrate understanding of the training and the ability to properly use their PPE, before being allowed to perform work requiring the use of PPE. Employees will be retrained as necessitated by changes in the workplace; types of PPE selected, and/or observed inadequacies in employee performance.

Procurement of PPE
The Tidewater Inc. Team SSHO will review requisitions for PPE. Supervisors will verify that the requested PPE is required and complies with the criteria established through the workplace hazard assessment.

PPE Inspection
Employees will perform a visual inspection on their PPE at regular intervals, and before and after each use to assure that the PPE will provide the necessary protection. Defective or damaged PPE will not be used. Supervisory personnel and the SSHO will monitor PPE utilization on an ongoing basis.

The Tidewater Inc. Team will inspect all of its subcontracts on an ongoing basis to ensure compliance for PPE. The Tidewater Inc. Team requires that its subcontractors provide PPE to its employees and that those employees have been trained in the use of PPE. The SHM or his designee (i.e., SSHO) will ensure compliance criteria are met.

PPE Maintenance
PPE will be cleaned and maintained by the user at regular intervals and after use, to assure that it will provide the necessary protection. Defective or damaged PPE will not be used.

(13) Hazard Communication Program (06.B.01)

The Tidewater Inc. Team shall evaluate jobsite operations, materials, and equipment involving potential exposure to hazardous or toxic agents or environments to formulate a hazard control program.

The hazard evaluation shall identify: the nature of the evaluation (air, biological or radiological samples, etc.); that it serves as certification of hazard evaluation; the workplace and activity evaluated; the name, position and credentials of the person certifying that the evaluation has been performed; and the date of the evaluation.

An AHA shall be used to document the evaluation. The hazard evaluation shall identify all substances, agents, and environments that present a health, explosive or fire hazard to workers or visitors and recommend hazard control measures. Engineering and administrative controls shall be used to control hazards; in cases where engineering or administrative controls are not feasible, PPE may be used.

The Tidewater Inc. Team shall provide the location of SDSs, records of Contractor employee training, and inventory of hazardous materials (including approximate quantities and a site map, as appropriate) that will be brought onto Government project by the Contractor and any subcontractors.

All chemicals brought onto the site will be subject to the 29 CFR 1910.1200 and may include the following:

- Gasoline and Diesel: Gasoline and Diesel will be used for site vehicles and excluding chainsaws will only be filled at offsite filling stations. All gasoline brought onsite will be stored in the appropriate containers.

A site map illustrating the locations of the above-listed chemicals is not provided because their storage location is unknown at this time.

Storage prior to transportation of hazardous chemicals, materials, substances and wastes shall be under the supervision of the SSHO.

Hazardous or Toxic Agent Labeling

Proper hazard labeling will be applied to containers containing hazardous substances brought on-site.

Safety Data Sheets (SDSs)

Copies of the SDSs for the above-listed chemicals will be kept on-site during the field activities. The SDSs will be reviewed by all site personnel during the initial site specific safety orientation. The SDSs will be the primary source of health and safety information for all chemicals.

Employee Information and Training

Employees will be trained in the corporate Hazard Communications program upon employment and then on the specific chemicals they will be dealing with. As the information or types of chemicals changes, employees will be re-trained as necessary.

Personnel working at NFARS will be briefed on the chemicals expected to be used or come in contact with, their locations and their identification during the initial tailgate safety meeting. Any changes in chemicals or information will be brought to the attention of all personnel immediately. The SDS for all of the expected chemicals will also be discussed during the tailgate safety meeting along with protective measures available to the personnel.

Personnel Protective Equipment

When engineering and work practice controls or substitution are either infeasible or insufficient, appropriate PPE and chemical hygiene facilities shall be provided and used for the transportation, use, and storage of hazardous or toxic agents.

(14) Process Safety Management Program (06.B.04)

A Process Management Safety Program is not required as the work involved does not constitute the following:

- A process that involves a flammable liquid or gas on site in one location in a quantity of 10,000 lb. (4,535.9 kg) or more as defined in 29 CFR 1910.119 or 29 CFR 1926.59(c); or
- A process that involves a chemical at or above the threshold quantities listed in Appendix A of the above-cited CFRs.

(15) Lead Compliance and Abatement Plan (06.C.02)

Lead is not expected to be encountered on this project; therefore, a Lead Abatement Plan is not applicable for this project.

(16) Asbestos Abatement Plan (06.C.03)

Asbestos is not expected to be encountered on this project; therefore, a Asbestos Abatement Plan is not applicable for this project.

(17) Radiation Safety Program (06.F)

Radiation is not expected to be encountered on this project; therefore, a Radiation Abatement Plan is not applicable for this project.

(18) Abrasive Blasting Plan (06.I)

Abrasive blasting operations are not part of the scope of work (SOW) at this job site; therefore, an Abrasive Blasting Plan is not applicable.

(19) Heat/Cold Stress Monitoring Plan (06.J)

Heat Stress Monitoring Plan (HSMP) (06.J.01)

If employees are in hot weather (i.e., ambient temperature exceeding 75 degrees F and 55% Humidity), the following procedures should be used to monitor the body's physiological response to heat and to manage the work cycle.

- Measure body temperature: Measure the body temperature orally using a clinical thermometer during initial period of rest. If the oral temperature exceeds 99.4°F (37.4°C), the employee shall not be allowed to continue work until the oral temperature is maintained below the latter threshold.
- Measure heart rate: At temperatures above 85°F employees should have their heart rate measurements taken at 30 minute intervals. They should stop work in PPE when heart rate reaches 120 beats per minute. This schedule is conservative and if one is under a light work load the work periods can be extended. If under a heavy work load or a sunny day the rest periods can be extended.
- Monitor Temperature: The American Conference of Industrial Hygienists (ACGIH) Threshold Limit Values work/rest schedule and the Wet Bulb Globe Temperature (WBGT) index is designed for use with permeable ordinary work clothes, and not for impermeable PPE. Therefore, the following modified schedule will be used for employees wearing PPE (e.g., impermeable Tyvek® or Tychem® coveralls) to conduct fuel handling and tank cleaning related tasks. If PPE is not being utilized, 10° F should be added to the temperature schedule below.
    - On a cloudy day, continuous work may be performed below 70°F. Employees should be aware of the potential for heat stress above this temperature and use buddy system and guidelines below.
    - 75% work / 25% rest each hour at air temperature 70-79°F
    - 50% work / 50% rest each hour at air temperature 79-85°F
    - 25% work / 75% rest each hour at air temperature above 85°F

- Work shall cease at a shaded dry bulb temperature of 98°F.

Cold Stress Monitoring Plan (CSMP) (06.J.04)

To maintain adequate protection against cold exposure, employees shall observe the following work practices and control measures:

- Alternate work and rest periods with rest periods in a warmer area
- Utilize a supplemental heat source, if possible
- Wear an insulating liner or hood under the hard hat
- Dress warmly by layering clothing
- Avoid becoming overheated by removing layers of clothing while working to remain cool enough to not perspire
- Utilize clothing materials that do not lose insulating value when wet or dirty (i.e., use wool or polypropylene; avoid down or cotton)
- Keep clothing clean.

If excessive cold persists in the work area and control measures cannot reduce the cold stress on employees, work will be terminated until the condition subsides. If field work is carried out during the winter, an enclosed heated environment will be made available at the site for employees.

The following procedure shall be followed to monitor ambient environmental conditions during the winter:

- At ambient temperatures below 45°F (7°C) the temperature shall be monitored at a minimum of eight (8) hour intervals
- At ambient temperatures below 45°F (7°C) and above 30°F (-1°C) the temperature shall be monitored at every four (4) hour intervals
- At ambient temperatures below 30°F (-1°C) the temperature and wind speed shall be monitored at every four (4) hour intervals or more frequently if the temperature lowers further.

(20) Indoor Air Quality Management (06.L)

The Tidewater Inc. Team will be conducting outdoor work only as a part of this contract.

(21) Mold Remediation Plan (06.L.04)

Mold Remediation operations are not part of the SOW at this job site; therefore, a Mold Remediation Plan is not applicable.

(22) Chromium (VI) Exposure Evaluation (06.M)

The Tidewater Inc. Team does not anticipate activities that could generate chromium (VI) fumes, mists, or dust under this contract.

(23) Crystalline Silica Monitoring Plan (06.N.02)

The Tidewater Inc. Team will not be using bentonite and cement. Therefore, a Crystalline Silica Abetment plan is not needed.

(24) Lighting Plan for Night Operations (07.A.06)

Night operations are not anticipated under this contract. However, if work is to be performed at night, a night operations lighting plan shall be developed to ensure that all activities, areas and operations are adequately illuminated to perform work safely in accordance with the lighting levels in Table 7-1 of Section 07.A of the EM385.1.1 (November, 2014).

(25) Traffic Control Plan (08.C.05)

The Tidewater Inc. Team does not anticipate operations involving the maintenance of traffic and access through the contract work area. However, if work is to be performed in close proximity to roadway traffic a traffic control plan shall be developed to ensure that all activities are completed in a safe manner.

(26) Fire Prevention Plan (09.A.01)

Keep work and storage areas clean and free of flammable or combustible debris at all times. Ensure that all flammable and combustible materials are stored properly; with all flammable liquids and gases separated from other flammable materials. Dispose of all rags which have oil, grease, paint thinners and cleaning agents that may be combustible in accordance with applicable local, state and federal regulations. All internal combustion engine powered equipment shall be inspected, and repairs made, if such hazards as igniting of fuel exist.

Fueling Area or Stations

a) "No Smoking, Matches, or Open Flame" signs must be posted and enforced.

b) "Turn Engines Off" signs must be posted and enforced in the same area.

c) Bonding of equipment to be fueled must be accomplished through the use of internally grounded hose or an external ground cable.

d) Make sure that fuel distributors fuel tank, dispensing hose, and nozzle comply with federal, state and local regulations.

e) Only approved industrial metal safety cans will be used for the handling and storage of flammable and combustible liquids up to 60 gallons and must be labeled as to the contents.

f) Portable storage tanks with the capacity of 60 gallons or more must be:

- Plainly marked as to contents
- At least 50 feet away from any building
- Kept free from debris, trash, grass, and weeds at all time
- Properly vented, if storing 600 gallons or more.

g) The SHM must be contacted for additional rules governing fueling depots or storage areas for flammable liquids.

Fire Protection and Control

Provide access roads for emergency vehicles from the start of the project, and maintain clear access to the building and storage area at all times. Coordinate the access with the local Fire Department to ensure it meets the requirements of the equipment that will respond in case of a fire.

Comply with the following basic rules of fire protection and control:

- Phone numbers of the nearest fire station or department must be posted at job site telephones.
- All two ton or larger trucks and cranes must be equipped with not less than a 2B ABC type fire extinguisher. (Winch trucks, haul trucks, draglines, and cranes-track, rubber tire or railroad car mounted).
- A fire extinguisher rated not less than 10B shall be provided within 50 feet of wherever more than five gallons of flammable or combustible liquids or five pounds of flammable gas are being used on the job site. This requirement does not apply to the integral fuel tanks of motor vehicles.
- Carbon tetrachloride and other toxic vaporizing fire extinguishers are prohibited
- All fire extinguishers must be inspected every month and serviced at least every twelve months with refills and repairs made by a local dealer licensed by the state to service the fire extinguisher or suppression system used
- Familiarize yourself along with the members of the crew with the use and care of these extinguishers. In case of a fire make sure everyone knows where the fire extinguishers are and how to use them. The SSHO must conduct a tool box safety meeting on this subject at least annually and with new employee/owners.
- Smoke only in designated areas. Make sure to extinguish matches/cigarettes and place them in approved containers.
- Minimize the amount of flammable liquids/gases kept at the work area to a single work shift supply
- Close containers of flammable liquids when not in use. Report spills and the location of excessive flammable vapor/gas concentrations immediately.
- Obtain the necessary permits when performing hot work or disabling fire protection systems
- Make sure materials and equipment do not block the access to extinguishers and fire protection hoses, hydrants, and standpipes. Also, make sure materials are kept at least 18 inches from sprinkler heads.
- Attempt to extinguish small fires (trash can size) only if trained to do so. If trained to extinguish fires, familiarize yourself with the location of fire extinguishers in the work area.
- At least one portable fire extinguisher of not less than 20 B rating must be located not less than 25 feet or more than 75 feet from a flammable combustible liquid storage area located outside.
- Fire extinguisher location plans must be prepared before construction of a structure begins. Fire extinguishers must be placed according to the plan prior to bringing flammable materials in the area.

(27) Wild Land Fire Management Plan (09.L)

Wild Land Fire Management is not a required activity under the current SOW. If potential exposure to wild land fire exist, the Tidewater Inc. Team will follow the facility Wild Land Fire Management Plan.

(28) Arc Flash Hazard Analysis (11.B)

Arc Flash Hazards are not a required activity under this contract. If potential exposure to arc flash hazards, the Tidewater Inc. Team will follow the facility Wild Land Fire Management Plan.

(29) Assured Equipment Grounding Control Program (AEGCP) (11.D.05, App. E)

Electrical cords must comply with EM 385-1-1, Section 11 and will be listed by UL or other nationally recognized testing laboratory and shall have unbroken insulation and should not be exposed to water or other liquids. A ground fault circuit interrupter (GFCI) outlet or cord must be used at all times. All electrical equipment must be inspected, and color coded as per the Assured Grounding and Bonding Program (EM 385-1-1: Section 11) if GFCIs cannot be used as stated above his contract does not involve work portable powered tools using extension cords.

(30) Hazardous Energy Control Program and Procedures (12.A.01)

This contract does not involve work requiring hazardous energy control procedures.

(31) Standard Pre-Lift Plan –Load Handling Equipment (16.A.03)

This contract does not involve load handling activities.

(32) Critical Lift Plan – Load Handling Equipment (16.H)

This contract does not involve critical lifts using load handling equipment.

(33) Naval Architectural Analysis –Load Handling Equipment (Floating) (16.L)

The Tidewater Inc. Team will not employ Floating Cranes/Derricks, Crane Barges, and Auxiliary Shipboard-Mounted Cranes under this contract.

(34) Floating Plant Inspection and Certification (19.A.01)

This contract does not involve Floating Plant and Marine Activities.

(35) Severe Weather Plan for Marine Activities (19.A.03)

This contract does not involve Floating Plant and Marine Activities.

(36) Emergency Plan for Marine Activities (19.A.04)

This contract does not involve Floating Plant and Marine Activities.

(37) Man Overboard/Abandon Ship Procedures (19.A.04)

This contract does not involve Floating Plant and Marine Activities.

(38) Float Plan for Launches, Motorboats, and Skiffs (19.F.04)

The Tidewater Inc. Team will not employ Launches, Motorboats, and Skiffs under this contract.

(39) Fall Protection & Prevention Plan (21.D)

The Tidewater Inc. Team may be exposed to falls requiring protection and planning under this contract. A Fall Prevention plan was developed for this contract and can be found in Appendix D.

(40) Demolition/Renovation Plan (23.A)

This contract will not involve Demolition or Renovation Activities. Therefore, no plans will be developed.

(41) Safe Practices for Rope Access Work Plan (24.H)

The Tidewater Inc. Team will not be climbing trees in order to fell them. Therefore, no plans will be developed.

(42) Excavation/Trenching Plan (25.A.01)

This involves excavation in the form of Stump removal to a maximum depth of 6 inches BGS therefore excavation and trenching is not required.

(43) Fire Prevention and Protection Plan for Underground Construction (26.D.01)

Underground construction is not applicable under this contract.

(44) Compressed Air Work Plan for Underground Construction (26.I.01)

Underground construction is not applicable under this contract.

(45) Erection and Removal Plans for Formwork and Shoring (27.C)

Formwork, shoring, and bracing are not applicable under this contract.

(46) PreCast Concrete Plan (27.D.01)

Precast Concrete operations are not applicable under this contract.

(47) Lift-Slab Plans (27.E)

Lift-slab operations are not applicable under this contract.

(48) Masonry Bracing Plan (27.F.01)

Masonry Construction is not applicable under this contract.

(49) Steel Erection Plan (28.B)

Structural Steel Assembly is not applicable under this contract.

(50) Explosives Safety Site Plan (29.A)

Explosives-related operations are not applicable under this contract.

(51) Blasting Safety Plan (29.A, 26.J)

The Tidewater Inc. Team personnel are prohibited from transporting, handling, storing, and using explosives, blasting agents, and blasting equipment.

(52) Dive Operations Plan (30.A.14)

Diving operations are not applicable under this contract.

(53) Safe Practices Manual for Diving Activities (30.A.15)

Diving operations are not applicable under this contract.

(54) Emergency Management Plan for Diving (30.A.18)

Diving operations are not applicable under this contract.

(55) Tree Felling and Maintenance Program (31.A.01)

Tree felling operations are required under this contract. The Tidewater Inc. Team, in communication with subcontractor Davey Tree, prepared a Tree Felling Plan. The Tree Felling and Maintenance Plan can be found in Appendix C

(56) Aircraft/Airfield Construction Safety & Phasing Plan (32.A.02)

Aircraft/Airfield Construction operations are not applicable under this contract.

(57) Aircraft/Airfield Safety Plan Compliance Document (32.A.02)

Aircraft/Airfield Construction operations are not applicable under this contract.

(58) Site Safety and Health Plan for HTRW Work (33.B)

The Tidewater Inc. Team employees will not be exposed to hazardous waste on this site.

(59) Confined Space Entry Procedures (34.A.05)

The Tidewater Inc. Team employees shall not enter Permit Required Confined Spaces.

(60) Confined Space Program (34.A.06)

Tidewater Inc. Team employees shall not enter Permit Required Confined Spaces.

j. RISK MANAGEMENT PROCESS

AHAs have been performed for the activities described in this APP and the scope of the contract. This analysis is contained in Appendix B. Site specific information will be reviewed during the site safety orientation prior to and during field implementation of the project. Site specific hazard information will also be covered during tailgate safety training. This training will be documented by the SSHO. As additional activities are identified that are not covered by the AHAs, new analyses will be developed and approved by the Tidewater Inc. Team and USACE and incorporated into the safety program.

APPENDIX A
SITE SAFETY AND HEALTH PLAN

SITE SAFETY AND HEALTH PLAN
FOR TREE REMOVAL ACTIVITIES

AT THE
NIAGARA FALLS AIR RESERVE STATION,
NIAGARA FALLS, NEW YORK

CONTRACT NO. W912DR-20-D-0012

Prepared for:

U.S. Army Corps of Engineers
Baltimore District
2 Hopkins Plaza
Baltimore, MD 21201

Prepared by:

Tidewater Inc.
6625 Selnick Drive, Suite A
Elkridge, MD 21075-6220, USA

November 2023

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Prepared by:

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Date

Concurrence by:

_____ _____

David McCall
Safety and Health Manager / Plan Approver
Tidewater, Inc.
Cell (740) 504-9714

Date

Approved by:

_____ _____

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Project Manager
Tidewater Inc
Office (614) 792-2896; Cell (614) 778-2618

Date

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ACRONYMS AND ABBREVIATIONS

°F	Degrees Fahrenheit
ACGIH	American Conference of Industrial Hygienists
AHA	Activity Hazard Analysis
ANSI	American National Standards Institute
APP	Accident Prevention Plan
CAMP	Community Air Monitoring Program
CFR	Code of Federal Regulations
COC	Chemical of Concern
CP	Competent Person
CPR	Cardiopulmonary Resuscitation
CRZ	Contaminant Reduction Zone
CSP	Certified Safety Professional
dBA	Decibels Utilizing the A Filter
EAC	Emergency Action Coordinator
EAP	Emergency Action Plan
EZ	Exclusion Zone
HAZWOPER	Hazardous Waste Operations and Emergency Response
HCP	Hearing Conservation Program
NIOSH	National Institute of Occupational Safety and Health
NFARS	Niagara Falls Air Reserve Station
OSHA	Occupational Safety and Health Administration
PEL	Permissible Exposure Limit
PID	Photo-Ionization Detector
PM	Project Manager
PMP	Project Management Professional
POC	Point of Contact
PPE	Personal Protective Equipment
ppm	parts per million
SDSs	Safety Data Sheets
SHM	Safety and Health Manager
SSHO	Site Safety and Health Officer
SSHP	Site Safety and Health Plan
SOW	Scope of Work
SZ	Support Zone
TLV	Threshold Limit Value
USACE	United States Army Corps of Engineers
VOC	Volatile Organic Compound

1.0 INTRODUCTION

Tidewater, Inc., Team, has prepared this Site Safety and Health Plan (SSHP) for implementation during tree removal activities at the Niagara Falls Air Reserve Station (NFARS), located in Niagara Falls, New York. The continued field efforts will be performed under the U.S. Army Corps of Engineers Baltimore District (USACE) Contract No. W912DR-20-D-0012.

The Tidewater Inc. Team will implement this SSHP during field activities. The Tidewater Inc. Team will perform the scope of work in accordance with the work plan prepared for this project.

1.1 Purpose and Objective

The purpose of this SSHP is to protect human health and the environment from the risks associated with field activities at Niagara Falls ARS. The Tidewater Inc. Team will perform field activities in accordance with the United States Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities; the National Institute of Occupational Safety and Health (NIOSH) / Occupational Safety and Health Administration (OSHA), October 1985; Title 29, Code of Federal Regulations (CFR), 1926.65, 1910.120, 1910.165, 1910.1030, 1910.1200, 1910.134; the United States Army Corps of Engineers (USACE) Safety and Health Requirements Manual, EM-385-1-1, (2014); and any other relevant Federal, State, and local regulations.

The SSHP objectives are to ensure that all necessary precautions for fieldwork are in place, and that appropriate health and safety procedures are followed at all times to protect personnel. In addition, the SSHP objectives include the necessary protection to prevent damage, injury, or loss of property and equipment, and to respond quickly and effectively to the Tidewater Inc. Team-related activities. The Site Safety and Health Officer (SSHO) will maintain a copy of the signed, final version of this SSHP and the Accident Prevention Plan (APP) on-site at all times when work is being performed. This SSHP is incorporated into the APP as Appendix A.

All Tidewater Inc. Team employees involved in intrusive field operations at the site (stump grinding) have completed the required 40-hour initial Hazardous Waste Operations and Emergency Response (HAZWOPER) training, maintain qualification through annual refresher training, are under a program of medical monitoring supervised by a physician, and are certified to wear respiratory protection, as specified in 29 CFR Part 1910.134. Field work that does not pose a risk of coming into contact with potential onsite contamination (non-intrusive work) does not require OSHA 40-hour HAZWOPER training, examples of these activities include: Site preparation, tree removal, and site restoration and maintenance.

The Tidewater Inc. Team recognizes that conditions on a site may change, or that more information may become available, during the operation. If, during the operation, it is determined that the conditions are not as described, or the protection specified in the APP/SSHP requires modifications, the SSHO will stop work and contact the Safety and Health Manager (SHM)/CSP and the Project Manager (PM) for guidance. Work will not resume until authorized by the PM.

1.2 Site Description

NFARS is located in the Towns of Niagara and Wheatfield, Niagara County, New York, approximately 15 miles north of Buffalo. The installation adjoins the Niagara Falls International Airport to the north, and both encompass approximately 958 total acres. NFARS and Niagara Falls International Airport are bounded by Lockport Road to the north, Porter Road to the south, Packard Road to the west, and Walmore Road to the east. The NFARS installation and Niagara Falls International Airport are bisected by Cayuga Creek with NFARS encompassing 547 acres on the north side of the Creek. The site 3 Landfill is located in the Northeastern portion of NFARS.

1.3 Scope of Work

The scope of work (SOW) for continued field activities at NFARS will be implemented in accordance with the work plan. The current project involves the removal and disposal of trees infested with Emerald Ash Boring insects. Maintenance will also occur following tree removal to remediate damage caused to the landfill cap. The work at NFARS will be implemented in accordance with the work plan and conducted in two phases. The following phases will be implemented at NFARS:

Phase 1: Tree removal, disposal, and CAMP Air Monitoring

- Perform site preparation activities including locating the trees to be removed, and vegetation removal surrounding trees to be cut down (to allow workers to access the base of all trees).
- Evaluating landfill cap conditions and making note of any issues documenting prior to tree removal.
- Remove all selected trees.
- Dispose of tree cuttings at offsite location capable of handling Cuttings infested with Emerald Ash Borer.
- Remove stumps associated with trees removed to a depth of no greater than 6 inches Below Ground Surface (BGS).
    - Perform CAMP air monitoring during stump removal activities to ensure contamination is not being mobilized into atmosphere.
    - Adjust operations accordingly.

Phase 2: Site Restoration

- Removal of all debris generated from tree removal prior to adding soil cover.
- Application of additional topsoil cover to establish the original grade of the landfill cap.
- Seeding to establish permanent soil cover.
- Any soil disturbed during tree removal operations will be restored to ensure the continued integrity of the landfill cap.

1.4 Site Activities Requiring an Activity Hazard Analysis

Work phases that require an activity hazard analysis (AHA) are identified below. The AHA's and control measures for these work phases planned are provided in Appendix B of the APP.

1. Mobilization and Demobilization
2. Tree and Stump Removal and Disposal
3. Site Maintenance and Restoration

2.0 KEY PERSONNEL AND RESPONSIBILITIES

Key personnel for this project include the Tidewater Inc. Team PM, Mr. Keith Fields; the SSHO, Mr. Hans White; and the alternate SSHO Mr. Udi Dias; the SHM, Mr. David McCall, Certified Safety Professional (CSP); and subcontractor personnel. An alternate SSHO with the required training will be available at all times and will be assigned when the SSHO is not on-site. All project field staff, including subcontractor personnel, have completed comprehensive health and safety training, which meets the requirements of Title 29 CFR Parts 1926.65, 1910.120. In addition, all workers assigned to this project will comply with the health and safety requirements associated with this project. All SSHOs certifications and resumes can be located in Appendix F.

Specific project safety responsibilities for these key personnel are provided in detail in Section D (2) of the APP and are briefly outlined below. The Tidewater Inc. Team developed this SSHP for the Tidewater Inc. Team personnel. Subcontractor personnel will, at a minimum, follow this SSHP or a plan approved by USACE and the Tidewater Inc Team.

2.1 Project Manager Responsibilities

The PM for this project will be Mr. Keith Fields, Professional Engineer (PE) and Project Management Professional (PMP), who has completed the 40-hour HAZWOPER class, and completes annual 8-hour HAZWOPER refresher classes. As the PM, Mr. Fields is responsible for generating, organizing, and compiling the SSHP, which describes planned field activities and potential hazards that may be encountered at the site. The PM will be responsible for establishing emergency communications with all potential emergency response organizations and verifying all emergency telephone numbers prior to the start of on-site work. The PM is also responsible for ensuring that adequate training and site safety briefings (including provisions for specific pieces of equipment) are provided to the project field Team. The PM will provide a copy of this SSHP to the project field Team, and a copy to each subcontractor prior to field activities. A copy of this SSHP shall be on-site at all times. Associated health and safety responsibilities will include:

- Coordinating the activities of all contractors' field personnel, including their signed acknowledgment of the SSHP;
- Selecting a SSHO and field personnel for the contractual site work to be undertaken;
- Ensuring that the tasks assigned to the contractor are being completed as planned and are kept on schedule;
- Providing authority and resources to ensure that the SSHO is able to implement and manage safety procedures;
- Preparing reports and recommendations about the project to the client and the concerned contractor's personnel;
- Ensuring that the SSHO is aware of all of the provisions of this SSHP and instructing all personnel on site safety practices and emergency procedures defined in this plan
- Ensuring that the SSHO is monitoring site safety;
- Directing changes in work practices to improve worker health and safety, if necessary;

- Removing individuals from the site if their conduct jeopardizes the health and safety of themselves and/or others;
- Suspending work on any project or operation that jeopardizes the safety of anyone in the area; and
- Suspending work on a project or activity if the health and safety plan and/or protocols used are (or are suspected to be) inappropriate or inadequate.

2.2 Safety and Health Manager Responsibilities

The SHM for this project is Mr. David McCall. The SHM is responsible for developing and coordinating the health and safety program. The SHM will also be responsible for reviewing and approving the SSHP for accuracy and incorporating new information or guidelines that aid the PM and SSHO in further definition and control of the potential health and safety hazards associated with this project. Along with the PM and the SSHO, the SHM also can suspend or modify work practices for safety reasons and dismiss individuals whose on-site conduct endangers the health and safety of themselves and/or others.

2.3 Site Safety and Health Officer Responsibilities

The SSHO for this project is Mr. Hans White, and the alternate SSHO is Mr. Udi Dias. The SSHO has a direct line of authority from the Tidewater Inc. Team's SHM to implement specific health and safety requirements for specific site activities, and for ensuring that all team members, including subcontractor(s), comply with the APP/SSHP. It is the SSHO's responsibility to inform the subcontractor(s) and other field personnel of chemical and physical hazards, as they become aware of them. The SSHO and alternate SSHO are the competent persons (CP) overseeing site activities during this tree removal. No project activities will be conducted unless the SSHO/CP is on site supervising. Additional SSHO responsibilities include:

- Ensuring that all project-related personnel have signed the personnel agreement and acknowledgments contained in this SSHP (Refer to the APP);
- Providing a daily site safety briefing (tailgate meeting) for team members;
- Evaluating weather conditions and chemical hazard information to make recommendations to the PM about any modification to work plans or personal protective equipment (PPE) requirements to maintain personnel safety;
- Monitoring the compliance activities and the documentation processes;
- Approving all field personnel working on site while taking into consideration their level of training, physical capacity, and ability to wear PPE necessary for the assigned tasks;
- Inspecting all PPE prior to use;
- Inspecting all equipment prior to use, which includes observing the testing of all "emergency" stop switches and ensuring that the required number of emergency stop switches are available;
- Assisting the PM in SSHP documentation compliance by completing standard forms (Refer to the APP);

- Monitoring the compliance of field personnel for the routine and proper use of PPE that is required for each task;
- Assisting in, and evaluating the effectiveness of, decontamination procedures for personnel, protective equipment, sampling equipment, heavy equipment and vehicles;
- Enforcing the "buddy system" as appropriate for site activities;
- Reviewing with site personnel the emergency phone numbers, the location and route to the nearest medical facility, the procedures for arranging emergency transportation to the nearest medical facility, and posting the related information (i.e., the telephone numbers of the local hospital, police and fire along with the route to the hospital);
- Stopping operations that threaten the health and safety of the field team or the surrounding population;
- Entering the exclusion area in emergencies after notifying emergency services and taking appropriate precautions;
- Observing field team members for signs of exposure, stress, or other conditions related to pre-existing physical conditions and/or site work activities;
- Serving as the Emergency Action Coordinator (EAC);
- Directing changes in work practices to improve health and safety;
- Removing individuals from operations if their conduct jeopardizes the health and safety of themselves and/or others; and
- Suspending work on a project or activity if the health and safety plan and/or protocols used appear, or are suspected to be, inappropriate or inadequate.

2.4 Project Field Staff

The project field staff is responsible for ensuring that activities are performed in accordance with the APP/SSHP/AHAs, and that deviations from the plan are based upon field conditions encountered, have been approved by the PM and/or SSHO, and that the information is well documented in field notes. Field staffs' health and safety responsibilities include:

- Following the APP/SSHP/AHAs;
- Following the Corporate Health and Safety Program;
- Reporting to the SSHO any unsafe conditions or practices;
- Reporting to the SSHO all facts pertaining to incidents that result in injury or exposure to toxic materials or chemicals of concern (COCs);
- Reporting equipment malfunctions or deficiencies to the SSHO;
- Reviewing the APP/SSHP in the field, as necessary;
- Attending the daily pre-work safety tailgate meetings;
- Attending the scheduled health and safety training classes; and
- Attending all scheduled medical examinations.

It is the responsibility of individual organizations involved in the field activities to ensure understanding of, and compliance with, the SSHP by its on-site employees or representatives

working in controlled areas. Failure by any person to adhere to this plan may result in removal from site activities.

2.5 Subcontractor Responsibilities

All subcontractors are responsible for their own health and safety program and the health and safety of their own employees. This requirement is based on OSHA regulations, which recognize the employer-to-employee responsibility for health and safety. Davey Tree has submitted a properly completed AHA to the Tidewater Inc. Team and all AHAs can be found in Appendix B.

As stated above, subcontractors are responsible for instituting health and safety training for their employees. At a minimum, each must comply with the Tidewater Inc. Team APP/SSHP. The Tidewater Inc. Team will provide copies to the subcontractor's employees when requested, and they will be required to sign the Site Safety Tailgate Meeting Form as part of the Tidewater Inc. Team safety protocol prior to working on site and can be found in Appendix G.

2.6 Policies and Procedures Regarding Noncompliance with Safety Requirements

Whenever a violation of safety policy occurs and requires correction, the SSHO will document the situation and request the subcontractor's competent person to initiate corrective action. Corrective action will be documented with further explanation given in the daily project notes. If immediate corrective action is not taken by the subcontractor, they will be notified in writing using the Safety/Health Violation Notice. The SSHO and PM will be informed of the action taken within 24 hours of the violation. The involvement of the PM is essential to ensuring that there are no additional violations of safety policies at the work site. The Tidewater Inc. Team reserves the right to immediately remove any personnel from the site for a serious violation of safety requirements.

2.6.1 Subcontractors First Violation of a Rule or Regulation

A subcontractor employee who is cited for a first-time notice of a Safety/Health Violation Notice shall be immediately removed from the site and shall not be permitted to return to work for a period of at least 24 hours, missing the next full workday. For example, if an employee was cited on a Friday afternoon, they would leave the site that day and would not be permitted to return to work until Tuesday morning.

2.6.2 Subcontractors Second Violation of a Rule or Regulation

A subcontractor employee responsible for a repeat offense or receiving a second Safety/Health Violation Notice shall be immediately and permanently removed from the site for the remainder of the contract period. This requirement may only be waived if the subcontractor demonstrates, on behalf of the employee, extenuating or mitigating circumstances, and obtains a waiver from the Tidewater Inc. Team SSHO and/or PM.

2.7 Safety Accountability for Managers and Supervisors

The following has been adopted into the Tidewater Inc. Team's Policies and Procedures Manuals:

"First line supervisors and management, site managers, department managers, and safety representatives are responsible for enforcing all safety and health policies. Tidewater Inc. will take disciplinary action against employee-owners for failing to enforce such policies." Tidewater Inc. will follow the violation procedures discussed for subcontractors with their own employees.

Also, the following statement was adopted into the policy: "The Tidewater Inc. Team reserves the right to dismiss employee-owners who commit serious or repeat safety or health violations."

3.0 HAZARD/RISK ANALYSIS

This section discusses chemical, physical and environmental hazards that workers may encounter. Section 3.1 identifies COCs anticipated to be present at the site. Section 3.2 discusses physical hazards identified with this site including those associated with the use of heavy equipment. Environmental hazards discussed in Section 3.3 are associated with the physical location of the site, weather conditions (such as, heat stress and noise), and contact with flora and fauna.

Daily "Tailgate" safety meetings will be held at the start of each workday; potential chemical, physical, and environmental hazards and preventative safety measures will be discussed. Subsequent Tailgate safety meetings may be called when the SSHO, SHM, or PM believes that a potential safety issue that was not covered in the morning meeting may exist. An AHA has been developed for each task associated with the general contract activities and is included in this SSHP as Appendix B to the APP. This analysis identifies the sequence of work, specific hazards anticipated, and the control measures to be implemented to minimize or eliminate each hazard. The AHAs will be used to augment daily safety meetings intended to heighten safety and hazard awareness on the job.

3.1 Chemical Hazards

The primary COC for groundwater monitoring within the Site 3 Landfill are VOCs. The Safety Data Sheets (SDSs) for COCs and other chemicals that may be used will be kept on-site at all times, at the point of storage during field activities. The SDSs will be provided in a combined project site list and made accessible in a centralized location for both the Tidewater Inc. Team and subcontractor personnel to use.

Exposure to a listed COC on site is improbable due to the nature of the work. Site workers will use Level D PPE protection while working on site, including hard hats, coveralls/standard work clothing, safety glasses with protective side shields, safety-toed work boots and leather work gloves. The Tidewater Inc. Team will acquire, and review with all personnel during daily safety meetings, all SDSs for any additional chemicals brought onto the site.

3.2 Physical Hazards

There are numerous physical hazards associated with this project, which, if not identified and addressed, could cause accidents and personal injury to field personnel, as well as operational problems. Field personnel should maintain awareness of potential safety hazards and should immediately inform the SSHO of any new hazards, so that corrective measures can be taken. In the event of a medical emergency, the nearest medical facilities (with directions) are outlined in Section 8.

3.2.1 Slips, Trips and Falls

During field activities, work may occur in areas where uneven surfaces or job supplies and other equipment at ground level present possible slip, trip and fall hazards. Wet weather conditions and areas where heavy equipment has traveled over may exacerbate such hazards. Work locations will

be kept as tidy as possible and free of ground debris. Personnel will wear appropriate footwear for site conditions and walk carefully.

3.2.2 Head and Back Injuries

As minimum requirements, hard hats and safety glasses will be donned prior to performing any site activities where hazards exist (tree removal and stump grinding). This will prevent minor head injuries caused while working around equipment, with hand tools, or process related structures. At the daily safety meeting, personnel will be educated in proper lifting techniques and will not lift heavy items without assistance.

3.2.3 Overhead Power Lines and Underground Utilities

All field vehicles and equipment will be maintained a minimum distance of 20 feet, in vertical and horizontal directions, from all overhead electrical power lines (energized lines) and/or electrical equipment with a voltage less than or equal to 50 kilovolts. If the voltage exceeds 50 kilovolts, the clearance will be increased by at least 4 inches for every 10 kilovolts over that voltage. Underground or overhead utilities are not anticipated to be encountered on the site.

3.2.4 Heavy Equipment

The use of heavy equipment presents the greatest potential for injury to personnel. The moving parts of heavy equipment may create pinch points, which can cause serious injury or death. Each piece of heavy equipment (i.e., Crane lift) shall have emergency shut-off switches, and all shut-off switches must be operable and tested at the beginning of each work day the equipment is operated. No unrestrained hair longer than shoulder length will be allowed on site workers. A tight fitting bandanna or hair net below the hard hat will be required to restrict hair longer than shoulder length. In all cases, rotating shafts or gears should be guarded to prevent accidental contact. Loose clothing and/or jewelry will also be prohibited around heavy equipment. Clothing hanging away from the body must be restricted and if this is not possible, the worker will have to change clothes. Jewelry around the neck, hands, forearms and waist will be removed prior to working around activity areas. Mobile equipment operators will have had the required training and will have demonstrated the necessary skills to operate the heavy equipment.

Another hazard associated with heavy machinery is the lack of visual contact between the operator and ground personnel when mobilizing, or possibly positioning the equipment. Personnel approaching heavy equipment while operating will observe the following protocols:

- Make eye contact with the operator (and spotter);
- Wear a brightly colored vest or shirt (high-visibility);
- Signal the operator/driver to cease heavy equipment activity/movement; and
- Approach the equipment and inform the operator of intentions.

A communication program including the use of hand signals, air horn, 2-way radios, and/or cellular phones among workers shall be implemented during the project. Workers on the ground are to use the “buddy system” at all times and be cognizant of the reduction of communication abilities in high noise areas. The specific hand signals to be used during the project shall be discussed in the

tailgate safety meeting. Hand signals that will be used by site personnel in emergency situations or when verbal communication is difficult will include the following.

Table 3-1: Hand signals to be used in emergency situations	
Signal	**Definition**
Hands clutching throat	Out of air or cannot breathe
Hands on top of head	Need assistance
Thumbs up	Okay, I am all right, or I understand
Thumbs down	No or negative
Arms waving upright	Send backup support
Fist clenched tight	Exit area immediately
Index and thumb rubbing together	Stop Slowly

In case of an emergency, an air horn shall be used by the SSHO to alert site personnel. The following signals will be used.

Table 3-2: Air horn signals to be used in emergency situations	
Signal	**Definition**
One Short Blast	Warning or Attention, Stand By for Directions
One Extended Blast	Evacuation
Repetitive Short Blasts	Fire
One Short and One Long Blast	All Clear
Short and Long Blasts Repeatedly	Medical Emergency

Any sounding of this device shall be cause to stop work and prepare to mobilize to the predetermined emergency meeting area (i.e., the Support Zone unless changed by the SSHO and announced during the morning Safety/Tailgate Meeting) for further direction or information. Personnel will remain in the emergency meeting area until the SSHO, or his authorized representative provides further instructions. A roll call will be conducted to confirm that all workers are mobilized in the meeting area.

3.2.5 Electrical Hazards

The SSHO will inspect all equipment daily prior to its use to confirm that it is functioning as designed. The SSHO will remove from service any equipment which is found to be malfunctioning. The equipment will be replaced in lieu of on-site repair. If applicable, all equipment will be properly grounded prior to and during all work activities performed on-site.

All electrical wiring on the heavy equipment shall be covered by the appropriately colored wire insulation. Junction boxes and connections will be sealed to protect from inclement weather.

3.2.6 Fire and Explosion Hazards

It is unlikely that explosive atmospheres will be encountered during the proposed tree removal activities; however, knowledge of fire/explosion prevention is required.

The following standard safety procedures will be implemented:

- All field vehicles and heavy equipment will be equipped with a type-ABC fire extinguisher. Fire extinguishers will be mounted on the vehicles where field personnel can easily access them. A fire extinguisher check, including inspecting gauges, hoses, and tanks, must be done monthly to ensure proper operation of the equipment.
- When necessary, other fire-fighting equipment should be made available.
- Open fires and burning are prohibited. Smoking will be prohibited in all areas where flammable, combustible, or oxidizing materials are stored or are in use.
- No flammable and combustible liquids (i.e., gasoline or diesel) will be stored on-site. All equipment used during site activities will arrive on-site with a full fuel tank.
- Vehicle engines will be shut off when not in use.
- Smoking is prohibited.

3.3 Environmental Hazards

Environmental hazards associated with the site will be discussed at the orientation meeting prior to the start of field activities. Personnel will be apprised of symptoms of exposure to certain biological hazards and heat stress. If site workers are required to wear semi-permeable or impermeable protective clothing, physiological monitoring for signs of heat stress injury will commence when ambient temperatures reach 75 degrees Fahrenheit (°F). There shall be at least one quart of water per person per hour and shade available throughout the workday. Employees may stop work whenever they believe it is necessary to prevent heat stress and have water and/or sit in the shade for at least 5 minutes. The SSHO is responsible for monitoring the weather on hot workdays (i.e., over 75°F when disposable suits are being worn) in order to adequately monitor the workforce.

3.3.1 Heat Stress

The Tidewater Inc. Team's field workers may spend some part of their day in a hot, humid environment. The amount of heat stress a worker faces in a hot work area may be affected by four environmental factors: temperature, radiant heat, humidity, and air velocity. Personal characteristics such as age, weight, fitness, medical condition, and acclimatization to the heat also affect the level of stress. The human body has defenses to reduce the effects of heat on the body. However, under certain situations, these body functions are not substantial enough to eliminate the problem. When this occurs, the body may be subject to heat stress. Physical reactions to heat stress will range from mild reaction such as fatigue, irritability, anxiety, and decreased concentration, to death.

Heat stress occurs in four stages. These are listed below in order from least to most severe:

1. Heat Rash: Heat rash is caused by continuous exposure to hot, humid air and is aggravated by chafing clothes. This condition decreases the ability to tolerate heat. The symptom is a mild red rash.
2. Heat Cramps: Heat cramps are caused by loss of body fluid through perspiration that is not balanced by adequate fluid intake. They typically are the first sign of heat stress and can

lead to heat stroke. Symptoms include acute, painful voluntary muscle spasms, particularly in the abdomen and the extremities. These may also occur during rest.

3. Heat Exhaustion: Heat exhaustion is a weakness caused by loss of fluids. This is the next sign that may lead to heat stroke. Symptoms are pale, moist, clammy skin; perfuse perspiration; and extreme weakness. Body temperature is normal, pulse is weak and rapid, and breathing is shallow. These symptoms may be accompanied by headache, vomiting and dizziness.
4. Heat Stroke: Heat stroke is the most serious and dangerous reaction to heat stress and is caused by a failure of the body's natural heat regulating mechanisms. Symptoms are red, hot, dry skin, nausea, dizziness, confusion, extremely high body temperature, rapid breathing and pulse rate, and unconsciousness.

To minimize heat stress, employees shall observe the following work practices and control measures in hot work areas:

- Alternate work and rest periods with rest periods in a cooler area;
- Reduce work load under extreme heat conditions;
- Drink large amounts of water;
- Ensure adequate ventilation and air movement around the worksite; and
- If excessive heat persists in the work area and control measures do not adequately reduce the heat stress on the employees, work will be terminated until the condition subsides.

3.3.2 Cold Exposure

During winter months employees will work in cold environments. Working outdoors at low temperatures may subject employees to cold stress. Exposure to extreme cold for a short period of time causes severe injury to the surface of the body. Prolonged exposure may result in a generalized cooling of the body and eventually in death.

Two factors influence the development of cold injuries: ambient temperature and wind velocity. Wind chill is used to quantify the chilling effect of wind in combination with the temperature. Moisture, from environmental conditions or perspiration, increases the cooling rate of the body and may decrease the insulating effectiveness of clothing.

Frostbite is the result of exposure of the skin to excessive cold conditions. It is characterized by a grayish or whitish appearance of the skin. Frostbite also causes a deadening of the nerve endings in the exposed areas. For example, a frostbitten hand will no longer feel cold to the victim. As a result, frostbite may go unrecognized for a period of time, which can cause more injury. To prevent frostbite, workers should stop work and warm cold skin at the onset of numbness.

Hypothermia is a general cooling of the body caused by freezing or rapidly dropping temperatures. Symptoms occur in five stages:

1. Shivering
2. Apathy, listlessness, sleepiness and cooling of the body to less than 95°F

3. Unconsciousness, glassy stare, slow pulse and slow respiratory rate
4. Freezing of the extremities
5. Death

To maintain adequate protection against cold exposure, employees shall observe the following work practices and control measures:

- Alternate work and rest periods with rest periods in a warmer area;
- Utilize a supplemental heat source, if possible;
- Wear an insulating liner or hood under the hard hat;
- Dress warmly by layering clothing;
- Avoid becoming overheated by removing layers of clothing while working to remain cool enough to not perspire;
- Utilize clothing materials that do not lose insulating value when wet or dirty (i.e. use wool or polypropylene; avoid down or cotton); and
- Keep clothing clean.

If excessive cold persists in the work area and control measures cannot reduce the cold stress on employees, work will be terminated until the condition subsides.

3.3.3 Noise

Noise is a potential hazard in areas where heavy equipment, power tools, pumps, compressors, or large generators are being operated. Equipment operation may produce noise levels that reach or exceed 85 decibels utilizing the A filter (dBA). Exposure to elevated noise levels can lead to temporary or permanent hearing loss and can also cause muscle tension and irritability. Exposure levels will comply with the American Conference of Industrial Hygienists (ACGIH), threshold limit value (TLV) continuous noise exposure limits outlined in Table 5-4 of EM-385.

Noise levels in excess of 85 dB are likely to be generated due to the inherent nature of diesel engines on heavy equipment. Site workers on tree crews or using a woodchipper and anyone working in the immediate vicinity, will don either disposable earplugs or earmuffs. Site workers not directly involved in site activities in these areas will not be allowed in the area.

The Tidewater Inc. Team's SSHO and Alternate SSHO have completed the 30-hour OSHA Construction Safety training. Instruction on the use of and proper fitting of disposable earplugs was included in both classes. The SSHO will visually confirm workers hearing protection is properly fitted into the ear.

3.3.4 Biological Hazards

Potential biological hazards associated with working at NFARS include poison ivy, giant hogweed, snakes, ticks, bees, and other insects. While no specific biological hazards have been identified or communicated by the host, the Tidewater Inc. Team employees and their subcontractors will be instructed to maintain awareness for biological hazards in their surroundings, especially when initially entering the work site. If any such hazards become known during the course of the project, the SSHO and/or the SHM will make the appropriate changes in

this SSHP and communicate the dangers/concerns to the workers. Workers will exercise caution when traversing the site and avoid heavily vegetated areas where biological hazards likely exist. No significant populations of any of the referenced potential biohazards have been identified at the work site.

Serious and/or threatening chemical and physical hazards frequently overshadow any potential exposure to biological hazards. However, specific biological hazards can cause injury and even death. Therefore, when appropriate, such hazards will be identified and evaluated in conjunction with all other actual or potential hazards associated with an operation, and steps taken to control exposure. Procedures as prescribed in the First Aid Book will be properly implemented. Paramedics will be summoned for workers exhibiting symptoms of allergic reaction to a biological hazard.

3.3.5 Radiological Hazards

Radiological hazards are not expected. Should radiological hazards be encountered during field activities, an amendment to this plan must be prepared.

4.0 SITE CONTROL AND WORK ZONES

Site access control during vegetations clearing and tree removal operations will be conducted by the Tidewater Inc. Team's employees who will be responsible for keeping work areas clear of unauthorized personnel. The Tidewater Inc. Team SSHO will be responsible for maintaining site access control restrictions and keeping unauthorized and untrained personnel out of restricted access zones.

Visitors will not be permitted within active work areas. All visitors, regardless of affiliations or approvals, will not be permitted unless they provide documentation of the training and medical surveillance requirements specified in this plan, have read and signed this APP/SSHP, and are escorted. Under no circumstances shall anyone enter the work zone without authorization from the Tidewater Inc. Team SSHO. This shall include client, utility, and regulatory representatives. A visitor sign-in sheet will be maintained by the Tidewater Inc Team, recording all who enter onto the site into the support zone. A Site Control Log will be used by the SSHO to record all personnel entering the work zone, the times at which they enter and depart, and their company affiliation. All visitors will be advised by the SSHO of the following upon arrival to the site:

- Safe work practices, such as proper site entry and egress, and proper hygiene during meal and rest breaks
- Recognition, in oneself and others, of physical conditions requiring immediate medical attention, especially heat stress, and application of simple first aid measures
- Procedures to be followed in case of emergencies

4.1 Site Work Zones

Work location restrictions will primarily be determined upon the potential physical safety concerns, as the potential for exposures to the COCs are highly unlikely to occur at or above their respective Permissible Exposure Limits (PELs). The site work zones shall include, but not necessarily be limited to, the following zones:

- Exclusion Zone (EZ)
- Contamination Reduction Zone (CRZ)
- Support Zone (SZ)

The EZ and CRZ will consist of any area in the immediate vicinity of the tree work activities. All employees will use appropriate PPE when working in those areas. The EZ will be defined as an area where there is a possible respiratory and/or contact health hazard and/or physical safety concern. In most instances, this area will be approximately a 30-foot radius from all site activities (i.e., bucket truck), to allow for safe movement of the equipment and the personnel in the work zone. Cones, yellow caution tape, or other appropriate means will identify the location of the EZ. The EZ and CRZ will be subject to change based on the size of trees and changing site conditions. A Community Air Monitoring Program (CAMP) will be implemented to determine if any contamination results from the site operations. The SSHO will restrict access to this area to site

personnel. Data from the air monitoring will be monitored and site operations changes will be made accordingly.

The SZ includes the areas surrounding the EZ and CRZ. The SZ can be any area located outside of the CRZ where activity support may occur. The SZ will be located to prevent employees from being exposed to any particulate levels above regulatory limits, and to allow the safe movement and use of tree removal equipment. Eating, drinking, or smoking will be permitted in the support area only after washing face and hands. Smoking will only be allowed in designated areas, and will not be permitted if flammables and/or gas cylinders are stored in the area and/or if hot work is being conducted. A Site Operations Center may be established if required.

4.2 Work Limitations

Work limitations include the following:

- No eating, drinking, or smoking in the EZ.
- All persons must wear eye protective equipment when and where appropriate. (Refer to applicable AHA for PPE requirements.)

Facial hair must not interfere with the fit of the respirator or come in contact with the face of the respirator where the respirator touches one's face.

5.0 PERSONAL PROTECTIVE EQUIPMENT

5.1 Levels of Personal Protective Equipment

The harmful effects that chemical substances have on the human body often necessitate the use of respiratory protection and personal protective clothing. Proper selection of PPE depends upon a number of factors. Protection against different types of chemicals and differing concentrations of those substances can be quite varied. The tasks to be performed and the probability of exposure to the substances must also be considered when specifying protective clothing.

Once the specific hazard has been identified, appropriate PPE can be selected. The protection level assigned must match the hazard confronted. The specific equipment comprising each level of protection will vary slightly but is defined primarily by the type of respiratory protective equipment used, and secondly by skin protection.

The following list briefly describes the various PPE Levels:

Level A: Used when the greatest level of skin, eye, and respiratory protection is needed and consists of a totally encapsulated suit with supplied breathing air.

Level B: Used when the highest level of respiratory protection is needed, but a lesser level (than Level A encapsulating suit) of skin protection is required.

Level C: Used when criteria for using air-purifying respirators are met, and a lesser level of skin protection is required.

Level D: Used in areas without respiratory hazards.

5.2 Anticipated Levels of Protection

The PPE Level will be determined by air monitoring discussed in Section 8.0. Based on the hazard analysis for the environmental project at the site, Level D protective clothing is the anticipated primary level of protection to be worn during site activities. Table 5-1, Action Response Levels, summarizes the criteria developed utilizing OSHA 1910.1000 Table Z-2.

5.2.1 Table 5-1 VOC Response Levels and actions

VOCS	
Response Levels	**Actions**
Total VOCs at downwind perimeter of work area exceed upwind background levels by 5 parts per million (ppm) (15-minute average).	• Work activities temporarily halted and monitoring continued. • If instantaneous readings readily drop below 5 ppm over background levels, work activities can resume.

Total VOCs at downwind perimeter of work area persistently exceed background levels by between 5 ppm and 25 ppm (15-minute average)	• Work activities halted, source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. • After this occurs, work can continue if total VOCs 200 feet downwind of exclusion zone or ½ the distance to nearest potential receptor or residential/commercial structure, whichever is less, is below 5 ppm (15-minute average); note that this distance cannot be less than 20 feet.
Total VOCs at the perimeter of work area exceed 25 ppm (15-minute average)	• Activities must be shut down

5.2.2 Table 5-2. Particulate Response Levels and Actions.

Response Levels	Actions
PM-10 particulate level at downwind perimeter 100 micrograms per cubic meter (µg/m^3) greater than upwind perimeter for 15-minute period.	• Employ dust suppression techniques (see Section 14.0).
Airborne dust observed leaving the work area	• Employ dust suppression techniques.
After implementation of dust suppression techniques, PM-10 particulate level at downwind perimeter over 150 µg/m^3 greater than upwind perimeter.	• Work must be stopped and activities re-evaluated • Work can resume if measures and controls reduce downwind PM-10 concentrations to within 150 µg/m^3 of upwind level and visible dust migration is prevented.

5.2.3 Level D

Level D protection is the minimum level of personal protection allowed on hazardous waste sites. Respiratory protection is not required, as the atmosphere is assumed breathable and uncontaminated. CAMP air monitoring will occur during all intrusive activities that have the potential to produce dust or VOCS.

Level D protection will consist of the "basic work clothing" plus:

- Hard hat (tree removal activities)
- Coveralls/standard work clothing
- Safety glasses with protective side shields
- Safety-toed work boots
- Chemical-resistant (nitrile) gloves and/or leather gloves

Earplugs or earmuffs with noise reduction ratings sufficient to attenuate the sound level will be mandatory during tree removal activities due to the inherent nature of diesel engines and the sound generated by chainsaws and associated equipment. Hard hats, safety glasses (goggles with splash shields or optional full-face shield), and safety shoes must meet American National Standards Institute (ANSI) approval.

5.2.4 Level C

Level C protection is defined by the use of either a full-face or half-face, air-purifying respirator. This level is used when low levels of contaminants of a known nature are present, sufficient oxygen is available, and contaminants are not considered immediately dangerous to life and health. Level C will consist of Level D above plus:

- Half-face (or full face), air-purifying respirator with NIOSH approved filter cartridges, which are selected depending upon the type of exposure
- Chemical-resistant or polyethylene-coated disposable outer coveralls (e.g., Tyvek®)
- Chemical-resistant (e.g., butyl) outer gloves (taped to outer coveralls)
- Chemical-resistant (e.g., nitrile) inner gloves
- Chemical-resistant safety boots (taped to coveralls)

5.2.5 Levels A & B

Levels A and B protection are not anticipated during field activities. If it appears that these levels may be required, the SSHO will immediately shut down and secure the operation and contact the PM, SHM, USACE point of contact (POC) for further guidance. The SSHO will be responsible for determining the appropriate level of personal protection to be used, based on the Action Response Levels established in this document. The SSHO, with the consent of the SHM and PM, shall notify the POC prior to implementing any modifications to the PPE or levels of protection.

5.2.6 Disposable Gloves Utilized in Level D PPE

When working in Level D PPE, site workers will utilize disposable nitrile gloves as their primary hand protection for site COCs. Leather gloves will also be available as another source of hand protection. If the worker is allergic to nitrile gloves, then latex or rubber gloves will be used. Nitrile gloves are made of synthetic rubber, contain no latex proteins, and offer good resistance to wear. They are more puncture resistant than many other types of rubber gloves and offer superior resistance to many types of chemicals, petroleum hydrocarbons included.

6.0 EXPOSURE MONITORING

This section outlines monitoring strategies that will be used to assess employee exposure to chemical hazards. The anticipated chemical hazards present on site are Volatile Organic Compounds (VOCs) and particulate dust. The Tidewater Inc. Team will utilize direct reading instruments to monitor chemical hazards through CAMP air monitoring. All direct reading instruments will be calibrated before and after each period of use in accordance with manufacturers' recommendations and standard industrial hygiene practice. Records detailing date, time, span gas, or other standards used and the name of the person performing the calibration will be stored with the instrument. The direct-reading instrument will be calibrated in accordance with the standard operating procedures found in the operator's manual accompanying the instrument. The SSHO will charge the batteries and verify that instruments are fully charged before each use.

VOCs Will be Monitored for Using a Multi RAE 3000 PID Ore equivalent monitoring device. Particulate dust will be monitored for using a Dustrack DRX 8533 or equivalent system. Niose Monitoring will not be required for this project.

6.1 Perimeter/Personnel Air Monitoring Activities

To monitor VOCs emitted from the soil during tree stump removal, the Tidewater Inc. Team will implement the use of a photo-ionization detector (PID). The PID is a real-time, direct-reading instrument for volatile organic vapors. The breathing zone of workers on-site will be monitored periodically. If the PID reading shows a sustained concentration greater than 10 ppm, engineering controls will be implemented (i.e., field personnel will move to an upwind, safe location), and the SSHO will contact the PM, SHM, and USACE POC for further instructions. PPE will not be upgraded due to consistent organic vapor readings in excess of 100 ppm or other work conditions; however, work will stop until the APP/SSHP has been revised to reflect new working conditions or conditions subside. PID readings will also be recorded through CAMP air monitoring downwind of operations. These readings will follow the same criteria and response to elevated readings.

6.2 Meteorological Monitoring Activities

On-site, ambient weather conditions (wind speed and direction, temperature, and relative humidity) will be monitored continuously via real-time Internet weather locations, and/or the National Weather Service. If a local station can provide data relevant to the site, its website will be used to obtain forecasts. On-site meteorological conditions will be observed by the SSHO for change in direction, magnitude, incoming storms, or conditions favorable for lightning. More stringent controls will be in place when wind direction is such that residences or populations are downwind from the site.

6.3 Dust Control Activities

The Tidewater team will suppress dust from stump grinding activities to the greatest extent practicable. If necessary, dust suppression will be achieved using an on-site water truck for

wetting roads, stump grindings, and stockpiles as needed. The Tidewater team will not be clearing and grubbing large areas that would expose un-vegetated soil vulnerable to dust production. Trucks will be restricted to paved roads to the greatest extent possible to avoid additional site disturbance. CAMP Air Monitoring will ensure that all non-visible Particulate dusts are accounted for. See Section 5.2.2 and table 5-2 for response action limits as well as the CAMP Air Monitoring Plan withing the EWP for further details.

6.4 Noise Monitoring

Noise monitoring will be conducted as noise levels in excess of 85 dB will be generated as a result of site activities. Hearing protection will be required for all site personnel during tree removal activities. As operators of chainsaws, chippers, and site workers in close proximity to machinery will likely be exposed to noise levels greater than 115 dB workers performing tree removal will wear the SENA TuffTalk Lite Helmet Mount System. Site workers not directly involved with tree removal activities will wear earplugs. Site noise levels will be monitored using a 3M Soundpro SE-2 sound meter stationed on a tripod at roughly 6ft above grade. Prior to use on the site the 3M Soundpro SE-2 will be calibrated using an AC-300 calibrator. Data will be downloaded and reviewed at the end of each day and hearing protection requirements will be adjusted accordingly based on the readings. The full Tidewater Inc. Hearing Conservation Program (HCP) can be found in Appendix I.

7.0 EMERGENCY PROCEDURES

This section describes emergency action procedures to be implemented at the site in case of an accidental spill or release of regulated substances. This section is consistent with the requirements of 29 CFR 1910.38 / CFR 1910.120(q)(1) and local, state, and federal disaster and emergency management plans. This Emergency Action Plan (EAP) will be implemented to prevent or minimize the impacts of unplanned events that could affect the safety and health of site workers or base personnel. Responses to incidental releases of hazardous substances where the substance can be absorbed, neutralized, or otherwise controlled at the time of release by employees in the immediate release area are not considered to be emergency responses within the scope of this standard.

No regulated chemicals other than fuel in fuel tanks and hydraulic fluid in the tree removal equipment will be on-site during project work. The potential for an uncontrolled release of large volumes of hazardous materials is remote.

The following sections discuss pre-emergency planning, personnel roles and lines of authority, emergency recognition and prevention, evacuation routes and procedures, emergency contacts and notifications, hospital route directions, emergency medical treatment procedures, protective equipment failure, fire or explosion, weather-related emergencies, spills or leaks, emergency equipment and facilities, and reporting.

The SSHO will conduct (and document) an emergency response/evacuation drill during the first day of work. He or she will also conduct unannounced tests of this EAP and record subsequent site worker responses to the simulated emergency situations. The SSHO and the SHM will review the worker responses and, if necessary, prepare an addendum to the SSHP identifying revisions to the EAP. Results of this review will be discussed with all site workers in subsequent tailgate safety meetings.

7.1 Pre-Emergency Planning

All employees working at the site will be trained in the provisions of this EAP during the initial site safety briefing and be updated of changes and/or reminded of these provisions as necessary during the daily tailgate safety meetings. The SSHO will review this EAP on a regular basis to ensure that the provisions of this plan are adequate and consistent with the current site conditions. The plan will be amended, if necessary, to keep it current with new or changing site conditions or information. This includes changing or moving the evacuation route or meeting area that the workers are directed to meet at following a site evacuation. The location of and access to the spill response equipment will be discussed and any personnel unfamiliar with deployment of sorbent booms onto the ground will be trained in the appropriate manufacturer's recommended deployment procedure. Proper deployment of sorbent pads and/or sorbent granular material onto the liquid will also be rehearsed.

7.2 Personnel Roles and Lines of Authority

The SSHO will also serve as the EAC for this project. The SSHO/EAC has the primary responsibility for responding to and correcting emergency situations, and for responding appropriately to ensure the safety of site personnel and the public. The SSHO/EAC will have the authority to cease any response activity if the safety of responders, site personnel, or the public is threatened. The SSHO/EAC's duties will include:

- Maintaining emergency preparedness;
- Performing site inspections and informing site workers and subcontractors of work activities and emergency action plans;
- Coordinating with emergency services prior to and during an emergency action scenario;
- Making notifications to appropriate authorities; and
- Preparing follow-up reports.

Site personnel are required to report all injuries, illnesses, spills, fires, and property damage to the SSHO/EAC. The SSHO/EAC must be notified of any on-site emergencies and is responsible for ensuring that the appropriate emergency procedures described in this section are followed.

Subcontractors are required to coordinate with the SSHO/EAC concerning activities associated with their individual scopes of work.

7.3 Emergency Recognition, Prevention, and Response

Table 8-1, Emergency Recognition, Prevention, and Response, of this APP/SSHP identifies potential emergency scenarios and provides emergency recognition, prevention, and response

guidance for each scenario. All on-site personnel will be made familiar with this information through pre-work training and tailgate safety meetings. All site personnel and visitors will be made aware of their responsibility in notification and warning of any identified emergency situations.

Table 7-1: Emergency Recognition, Prevention, and Response	
Emergency Scenario - Employee Injury/Illness	
Recognition	**Prevention and Response**
Employees who have been exposed to site contaminants without the use of respiratory protection will report the exposure to their supervisor and the SSHO. Employees who feel they are suffering symptoms of exposure to site contaminants or have suffered an injury will also report to their supervisor and the SSHO. Employees should observe each other for signs and symptoms of exposure to site contaminants and other environmental stress. Signs of exposure include the following: • Skin discoloration • Excessive perspiration • Lack of coordination • Staggered gait • Sleepiness, dizziness, drowsiness • Incorrect responses to questions • Irritability or irrational behavior	**Prevention:** The provisions of the SSHP, including the Activity Hazard Analyses, will be followed to prevent injury and illness. **Response:** If an injury occurs due to an accident, the SSHO will be notified immediately. The SSHO will be provided with all appropriate information concerning the nature and cause of the injury to allow for treatment to be initiated. The PM will be notified and will investigate the cause of the injury and make any necessary changes in work procedures. Personnel Injury in the EZ – Upon notification of an injury in the EZ, work will immediately cease, and the injured person assessed. If the injury was the result of a site emergency situation, all personnel will evacuate the site and assemble at the pre-determined safe area. If it is a local problem, personnel in the work area will evacuate to the decontamination reduction area. If the injured party(s) can be evacuated without the risk of further injury, they will be removed from the work zone immediately. If not, stretchers will be obtained to evacuate the injured party(s). The nature of the injury will be evaluated, and the injured person will be decontaminated to the extent possible prior to movement to the SZ. The appropriate first aid will be administered, and contact will be made for an ambulance with the designated medical facility, if required. No person will re-enter the EZ or work area until the cause of the injury or symptoms is determined. If the injury is the result of chemical exposure, an assessment of potential airborne contaminant concentration will be performed using field instrumentation. Rescue will be performed in a level of protection appropriate for the anticipated airborne contaminant concentrations. Emergency decontamination procedures are described in Section 7.5. A copy of the decontamination procedures will be given to the local ambulance and emergency room personnel. Personnel Injury in the SZ – Upon notification of an injury in the SZ, the SSHO will assess the nature of the injury. If the cause of the injury or the loss of the injured person does not affect the performance of the site personnel, operations will continue with appropriate first aid and necessary follow-up. If the designated emergency signal is sounded, all site personnel will move to the pre-designated safe area and wait for

Table 7-1: Emergency Recognition, Prevention, and Response	
Emergency Scenario - Employee Injury/Illness	
Recognition	**Prevention and Response**
	further instructions. Work will stop until any risk is removed or minimized.
Table 8-1: Emergency Recognition, Prevention, and Response	
Emergency Scenario – Fire/Explosion	
Recognition	**Prevention and Response**
All fires and visible smoke will be immediately reported to the SSHO and the PM.	**Prevention:** The primary goals of fire prevention and protective measures are to control ignition sources and early detection and rapid response. The following preventative measures will be taken at the site: • Smoking will be prohibited at the site except in designated areas • No welding, open flames, or spark-producing activities will be allowed on-site unless evaluated and approved by the SSHO • Only approved containers will be used to store flammable and combustible liquids **Response:** In the event of a fire or explosion, site evacuation procedures will be implemented and emergency response services will be notified. Tidewater Inc. Team personnel will only attempt to extinguish small incipient fires (e.g., fires that can be extinguished with available portable fire extinguishers). In the event of larger fires, the Tidewater Inc. Team will notify the proper authorities and evacuate the site in accordance with the Emergency Response Plan.
Emergency Scenario – Environmental Release	
Recognition	**Prevention and Response**

Table 7-1: Emergency Recognition, Prevention, and Response	
Emergency Scenario - Employee Injury/Illness	
Recognition	**Prevention and Response**
Visual observations of leaking containers or puddles of unknown liquids will be reported to the SSHO and the site supervisor immediately. The SSHO will report the incident to the PM. The air monitoring program discussed in Section 6.0 of the SSHP will be the primary recognition tool for air releases.	**Prevention:** All liquids will be stored in approved containers. Additional spill and discharge information is provided in Section 9.2.2 of the APP. Engineering controls such as dust suppression will be used to minimize the release of airborne contaminants. **Response:** Response to an environmental release will involve ceasing site work, notification of the USACE and Facility points of contact and appropriate federal, state and local agencies, and implementing spill or dust control procedures. In the event of a severe spill or leak, site personnel will follow the procedures listed below: • Evacuate the affected area and relocate personnel to the pre-determined safe area • Inform the SSHO, the site supervisor, and the PM immediately • Locate the source of the spill/leak and stop the flow if it is safe • Begin containment and recovery of spilled or leaked materials • Notify appropriate federal, state and local agencies

7.4 Site Security and Control

Work areas will be delineated with traffic cones, barricades, and/or yellow caution tape. Site control zones will be established as described in Section 6.0 of this APP/SSHP to control the spread of contamination and employee exposure to chemical and physical hazards. Access to the exclusion zone will be restricted to authorized personnel only. The perimeter of a delineated EZ will be established in a manner that will provide adequate room for the number of workers involved, their equipment, and be a safe distance and method of travel to the decontamination area. All tools, equipment, and materials will be stored in work vehicles or a secure area for overnight storage. Such overnight storage locations will be identified by the POC for the facility. Temporary storage facilities will be equipped with locks that will be secured at the end of each work shift.

7.5 Evacuation Routes and Procedures

The on-site communication systems that will be used for this project include the use of an air horn, hand signals, and cellular phones among workers. Workers are to use the “buddy system” at all times and be cognizant of the reduction of communication abilities in high noise areas and/or poor air cellular service areas. Hand signals that will be used by site personnel in emergency situations or when verbal communication is difficult are listed in Table 8-2.

Table 7-2: Hand signals to be used in emergency situations

Signal	Definition
Hands clutching throat	Out of air or cannot breathe
Hands on top of head	Need assistance
Thumbs up	Okay, I am all right, or I understand
Thumbs down	No or negative
Arms waving upright	Send backup support
Gripping partner's wrist	Exit area immediately

In the event of an emergency that necessitates an immediate work stoppage or site evacuation, the air horn shall be used by the SSHO to alert site personnel. One extended blast of the air horn will signal an immediate work stoppage, with all personnel moving into a predetermined meeting/safe area.

Whenever possible, evacuation should be in the direction perpendicular to the wind direction without passing through the plume or smoke cloud, if any. The emergency meeting location and site evacuation route for the site will be communicated to site personnel during the morning tailgate meeting, and the evacuation route map will be reviewed during the daily tailgate safety meeting. Personnel will remain in the emergency meeting area until the SSHO or his/her authorized representative provides further instructions.

7.6 Emergency Contacts and Notifications

The name, telephone number, and location of police, fire, and other emergency response agencies will be available on site at all times. If emergency personnel are called to the site, efforts should be made to accommodate their operations at the site. Emergency telephone numbers for this project are presented in Table 8-3, Emergency Telephone Numbers. In the event of a medical emergency, personnel will notify the appropriate emergency organization and will take direction from the SSHO. In the event of a fire, explosion, or spill at the site, the SSHO will notify first responders and the appropriate federal, state, and local agencies and will follow the procedures discussed in Table 8-1, Emergency Recognition, Prevention, and Response.

Table 7-3: Emergency Telephone Numbers

Emergency Services		
First Responders		911
Montefiore St. Luke's Cornwall Emergency Room		(845) 561-4400
Poison Control Center		(800) 222-1222
National Response Center		(800) 424-8802
OSHA, Albany Area Office		(518) 457-1263
OSHA Referral		(800) 321-6742
USACE		
Thomas Heins	Project Manager	Mobile: (917) 936-6273

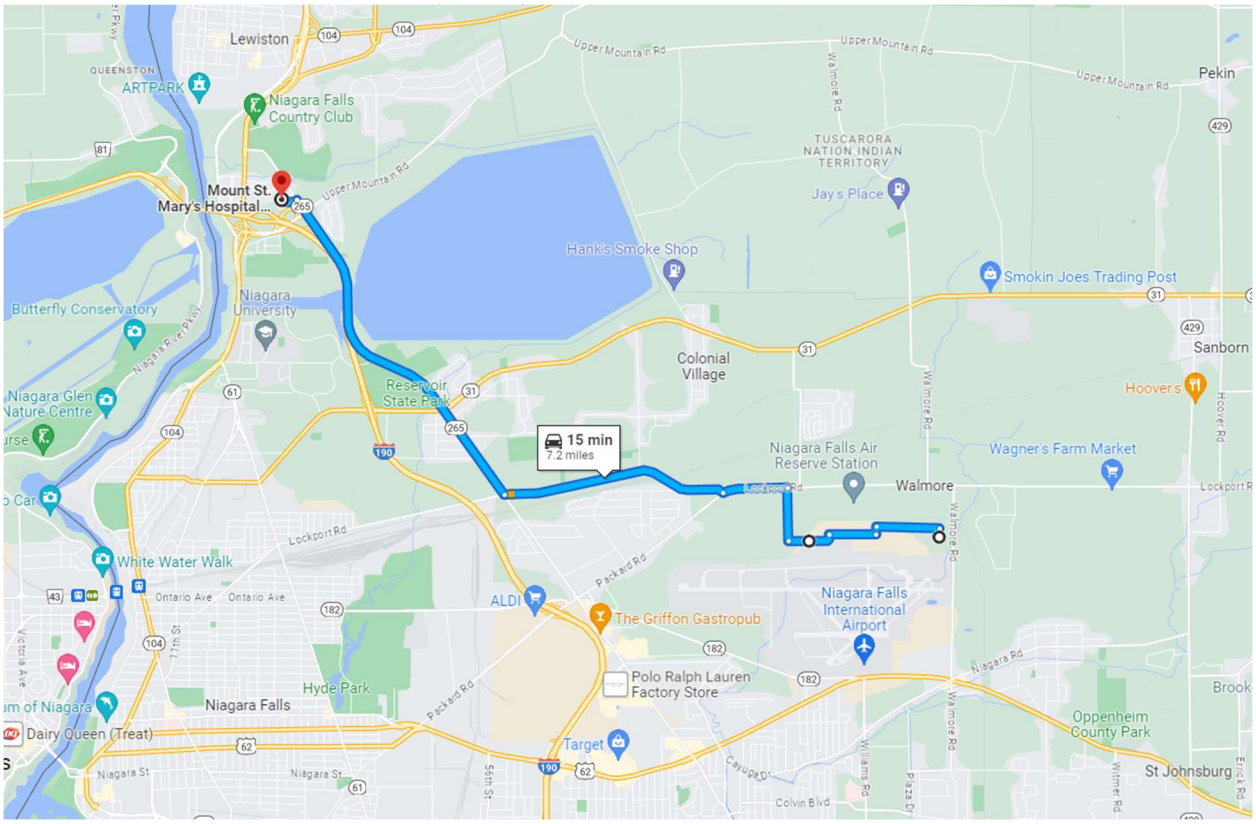
Table 7-3: Emergency Telephone Numbers		
Tidewater Inc. Team		
Keith Fields	Project Manager	Mobile: (614) 778-2618
Hans White	Site Safety and Health Officer	Mobile: (916)-402-3308
Udi Dias	Alternate Site Safety and Health Officer	Mobile: (240)-217-1153
David McCall	Safety and Health Manager	Office: (740) 504-9714

7.7 Emergency Medical Treatments and First Aid

A first aid kit and fire extinguisher will be located in the SZ or as appropriate. The first aid kit will contain the American Red Cross first aid manual or equivalent. A minimum of two personnel trained and certified in adult first aid, cardiopulmonary resuscitation (CPR), and bloodborne pathogens, in accordance with 29 CFR 1910.1030, will be on-site at all times that work is being performed. If an injured individual requires further attention, the individual will be immediately transported to the nearest hospital. A hospital route map for the Mount St. Marys Emergency Room is presented in Figure 8-1. If necessary, the worker will be decontaminated prior to transport to the facility; if the injury is serious, decontamination may be delayed pending emergency treatment. As explained earlier, concentrations of the COC anticipated to be encountered at these sites are not considered acutely toxic and should not prevent the implementation of emergency medical care.

Fire:	**911**
Ambulance:	**911**
Hospital:	**1-716-297-4800 (Emergency Department)**
Directions to Hospital:	**Mount St. Mary's Hospital**
	5300 Military Road
	Lewiston, NY 14092

Figure 8-1: Hospital Route Map



Directions to Mount St. Mary's Hospital Emergency Room **7.1 miles, 12 minutes**

- **Head south on Kinross Street toward Langley Street 0.4 Miles**
- **Turn left on Hulby Street 194 Feet**
- **Turn right on Hulby Street 0.2 Miles**
- **Turn right onto Kirkbridge Drive 144 Feet**
- **Turn left on to Wagner Drive 0.4 Miles**
- **Turn left onto Blewett Drive 0.4 Miles**
- **Turn right on to Tuscarora Road 0.4 Miles**
- **Turn left onto Lockport Road 0.4 Miles**
- **Turn right onto Joris Ct/Lockport Rd 1.8 Miles**
- **Turn right onto NY-265 N/Military Rd 3.0 Miles**
- **Turn left 0.1 Mile (arrived)**

General first aid procedures are outlined below:

- Skin/Eye Contact: Use copious amounts of soap and water. Wash/rinse affected area thoroughly and then provide appropriate medical attention. Eyewash system will be provided on-site at the SZ or as appropriate. Eyes should be rinsed for 15 minutes if there was chemical contact with the eyes. The eyewash station will be ANSI-certified and will meet the Z¬358.1-2004 standard. This eyewash station will be capable of providing flushing fluid to the eyes at 1.5 liters per minute (0 to 4 gallons per minute) for a minimum of 15 minutes.
- Inhalation: Move to fresh air and, if necessary, decontaminate and transport to hospital. Any loss of consciousness or exposure to airborne toxic substances, even if the individual appears to have fully recovered, will require immediate treatment or surveillance by a qualified physician.
- Ingestion: Notify Poison Control Center and emergency medical facility and transport to nearest emergency medical facility immediately.
- Puncture Wound or Laceration: Decontaminate and transport to emergency medical facility. Apply direct compression to stop or slow the flow of blood. Universal precautions to prevent contacting the blood of another shall be implemented.

7.8 Emergency Response Equipment

Based on similar work, the low potential for spills, and the lack of acutely toxic concentrations, it is anticipated that the specified safety equipment worn (U.S. EPA Level D) by the workers will be sufficient for the emergency action events that may occur at this site. The hazard analyses conducted did not identify a risk of a release of potentially flammable or explosive substances.

EPA Level D PPE will include hard hats (as needed), steel-toed boots, work gloves, chemical resistant gloves (as needed), hearing protection (as necessary), and eye protection.

In addition, the following emergency equipment will be available at the site:

- First aid kit
- Eye wash station (portable)
- Fire extinguisher
- Mobile phone
- Sorbent booms and granular material
- Drums
- Spill kits

7.9 Reporting

All emergency situations require follow-up and reporting. Attachment H to the APP, Tidewater Inc. Health and Safety Forms, includes the Tidewater Inc. Injury and Illness Report. This report must be completed and submitted to the PM within twenty-four (24) hours of an emergency situation. The PM will review the report and forward it to the SSHO for review. The report must

include proposed actions to prevent similar incidents from occurring. The SSHO must be fully informed of the corrective action process so that he or she may implement applicable elements of the process in the future.

The USACE PM will be notified within four (4) hours of the incident, following administration of necessary first-aid procedures to workers, if applicable. If the accident is serious and the injury(s) results in permanent disfigurement, loss of limb or death, the area will be immediately secured and will not be released until authorized by the USACE PM. OSHA will be notified within eight hours.

8.0 MEDICAL SURVEILLANCE

8.1 Medical Examination Requirements

The Tidewater Inc. Team site personnel (as outlined in Tidewater's Health and Safety Program) and subcontractor project personnel working on-site will have undergone either a baseline or annual medical monitoring examination within 12 months prior to participation in fieldwork. Medical screening is conducted at the start of employment and annually thereafter and may consist of the following as directed by the medical doctor:

- Medical and occupational history
- Physical examination, with particular attention to the cardiopulmonary system, general physical fitness, skin, blood forming, hepatic, renal, and nervous systems
- Urinalysis
- Blood analysis
- OSHA Noise questionnaire
- Pulmonary function test
- Chest X-ray
- Audiogram
- Electrocardiogram

Based on this examination, the physician will certify in writing whether the individual is capable of full participation in the program, or whether that person must work within certain restrictions. Personnel may be excluded from this project for medical reasons. Any person suffering a lost-time injury or illness must have medical approval prior to returning to work on site.

8.2 Record Keeping

All medical records must be maintained by the employer for a period of at least 30 years after the employee's termination of employment, in accordance with OSHA regulations on confidentiality and record keeping. Prior to the initiation of work, subcontractors will submit copies of their medical fitness certifications to the Tidewater Inc. Team SSHO for each employee to be assigned to the site. The certifications will state that the employee has received a medical examination within the previous 12 months and has been determined fit to perform on-site work.

9.0 TRAINING

It is recognized that conditions on a site may change or that more information may become available during the operation. If during field activities, it is determined that the conditions are not as described, or the protection specified in the APP and SSHP require modifications, work will cease, and the SSHO will contact the PM for guidance. Work will not resume until authorized by the PM.

In addition to conducting the daily tailgate meetings (which may include supplemental safety training), the SSHO will conduct a Site Supervisors' safety meeting at least once a month. These monthly Supervisor safety meetings will include a discussion on past and present safety issues on site, plans for new or changed activities, reviewing the appropriate AHA (by trade), establishing safe working procedures for anticipated hazards, and providing pertinent health and safety training and reinforcement.

9.1 General Personnel – Training

All of the Tidewater Inc. Team personnel are required to attend new employee orientation training. This training includes:

- Hazard Communication/Petroleum Hydrocarbons
- Emergency Action Response Procedures
- Basic Safety Training
- A review and discussion of the Corporate Health & Safety Policy

9.2 Field Personnel – Training

The Tidewater Inc. Team is to provide acceptable certification of training for all personnel on site. At a minimum, all Tidewater Inc. Team personnel involved with intrusive activities will be required to provide 40-hour HAZWOPER Training and applicable 8-hour Refresher Training Certificates prior to the start of fieldwork. These documents will be presented to the SSHO before any field activities take place. Mandatory training (which must be current) required on this project includes:

1. An initial 40-hour HAZWOPER Training Class
   - Workers will have 3-days of on-site, supervised field training
   - Supervisors will have 3-days of on-site supervised field training with at least 8 additional hours of specialized training at the time of job assignment (i.e., on the following programs: Company's Health & Safety policy, employee training, PPE, spill containment and health hazard monitoring and techniques).
2. An annual 8-hour HAZWOPER Refresher Training class and OSHA Construction Safety Training

- The SSHO and/or Alternative SSHO shall have completed the 30-hour OSHA Construction Safety Training.
- Potential Topics covered in these classes include the following:
  - Introduction to OSHA
  - Hazard Communication/Lead and Asbestos
  - Cranes/Rigging
  - PPE
  - Confined Space Entry
  - Legal Issues
  - Fall Protection
  - Electrical Safety
  - Material Handling
  - Excavations, Trenching, and Shoring
  - Ladders/Stairs
  - Scaffolds
  - Steel
  - Demolition

3. At least two (2) personnel with current Adult First Aid/Adult cardiopulmonary resuscitation (CPR) and Bloodborne Pathogens Training will be on site at all times during site work.
4. Hazard Communication Training
5. PPE Training
6. The SSHO or his/her alternate will be the competent person on site when any fieldwork associated with this project is being conducted. The competent person will have experience in mobilization, site set up, use of protective systems, and requirements of 29 CFR 1926.650-652.
7. All heavy equipment operators will have received proper training and have extensive experience. The subcontractor Davey Tree will have all needed certifications and licenses to perform the scoped work.

Records of employee qualifications are kept in Tidewater's corporate office. As required by OSHA regulations (29 CFR 1926.65), all Tidewater Inc. Team's on-site employees have received 3 days of supervised field training and an 8-hour supervisor class. All site personnel will complete this initial HAZWOPER training before assignment to this project. The course content of this training will include, but not be limited to, the following:

- Names of personnel and alternates responsible for site safety and health.
- Safety, health, and other hazards present on the Site.
- Use of protective clothing and equipment.

- Work practices by which the employee can minimize risks from hazards.
- Safe use of engineering controls and equipment.
- Medical surveillance requirements including recognition of symptoms and signs which might indicate overexposure to hazards.
- Emergency response procedures.
- Refresher training requirements.

In addition, the on-site management, supervisors, and SSHO will receive additional management training, which will include, but not be limited to, the following:

- The employer's safety and health program.
- Associated employee training program.
- PPE program.
- Spill containment program.
- Health hazard monitoring procedures and techniques.
- CPR/First Aid Training.

The SSHO will keep copies of the certifications for the completion of such training for all site workers on site in a file. Workers without such certification will not be allowed to work at the site. Prior to commencement of field operations at the project site, personnel will receive site-specific training (briefed in the tailgate safety meeting). This training will include a review of all information contained in this SSHP, with particular emphasis on the following:

- Types and anticipated levels of hazardous substances known to be present on site, their PELs, health effects, and exposure routes.
- The need for PPE.
- The importance of maintenance and attention to proper fit of PPE.
- Prescribed decontamination procedures.
- Safe work practices, such as proper site entry and egress, and proper hygiene during meal and rest breaks.
- Recognition in oneself and others of physical conditions requiring immediate medical attention, especially heat stress and application of simple first aid measures.
- Procedures to be followed in case of emergencies.

10.0 ADVERSE WEATHER CONDITIONS

In the event of adverse weather conditions, the SSHO will determine if work can continue without endangering the health and safety of the field workers. The SSHO will monitor the weather news in the morning and afternoon through the radio or internet, and will document it in the contractor production report. He or she will also coordinate with a local weather center, if available, to obtain specific information about the current weather conditions. Some of the items to be considered prior to determining if work should continue are:

- Potential of heat stress and heat-related injuries.
- Potential for frostbite and cold-related injuries.
- Dangerous weather-related working conditions (e.g., high winds, rain, snow, lightning, smog, fog).
- Limited visibility.
- The potential for electrical storms (no outdoor activities will be permitted during electrical storms).

11.0 PERSONAL HYGIENE AND SANITATION

The Tidewater Inc. Team will establish and maintain basic sanitation provisions for all employees and subcontractors. The Tidewater Inc. Team will ensure that an adequate supply of drinking water is available at the job site while work is being carried out. Access to public toilets or rental of portable toilets with hand-washing capacity will be afforded to site workers when needed. The supervisor will ensure that adequate breaks are given for personnel to use the toilet facilities and water intake. The SSHO will ensure that employees wash their hands and faces thoroughly before breaks, before lunch, and at the end of the workday.

No eating, drinking, smoking, or applying cosmetics will be allowed in the CRZ or EZ. Drinking water will be available in the SZ during working hours. Plastic bags or steel containers will be provided for the collection of refuse and disposable garments and materials. Good housekeeping practices will be always enforced.

12.0 REFERENCES

Chemical Information File, USDOL-OSHA, 1985.

National Institute of Occupational Safety and Health (NIOSH). Pocket Guide to Chemical Hazards, DOHS Pub No. 2005-149.

Occupational Safety and Health Administration (OSHA). Occupational Safety and Health Administration Standards, Title 29 CFR, Parts 1910 and 1926, United States Department of Labor, Occupational Safety and Health Administration.

1985. Guidance Manual for Hazardous Waste Site Activities, NIOSH/OSHA/EPA/ USCG, DHH, Publication No. 85-115.

U.S. EPA. See United States Environmental Protection Agency Standards.

United States Army Corps of Engineers, 2014. Safety & Health Requirements Manual, EM 385-1-1, November 30.

APPENDIX B
ACTIVITY HAZARD ANALYSIS

Activity Hazard Analysis (AHA)

pMActivity/Work Task: Mobilization and Demobilization	Overall Risk Assessment Code (RAC) (Use highest code)					L
Project Location: Nagara Falls ARS, Niagara Falls, New York	**Risk Assessment Code Matrix**					
Contract Number: W912DR-20-D-0012	**Severity**	**Probability**				
Date Prepared: 10/25/2023		Unlikely	Seldom	Occasional	Likely	Frequent
Prepared by (Name/Title): Nick Wyckoff/Junior Scientist	Catastrophic (I)	M	H	H	E	E
	Critical (II)	L	M	H	H	E
Reviewed by (Name/Title): Keith Fields/Project Manager	Marginal (III)	L	L	M	M	H
	Negligible (IV)	L	L	L	L	M
SSHO/CP: Hans White Alternate SSHOs/CPs: Udi Dias	Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)					
	"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.				**RAC Chart**	
	"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible				E = Extremely High Risk	
Notes:					H = High Risk	
	Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.				M = Moderate Risk	
					L = Low Risk	

This AHA serves as the PPE hazard assessment certification as required by 29 CFR 1910.132.

Task Steps	Potential Hazards	Critical Safety Procedures and Controls	RAC
In transit to/from site, driving within the site CP: Hans White (SSHO) Alternate CP: Udi Dias (Alternate SSHO)	Driving while fatigued, unfamiliarity with route, surroundings, distractions while driving, erratic, careless behavior of other drivers on the road, not regarding blind spots, not paying attention, Faulty vehicle, Non-compliance to standards and procedure (i.e., use of mobile phone while driving), Minimum space / improper planning	Get plenty of rest the night before. Conduct a proper vehicle inspection prior to leaving the office. Review and fill out Journey Hazard Assessment. Keep maps of the areas with you for reference. Do not use cell phones while operating the vehicle. Always use Defensive Driving techniques. Leave yourself out. Always wear seat belts while operating the vehicle. Defensive driving training for staff; Apply Life Saving Rule on Driving; Apply Journey management process for planning and executing necessary road transport journeys safely; Keep a safe distance between yourself and other vehicles in accordance with highway safety guidelines; Avoid reversing try to park facing out so you can later exit your parking space as safely as possible, Avoid sudden braking.	L
Work off site on roadways CP: Hans White (SSHO) Alternate CP: Udi Dias (Alternate SSHO)	No clear Red Zone boundaries set at work site, Faulty equipment, Non-compliance with standards and procedures	Appropriate barrier and signage system (Installation of barricades and warning signs and Training in Work Area barricading and Temporary site closure guidelines).	L

Task Steps	Potential Hazards	Critical Safety Procedures and Controls	RAC
Weather issues from floods, windstorms, tornadoes, lightning, ice storm, snow and ice build-up, fog, or waterspouts Applicable in any operational environment (facility location) where such weather events occur. CP: Hans White (SSHO) Alternate CP: Udi Dias (Alternate SSHO)	Inadequate preventative measures applied; Lack of awareness	Follow local procedure / equipment to monitor weather service for severe weather warnings. Follow local procedure that defines requirements to address relevant severe weather conditions. Activate shutdown procedure during inclement weather. If needed, execute relevant scenario of the Emergency Response Plan. Consider particular elements of the work that could be affected by the weather e.g. changes in wind during lifting operations and working at height. Suspend work if weather conditions change. Verify that conditions remain the same when returning after a short break in work.	**L**
General Assessment of Work Site CP: Hans White (SSHO) Alternate CP: Udi Dias (Alternate SSHO)	General Construction Hazards, slips, trips, falls	Minimum Personal Protective Equipment Dress: • Long Pants • Shirts with Sleeves • Hardhat (if overhead hazards are present) • Safety Boots/Shoes (Steel or composite Toe) • Safety Glasses / Safety Goggles / Face Shields • Leather Palm Gloves • Hearing Protection (pneumatic tools) • Reflective Safety Vests Coordinate work activities at daily site safety meetings Caution should be used when navigating the site. Be aware of changes in grade, elevation, and any surface contamination when walking. Clear area leading to and around work locations. Place cones or mark-out holes or depressions in the ground to avoid stepping in them.	**L**
Identify trees to be removed within Site 3 CP: Hans White (SSHO) Alternate CP: Udi Dias (Alternate SSHO)	Uneven or unstable ground, hazardous flora/fauna, exhaustion/over exertion, heat and cold stress, UV exposure.	Be aware of changes in grade and elevation when walking. Clear area leading to and around locations if needed. Place cones or mark out holes or depressions in the ground to avoid stepping in them. Check for poison ivy, ticks, spiders, snakes, and/or other biological hazards. Take regular breaks and hydrate, or if feeling faint or over exerted. Wear appropriate clothing for the current field conditions. Use sun block to avoid sunburn. Avoid prolonged exposure to the sun.	**L**
Equipment usage on Site CP: Hans White (SSHO) Alternate CP: Udi Dias (Alternate SSHO)	Faulty or inappropriate equipment. Pinch points, abrasion, cuts to the hands. Spills, fire.	Inspect equipment (including hand tools) prior to use. Put faulty equipment out of service. Do not refuel generators, etc. until the equipment has cooled down. Always use a funnel to avoid spillage of fuel.	**L**

Task Steps	Potential Hazards	Critical Safety Procedures and Controls	RAC
Unload/Load Equipment from Vehicle CP: Hans White (SSHO) Alternate CP: Udi Dias (Alternate SSHO)	Back strain, pinch points, abrasion.	Utilize proper lifting procedures (keep your back straight, lift with your legs and knees) when unloading equipment from the vehicle. No individual employee is permitted to lift any object that weighs over 60 pounds. Proper lifting techniques shall be used. Multiple employees or the use of mechanical lifting are for lifting objects over the 60-pound limit. Materials shall be inspected for sharp edges prior to being handled, and avoid pinch point hazards. Utilize material handling devices when possible to move equipment (lift gates, pallet jacks, hand trucks, etc.). If necessary, use a ramp for loading/unloading wheeled devices, ensuring the ramp is properly supported prior to use. Communicate with co-workers who are assisting you to avoid back strain and pinch points. Do not carry heavy equipment over long distances without use of a cart, etc. If workers are above 4 feet elevation from ground surface or lower level, fall protection must be provided/used.	**L**
Movement on Site CP: Hans White Alternate CP: Udi Dias	Vehicle collisions, pedestrian injuries	Do not exceed the posted speed limit. Be careful when backing up that you do not hit other vehicles, bollard, monitoring well stickups, other objects, and pedestrians. Use a spotter when possible. Always be aware of traffic movements around you. Only park in designated areas, and back into the space when practicable.	**L**

Equipment to be Used	Inspection Requirements	Training Requirements
CAMP equipment	Visual prior to use	Tailgate safety meeting
Hand Tools	Visual prior to use	40-hour HAZWOPER training and 8-hour HAZWOPER Refresher training (if applicable)
Vehicles	Visual prior to use	Tailgate safety meeting
Personal protection equipment • Level D PPE (steel-toed boots, safety glasses, safety vest)	Current Certification	40-hour HAZWOPER training and 8-hour HAZWOPER Refresher training (if applicable)

Activity/Work Task: The Work consists of tree felling, hauling, stump grinding, topsoil, seed (no tree climbing).

Project location:

Contract Number:

Date Prepared: 10/26/2023

Prepared by (Name/Title): Timothy Walsh, VP Health & Safety

Onsite Competent Person by (Name/Title): Brett Powenski, Foreman A

Notes: (Field Notes, Review Comments, etc.)

Overall Risk Assessment Code (RAC) (Use highest Code): **M**

Risk Assessment Code (RAC) Matrix

Severity	Probability				
	Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	E	E	H	H	M
Critical	E	H	H	M	L
Marginal	H	M	M	L	L
Negligible	M	L	L	L	L

Step 1: Review each "Hazard" with identified "Controls" and determine RAC (See above)

"**Probability**" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.

"**Severity**" is the outcome/degree if an incident, near miss or accident did occur and identified as: Catastrophic, Critical, Marginal or Negligible.

RAC Chart

E = Extremely High Risk

H = High Risk

M = Moderate Risk

L = Low Risk

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard on AHA. Annotate the overall highest RAC at the top of the AHA.

Job Steps	Hazards	Controls	RAC

Mobilization/Setup/Demobilization CP:
 	
Brett Powenski (Foreman)
 	
Alternate CP: Adam Martin (Foreman)
	• Hit by vehicles
	• Cuts/Abrasions
	• Manual handling
	• Slips/trips/falls
		• Place road signs and traffic cones at appropriate distances if applicable
		• Activate beacon and four-way flashers to warn traffic
		• Utilize Davey Warm-up/Stretching Exercises Use safe lifting techniques and load management
		• Work within the Power-Zone
		• Follow good housekeeping principles Step deliberately
		• Wear proper/required PPE, as needed
		  ○ Hi-Vis vests
		  ○ Head protection/safety hats
		  ○ Hand protection/work gloves
		  ○ Foot protection/approved footwear appropriate to the conditions (ie., safety boots)
		  ○ Eye protection/safety glasses
		  ○ Hearing protection (ie., earmuffs or earplugs)
			M

Traffic Control – Install work zone traffic control devices if applicable
 	
CP: Brett Powenski (Foreman)
Alternate CP: Adam Martin (Foreman)
	• Struck by vehicles
	• Cuts/abrasions
	• Lifting/manual handling
	• Slips/trips/falls
	• Adverse weather
		• Use vehicle as blocker, activate beacon and four-way flashers to warn drivers
		• Stay alert
		• Set-up site facing oncoming traffic
		• Utilize Davey Warm-up/Stretching Exercises
		• Work within your power zone
		• Follow good housekeeping principles
		• Step deliberately, watch for holes, etc.
		• Cover or eliminate sharp edges
		• Wear proper/required PPE, as needed
		  ○ Hi-Vis vests
		  ○ Head protection/safety hats
		  ○ Hand protection/work gloves
			M

		○ Foot protection/approved footwear appropriate to the conditions (ie., safety boots) ○ Eye protection/safety glasses ○ Hearing protection (ie., earmuffs or earplugs)	
Traffic Control – Maintain Work Zone Traffic Control if applicable CP: Brett Powenski (Foreman) Alternate CP: Adam Martin (Foreman)	• Struck-by vehicles, equipment • Adverse Weather affecting vehicle stopping distance	• Maintained road signs in unobstructed view • Maintain road signs and traffic cones at appropriate distances • Clean, reflective, well-maintained vests, stop/slow paddle, cones, and signs, etc. • Wear proper/required PPE, as needed ○ Hi-Vis vests ○ Head protection/safety hats ○ Hand protection/work gloves ○ Foot protection/approved footwear appropriate to the conditions (ie., safety boots) ○ Eye protection/safety glasses ○ Hearing protection (ie., earmuffs or earplugs)	M
Traffic Control – Flagging if applicable CP: Brett Powenski (Foreman) Alternate CP: Adam Martin (Foreman)	• Struck-by vehicles, equipment • Adverse weather affecting vehicle stopping distance	• Traffic control training • Clean, reflective, well-maintained vests, stop/slow paddle, cones, and signs, etc. • Wear proper/required PPE, as needed ○ Hi-Vis vests ○ Head protection/safety hats ○ Hand protection/work gloves ○ Foot protection/approved footwear appropriate to the conditions (ie., safety boots) ○ Eye protection/safety glasses ○ Hearing protection (ie., earmuffs or earplugs)	M
Traffic Control – Working within the traffic control zone if applicable	• Struck, crushed by vehicles, equipment, tools, loads, and other objects	• Stay within work area (coned area) • Avoid working direct behind equipment	M

		• Minimize working with back to traffic • Wear proper/required PPE, as needed ○ Hi-Vis vests ○ Head protection/safety hats ○ Hand protection/work gloves ○ Foot protection/approved footwear appropriate to the conditions (ie., safety boots) ○ Eye protection/safety glasses ○ Hearing protection (ie., earmuffs or earplugs)	
Traffic Control – Operating equipment within the traffic control zone if applicable CP: Brett Powenski (Foreman) Alternate CP: Adam Martin (Foreman)	• Struck-by vehicle • Roll over • Slips/trips/falls	• Maintain effective traffic control • Inspect stability of road edge • Set vehicle brakes, chock wheels, set outrigger with pads • Follow good housekeeping principles Step deliberately, watch for holes, etc. • Wear proper/required PPE, as needed ○ Hi-Vis vests ○ Head protection/safety hats ○ Hand protection/work gloves ○ Foot protection/approved footwear appropriate to the conditions (ie., safety boots) ○ Eye protection/safety glasses ○ Hearing protection (ie., earmuffs or earplugs)	M
Traffic Control – Breakdown/ remove traffic control devices if applicable CP: Brett Powenski (Foreman) Alternate CP: Adam Martin (Foreman)	• Struck by vehicles • Cuts/abrasions • Lifting, manual handing • Slips/trips/falls	• Use vehicle as blocker • Activate beacon and four-way flashers to warn drivers • Stay alert. • Breakdown site facing oncoming traffic or use blocker vehicle • Utilize Davey Warm-up/Stretching Exercises Work within your power zone • Follow good housekeeping principles	M

		• Step deliberately, watch for holes, etc.
		• Cover or eliminate sharp edges
		• Wear proper/required PPE, as needed
		  ○ Hi-Vis vests
		  ○ Head protection/safety hats
		  ○ Hand protection/work gloves
		  ○ Foot protection/approved footwear appropriate to the conditions (ie., safety boots)
		  ○ Eye protection/safety glasses
		  ○ Hearing protection (ie., earmuffs or earplugs)
		  ○ Chaps/chainsaw pants	

Working with chainsaw CP: Brett Powenski (Foreman) Alternate CP: Adam Martin (Foreman)	• Contact with overhead utilities	• Job Briefing • Identify conductors and voltages • Respect minimum approach distances, use ground spotter in congested areas • Cut and/or control all vegetation using appropriate tools/methods so as to avoid contact • Only properly maintained non-conductive tools	M

	• Kick-back of saw
	• Cuts
	• Equipment failure
	• Burns from exhaust
	• Over exertion
	• Over extension
	• Noise
	• Flying debris
		• Wear proper/required PPE, as needed
		  ○ Hi-Vis vests
		  ○ Head protection/safety hats
		  ○ Hand protection/work gloves
		  ○ Foot protection/approved footwear appropriate to the conditions (ie., safety boots)
		  ○ Eye protection/safety glasses
		  ○ Hearing protection (ie., earmuffs or earplugs)
		  ○ Chaps/chainsaw pants
		• Knowledge of the reactive forces of a chain saw Climber tied in twice when using a chain saw aloft.
			M

		• Work within the Power-Zone	
	• Struck-by falling tree limbs	• Possess skill set appropriate to work activity. • Ground personnel remain outside identified drop zone • Communication - Command/Response • Ensure all tree sections being removed are controlled using approved rigging equipment and procedures • Wear proper/required PPE, as needed o Hi-Vis vests o Head protection/safety hats o Hand protection/work gloves o Foot protection/approved footwear appropriate to the conditions (ie., safety boots) o Eye protection/safety glasses o Hearing protection (ie., earmuffs or earplugs) o Chaps/chainsaw pants	M
Working with Chipper CP: Brett Powenski (Foreman) Alternate CP: Adam Martin (Foreman)	• Entrapment by Chipper • Moving parts • Slips, trips, falls • Equipment failure	• Ensure pre-use checks and maintenance have been completed • Feed brush butt end first • Utilize the Davey Lockout/Tagout procedures prior to performing and maintenance or repair • Block/secure cutterhead prior to changing adjusting chipper knives • Follow good housekeeping principles • Step deliberately, watch for holes, etc. • Daily/weekly/monthly inspections and maintenance is performed • Wear proper/required PPE, as needed o Hi-Vis vests o Head protection/safety hats	M

		○ Hand protection/ non-gauntlet style gloves ○ Foot protection/approved footwear appropriate to the conditions (ie., safety boots) ○ Eye protection/safety glasses ○ Hearing protection (ie., earmuffs or earplugs)	
	• Struck by branches/brush	• Feed chipper from curb side brush butt first • Watch for and cut angular branches prior to feeding into chipper • Wear proper/required PPE, as needed ○ Hi-Vis vests ○ Head protection/safety hats ○ Hand protection/ non-gauntlet style gloves ○ Foot protection/approved footwear appropriate to the conditions (ie., safety boots) ○ Eye protection/safety glasses ○ Hearing protection (ie., earmuffs or earplugs)	M
	• Flying Debris	• Ensure all equipment guards are in place and in good condition • Maintain a safe distance from all discharge chutes/areas • Wear proper/required PPE, as needed ○ Hi-Vis vests ○ Head protection/safety hats ○ Hand protection/ non-gauntlet style gloves ○ Foot protection/approved footwear appropriate to the conditions (ie., safety boots) ○ Eye protection/safety glasses	M

		○ Hearing protection (ie., earmuffs or earplugs)	
	• Pinch Points	• Use a spotter to align vehicle and trailer • Do not enter space between vehicle and trailer unless properly blocked/secured • Use jack-stand to raise/lower onto hitch	M
	• Excessive Noise	• Ensure all mufflers are in place and in good working order • Wear proper/required PPE, as needed ○ Hi-Vis vests ○ Head protection/safety hats ○ Hand protection/ non-gauntlet style gloves ○ Foot protection/approved footwear appropriate to the conditions (ie., safety boots) ○ Eye protection/safety glasses ○ Hearing protection (ie., earmuffs or earplugs) ○ Chaps/chainsaw pants	M
Climbing CP: Brett Powenski (Foreman) Alternate CP: Adam Martin (Foreman)	• Contact with energized overhead utility lines	• Maintain minimum approach distances at all times • Cut and/or control all vegetation using approved tools/methods so as to avoid contact • Use only tested and approved and properly maintained tools	M
	• Falling • Equipment failure • Improper use of equipment • Body motion injuries • Tree stability, structure • Visibility • Slipping	• Assess tree for stability and hazards • Use only Davey approved/issued equipment • Inspect for excessive wear or damage prior to use • Tie-in around the parent stem above a limb sufficient to hold the climber's weight	M

		• Climber to be tied in at all times with climbing line or safety lanyard, tied-in twice for chainsaw use • Check friction hitch regularly • Use figure 8 stopper knots to prevent roll out of friction hitch (open systems) and rappelling past end of climbing line • Use and maintain three point climbing technique, to not allow climbing line to become excessively slack • Use a natural or artificial re-direct for greater than 30-degree angles • Don't overextend yourself • Work within your Power-Zone • Prior to making larger cuts Communicate with ground employee - use ground guide	

	• Injury by gaff	• Ensure properly sharpened, no loose fasteners or worn/broken straps.
		• Avoid cracks, knots, and loose bark
		• Do not walk or drive with spurs on
		• Cover gaffs when storing
		• Wear proper/required PPE, as needed
		  ○ Hi-Vis vests
		  ○ Head protection/safety hats
		  ○ Hand protection/ work gloves
		  ○ Foot protection/approved footwear appropriate to the conditions (ie., safety boots)
		  ○ Eye protection/safety glasses
		  ○ Hearing protection (ie., earmuffs or earplugs)
			M

	• Overexertion	• Take regular breaks, maintain proper fluid and food intakes • Wear layers of clothing that can be adapted to changes in weather	M

	• Overextension	• Utilize Davey Warm-up/Stretching Exercises • Work within the Power-Zone • Use safe lifting techniques and load management	M

Rigging for Limb Removal
 	
CP: Brett Powenski (Foreman)
 	
Alternate CP: Adam Martin (Foreman)
	• Electrical contact from overhead utilities
	• Persons struck by vehicle/ equipment
	• Mechanical failures
	• Body motion, manual handling injuries
		• Maintain minimum approach distances at all times, use ground spotter in congested areas; use only tested and approved and properly maintained tools.
		• Cut and/or control all vegetation using approved tools/methods so as to avoid contact.
		• Ground personnel remain outside of identified hazard area
		• Communicate - use a spotter as needed
		• Permit only authorized personnel involved in the rigging operation to remain in the designated work area
		• Plan for mechanical failure - have a communicated back-up plan
		• Utilize Davey Warm-up /Stretching Exercises, work within their Power-Zone
		• Do not over-reach, re-position to allow work to be performed within Power-Zone
		• Wear proper/required PPE, as needed
		  ○ Hi-Vis vests
		  ○ Head protection/safety hats
		  ○ Hand protection/ work gloves
		  ○ Foot protection/approved footwear appropriate to the conditions (ie., safety boots)
		  ○ Eye protection/safety glasses
		  ○ Hearing protection (ie., earmuffs or earplugs)
			M

	• Struck by tree limbs	• Ensure all tree sections being removed are controlled using approved rigging equipment and procedures • Ground personnel to remain outside the identified hazard area • Communication given and confirmed prior to cuts	M
Working from Aerial Lift CP: Brett Powenski (Foreman) Alternate CP: Adam Martin (Foreman)	• Electrical contact with over-head utilities • Cut tree limbs contacting overhead utilities • Falling • Tipping equipment • Equipment failure • Manual handling • Adverse weather conditions • Unstable ground surface conditions	• Inspection set up area, evaluate for stability • Use outriggers and pads, crib as appropriate, or use alternative method • Maintain minimum approach distances at all times • Face direction of aerial lift travel • Use ground spotter in congested areas Inspect fall protection belt and lanyard for excessive wear or damage prior to use • Use fall protection at all times while aloft Don't overextend yourself • Ensure required annual structural, daily/weekly inspections and maintenance is performed and current. • Assess tree for stability and hazards • Cut and/or control all vegetation using approved tools/methods so as to avoid contact • Use only Davey approved/issued and maintained equipment • Set vehicle brakes, chock wheels, set outrigger with pads. • Do not rest bucket or boom on any part of a tree. Do not use lift as a crane. • Respect operational limitation • Operate all functions from lower controls prior to entering bucket	M

		• Utilize Davey Warm-up/Stretching Exercises Do not operate lift when lighting is present
		• Wear proper/required PPE, as needed
		  ○ Hi-Vis vests
		  ○ Head protection/safety hats
		  ○ Hand protection/ work gloves
		  ○ Foot protection/approved footwear appropriate to the conditions (ie., safety boots)
		  ○ Eye protection/safety glasses that have the appropriate lens color for the light conditions; additional illumination may be needed for low light conditions
		  ○ Hearing protection (ie., earmuffs or earplugs)	

Felling trees
 	
CP: Brett Powenski (Foreman)
 	
Alternate CP: Adam Martin (Foreman)
	• Hit by vehicles
	• Slips/trips/falls
	• Struck-by falling tree/ limbs
	• Contact with overhead utilities
	• Kick-back of saw
	• Cuts
	• Burns from exhaust
	• Over exertion
	• Over extension
	• Noise
	• Flying debris
		• Develop and Follow the Six Steps of Precision Tree Felling Plan:
		  • Risk Assessment (site and tree)
		  • Tree Felling-Height Assessment
		  • Tree Felling-Lean Assessment (Side, Back, Front)
		  • Tree Felling-Escape Routes / Retreat Path
		  • Tree Felling-Notch and Hinge Plan
		  • Tree Felling- Back cut plan
			M

Stump grinding CP: Brett Powenski (Foreman) Alternate CP: Adam Martin (Foreman)	• Contact with underground utilities	• Call 811 for utility location and marking	M
	• Flying Debris	• Ensure all equipment guards are in place and in good condition • Maintain a safe distance from all discharge areas • Make sure that no one is working on, above, below, or close to the machine before starting	M

		the engine or beginning to move the machine. Make sure that the area is clear of people.
		• Wear proper/required PPE, as needed
		  ○ Hi-Vis vests
		  ○ Head protection/safety hats
		  ○ Hand protection/ work gloves
		  ○ Foot protection/approved footwear appropriate to the conditions (ie., safety boots)
		  ○ Eye protection/safety glasses
		  ○ Hearing protection (ie., earmuffs or earplugs)	

	• Excessive Noise	• Wear proper/required PPE, as needed
		  ○ Hi-Vis vests
		  ○ Head protection/safety hats
		  ○ Hand protection/ work gloves
		  ○ Foot protection/approved footwear appropriate to the conditions (ie., safety boots)
		  ○ Eye protection/safety glasses
		  ○ Hearing protection – operators of stump grinders are to wear muffs over plugs for additional noise reduction.
		• Ensure all mufflers are in place and in good working order
			M

	• Tipping equipment	• Extreme caution must be exercised when cutting stumps on slopes. If unsure of stability, don't cut the stumps.	M
Handling limbs/debris CP: Brett Powenski (Foreman) Alternate CP: Adam Martin (Foreman)	• Handling heavy limbs • Awkward movements, postures • Slips, trips, falls • Cuts, scraps	• Utilize Davey Warm-up/Stretching Exercises • Use safe lifting techniques and load management • Do not overreach, re-position to allow work to be performed within the Power-Zone • Wear approved footwear appropriate to the conditions • Follow good housekeeping principles	M

		• Step deliberately, watch for holes, etc.
		• Apply fall protection or alternative methods for steep slopes
		• Wear proper/required PPE, as needed
		  ○ Hi-Vis vests
		  ○ Head protection/safety hats
		  ○ Hand protection/ work gloves
		  ○ Foot protection/approved footwear appropriate to the conditions (ie., safety boots)
		  ○ Eye protection/safety glasses
		  ○ Hearing protection – operators of stump grinders are to wear muffs over plugs for additional noise reduction.	

Activity Hazard Analysis (AHA)

Activity/Work Task: Site Maintenance and Restoration	Overall Risk Assessment Code (RAC) (Use highest code)	L
Project Location: Nagara Falls ARS, Niagara Falls, New York	**Risk Assessment Code Matrix**	
Contract Number: W912DR-20-D-0012	**Severity**	**Probability**
Date Prepared: 10/25/2023		Unlikely / Seldom / Occasional / Likely / Frequent
Prepared by (Name/Title): Nick Wyckoff/Junior Scientist	Catastrophic (I)	M / H / H / E / E
	Critical (II)	L / M / H / H / E
Reviewed by (Name/Title): Keith Fields/Project Manager	Marginal (III)	L / L / M / M / H
	Negligible (IV)	L / L / L / L / M
SSHO/CP: Hans White Alternate SSHOs/CPs: Udi Dias	Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)	
	"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.	**RAC Chart**
	"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible	E = Extremely High Risk H = High Risk
Notes:	Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.	M = Moderate Risk L = Low Risk

This AHA serves as the PPE hazard assessment certification as required by 29 CFR 1910.132.

Task Steps/Assigned CP	Potential Hazards	Critical Safety Procedures and Controls	RAC
Seeding and watering grass CP: Hans White (SSHO) Alternate CP: Udi Dias (Alternate SSHO)	Slips, Trips, Falls Cold/Heat Stress Cuts/Scrapes/Bruises	• Watch your step and ensure proper footing and avoid walking on uneven terrain or slippery surfaces. Do not run. Stay on paths or roads where practical. • Drink adequate water. • Slow down work rate and increase breaks in hot weather. • Dress appropriately in cold weather and avoid getting clothing wet. • Wear appropriate clothing for weather conditions. • Maintain 3 points of contact when climbing into vehicle. • Avoid working and parking in high traffic areas. Use high visibility safety vests, traffic cones if necessary. • Avoid parking near or on roadway, blind curves, or near hills where visibility of oncoming traffic may be obscured. If parking is required in off- road areas, park to the side of the road, deploy safety cones and ensure to leave adequate room for passing traffic.	L

Equipment to be Used	**Inspection Requirements**	**Training Requirements**
Hand Tools, Hose, Seeder	Visual prior to use	Tailgate safety meeting
Personal protection equipment • Level D PPE (steel-toed boots, safety glasses, safety vest)	Current Certification	• 40-hour HAZWOPER training and 8-hour HAZWOPER Refresher training (if applicable)

APPENDIX C
Tree Felling and Maintenance Plan

Tree Surgery and Removal

I. Introduction
- Right of Refusal

II. Pruning and Trimming
- Pruning and Branch Removal
- Pruning Tools
- Cutting Branches and Limbs
- Roping, Rigging and Lowering Limbs
- Pruning Palm Trees

III. Tree Removal
- Work Site Inspection, Planning and Preparation
- Notches and Back Cuts
- Lodged Trees
- Rotten and Hollow Trees
- Split Trees
- Trees Larger in Diameter than Saw Bar Length
- Sectional Tree Removal
- Manual Land Clearing

IV. Limbing and Bucking
- Limbing
- Bucking (Cross Cutting)
- Handling Wood and Brush on the Ground

V. Tree Support Systems

VI. Tree Lightning Protection Systems

Appendix A Weight of Green Wood Table

I. INTRODUCTION

The Davey Company and its subsidiary companies provide tree and landscape services, including utility line clearance services. Our work includes the pruning and cutting of tree limbs and, at times, the removal of trees with hand and powered equipment. Some of the tools and procedures we utilize may also be used by loggers. We are not loggers, we are not in the logging business. We are professional arborists, landscapers and green industry, technical specialists. The information contained herein is directed to Davey operations.

Tree Risk Assessment and the Right to Refuse

Before climbing or working on any tree, assess the health condition and structure for potential weaknesses. Note the proximity of tree parts to any electrical conductors and ensure that Minimum Approach Distances (MAD)
appropriate for training and qualification levels can be maintained at all times during the operation. Locate obstacles; things that will need to be moved or protected during operations. Develop and implement a plan to deal with any electrical hazards and obstacles that you identify.

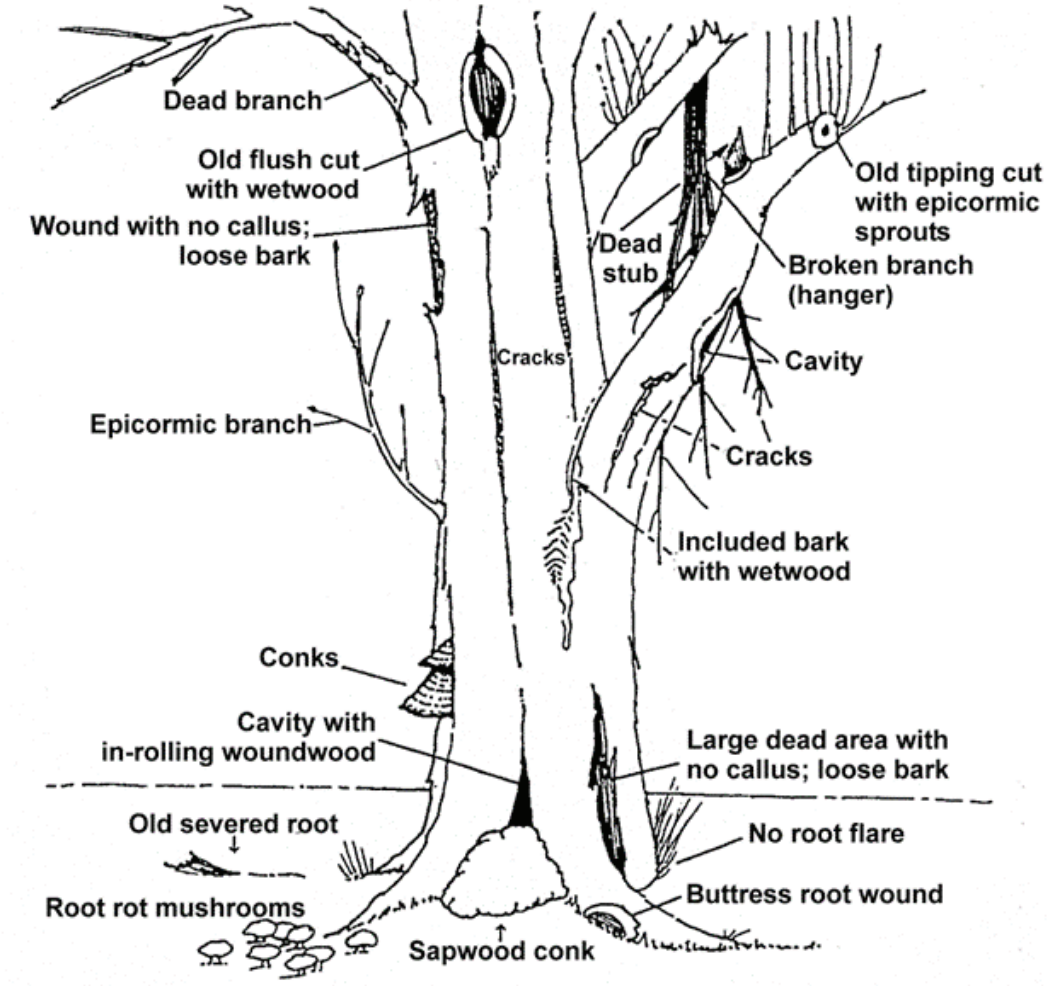
Check the entire crown for dead or decayed branches and limbs, epicormic branches (water sprouts) around old topping cuts, nests, and weak crotches - especially those with included bark.

Inspect and probe a tree's lower trunk and root collar on all sides for loose bark, cracks, cavities, mushrooms, conks and cankers, rot and decay. Remove or push aside vegetation (such as vines) at the tree base for inspection. Sound the base of the trunk with a small mallet or solid piece of hard wood, listening for dull or hollow sounds that may indicate the presence of dead areas under the bark, decay pockets, or cavities near the base of the tree at the trunk-root flare. If you find evidence of weakness at the base of the trunk, investigate further to determine the extent of the defect and the level of risk associated with it. If you are unsure about determining the level of risk, seek assistance from your crew leader, sales arborist,supervisor or, other more experienced arborist.

The tree worker/arborist has the final determination and right to refuse to prune or take down a tree if there is danger to life or property. If, after performing the tree risk assessment, the tree worker/arborist suspects that the tree is hazardous, the immediate supervisor or manager shall be contacted and the situation explained and a safe plan of action determined and followed.

Potentially hazardous conditions include:

- Growth beyond natural form into dangerous lop-sided form.
- Excessive trunk lean (greater than 20 degrees).
- Recent loss of large limbs.
- Tall, top-heavy edge trees exposed by removal of surrounding trees.
- Construction equipment damage.
- Backfilling and grading at or within the crown drip line.
- New road or structures near base of the tree.
- Trunks with no trunk-root flares.
- Deep, open cracks in trunk and branches, especially cracks on opposite sides.
- Deep, open cracks below adjoining stems or scaffold limbs.
- Large branches that have grown rapidly from topping cuts.
- Storm damaged branches, trunks and roots.
- Fungal fruiting bodies on or near root collars, buttress roots and surface roots.
- Rots, decay and cankers — sunken dead spots, and cavities, in the main trunk(s) or large scaffold limbs.
- Evidence of severed roots.
- Evidence of borers on the main stem and branches that may indicate severe stress.
- Heavy vine cover that could hide any of the above conditions



Factors and Forces to consider when assessing tree risk for rigging.

FACTORS:

Branch and Root Attachment:

Do the growth patterns and geometry (body language) of the tree indicate strong branch and root attachments and tree structure or weaker attachments and tree structure.

Decay:

Is decay present in the trunk, branches, or roots? If so, what type of decay fungi in present, where is the decay located, and what is the extent of the decay?

Damage:

Is there visible damage to the root system, trunk, or branches? Damage may include wind damage to branches, barks wounds and cracks in the trunk, and cuts or fills and compaction injuries to the root system.

Response:

Has the tree responded to strength loss from previous injuries with active growth of new wood? Does the tree have normal trunk taper?

Site:

Does the tree have conflicts with utilities, other trees, or structures? Has the soil grade been changed, excavated, filled, or otherwise disturbed? Is the root zone restricted?

FORCES:

Tree Work:

Is the tree structurally sound and able to withstand the forces that will be applied during the rigging process? Rigging systems can apply heavy forces to a tree or branch.

Gravity:

Has the tree had any sudden changes that may change the force of gravity on the tree; has a large section of the tree been broken out or pruned off? If so, the force of gravity may be redistributed within the structure of the tree creating some loss of stability. Such trees need to be approached with caution.
Weather:

Has the structure of the tree been affected by weather events? High winds and ice and snow storms, can cause internal damage that will create structural strength loss. Look for cracks or splits that indicate possible weather damage. Heavy rains can waterloged soils and reduce root strength and whole tree stability.

Leverage:

When rigging from trees minimize the twisting forces, torque, being applied to branches and the trunk. The longer the branch or trunk being twisted, the greater the force is applied to the connection point of the branch or the base of the trunk. Excess torque can cause branch or whole-tree failure.

Electric:

Electricity is a hazard on many job sites. Before starting any job, electrical hazards must be identified and the exposures reduced to safe levels by following the appropriate electrical hazards safe working procedures including maintaining the appropriate Minimum Approach Distances (MAD) for personnel and equipment.

II. PRUNING AND TRIMMING

Pruning and Branch Removal

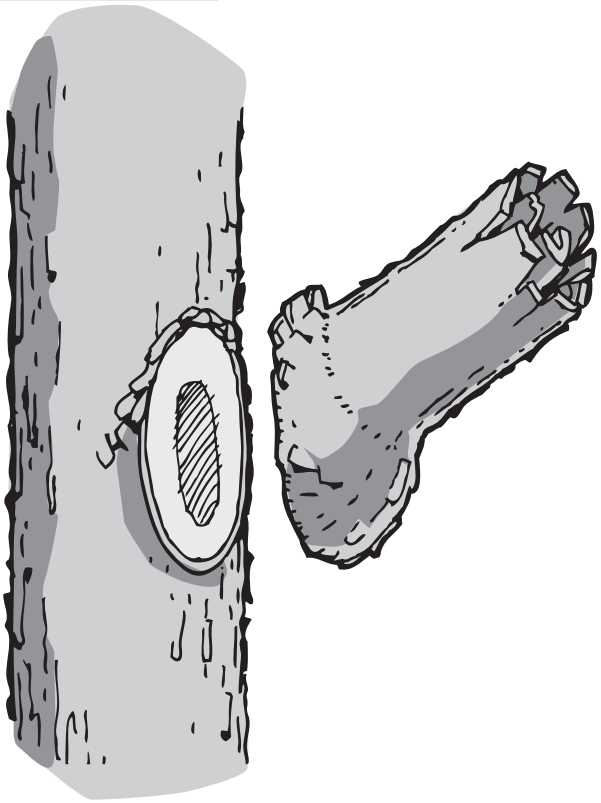
Pruning is removal of plant parts. Proper pruning enables
removal of dead, diseased, broken, malformed and undesirable parts of woody plants without harming remaining plant parts or creating hazardous conditions.

Pruning is a wounding process. Proper pruning cuts minimize damage to woody plants by promoting growth of woundwood. Woundwood is lignified, differentiated tissues produced from wounded cambium that grow over and eventually seal pruning cuts.

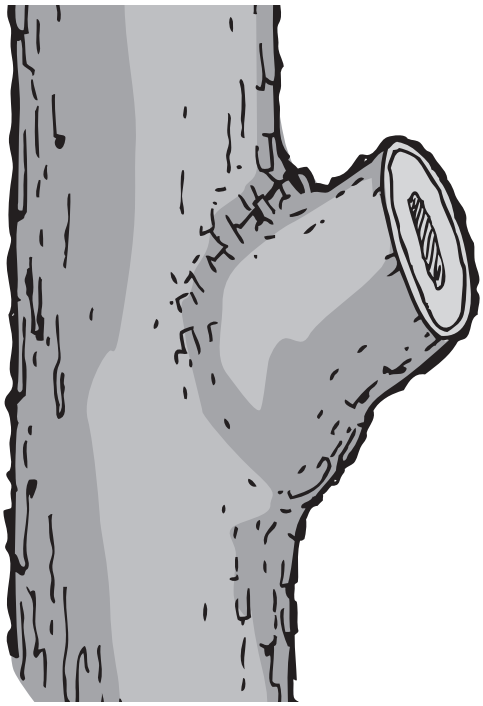
A proper branch removal cut does not remove, injure or damage the branch bark ridge and the branch collar when made outside the branch bark ridge and close to the collar. Only branch tissue is removed; stem tissue is not disturbed and concentric rings of woundwood will form over the finish cut.

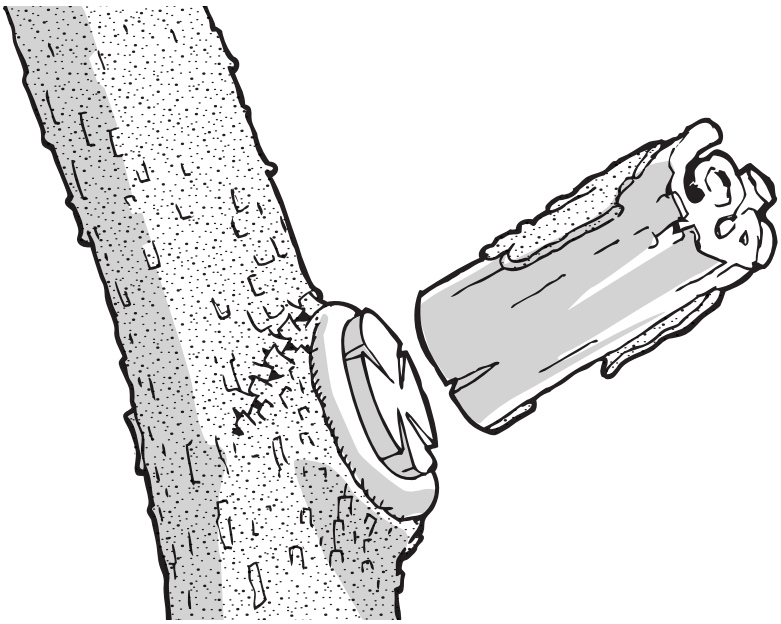
Flush cuts are improper pruning cuts made inside the branch bark ridge or the branch collar, causing injury to stem tissues. Flush cuts often result in pronounced development of woundwood on only the sides of pruning wounds with very little, if any, woundwood forming on the top or bottom of such a wound.

Stub cuts are incorrect pruning cuts made too far outside the branch bark ridge or branch collar, leaving excessive branch tissue attached to the remaining stem or branch part. Wound closure is delayed because the woundwood must grow over the remaining stub.



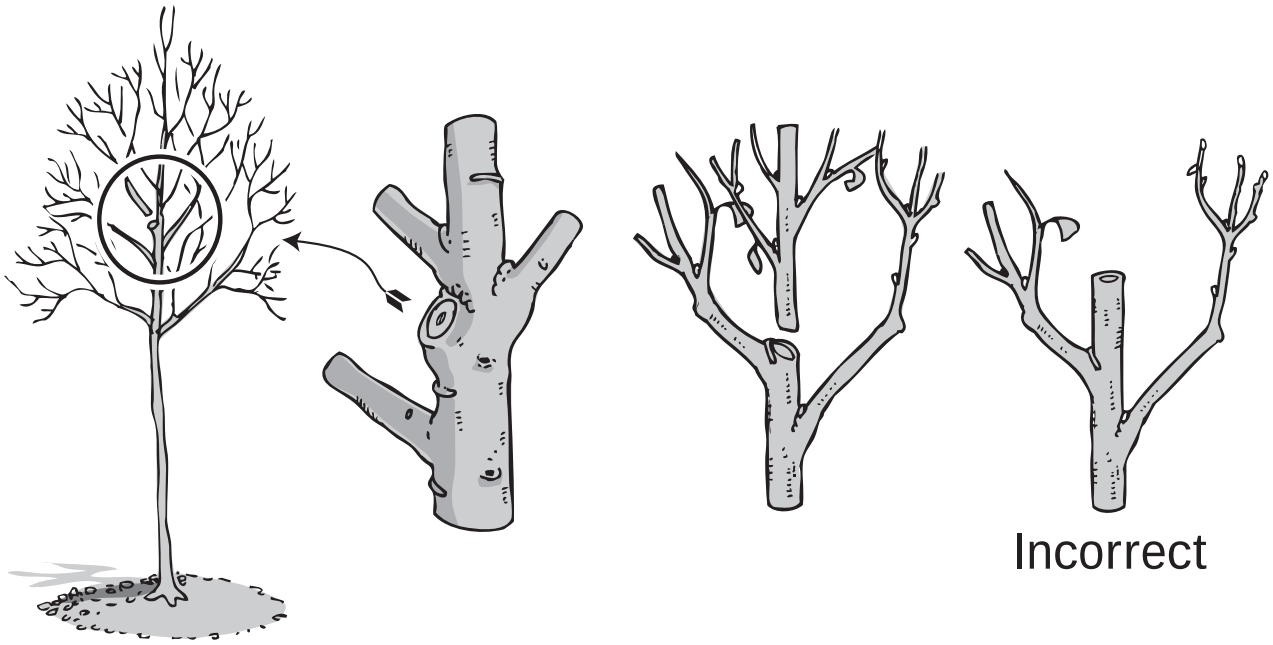
Dead branches: A living branch collar and branch bark ridge continue to grow at the base of a dead branch. A dead branch is removed or cut just outside of the base ring of living tissue.





Epicormic sprouts are shoots that arise from latent or adventitious buds. Watersprouts are epicormic shoots that grow on stems and branches. Suckers are epicormic sprouts produced from root tissue. Excessive epicormic sprouts often result from severe or incorrect pruning, are usually weakly attached, deter intended clearance work and increase risks of hazard.

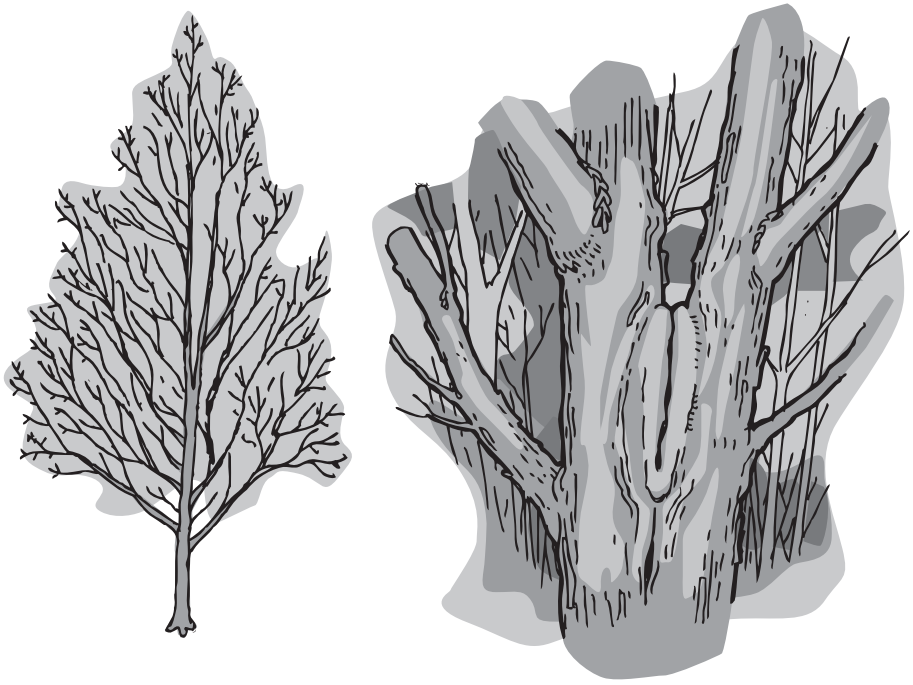
Thinning is selective removal of small live branches to reduce crown density. Proper thinning retains crown shape and size and should provide an even distribution of foliage throughout the crown.



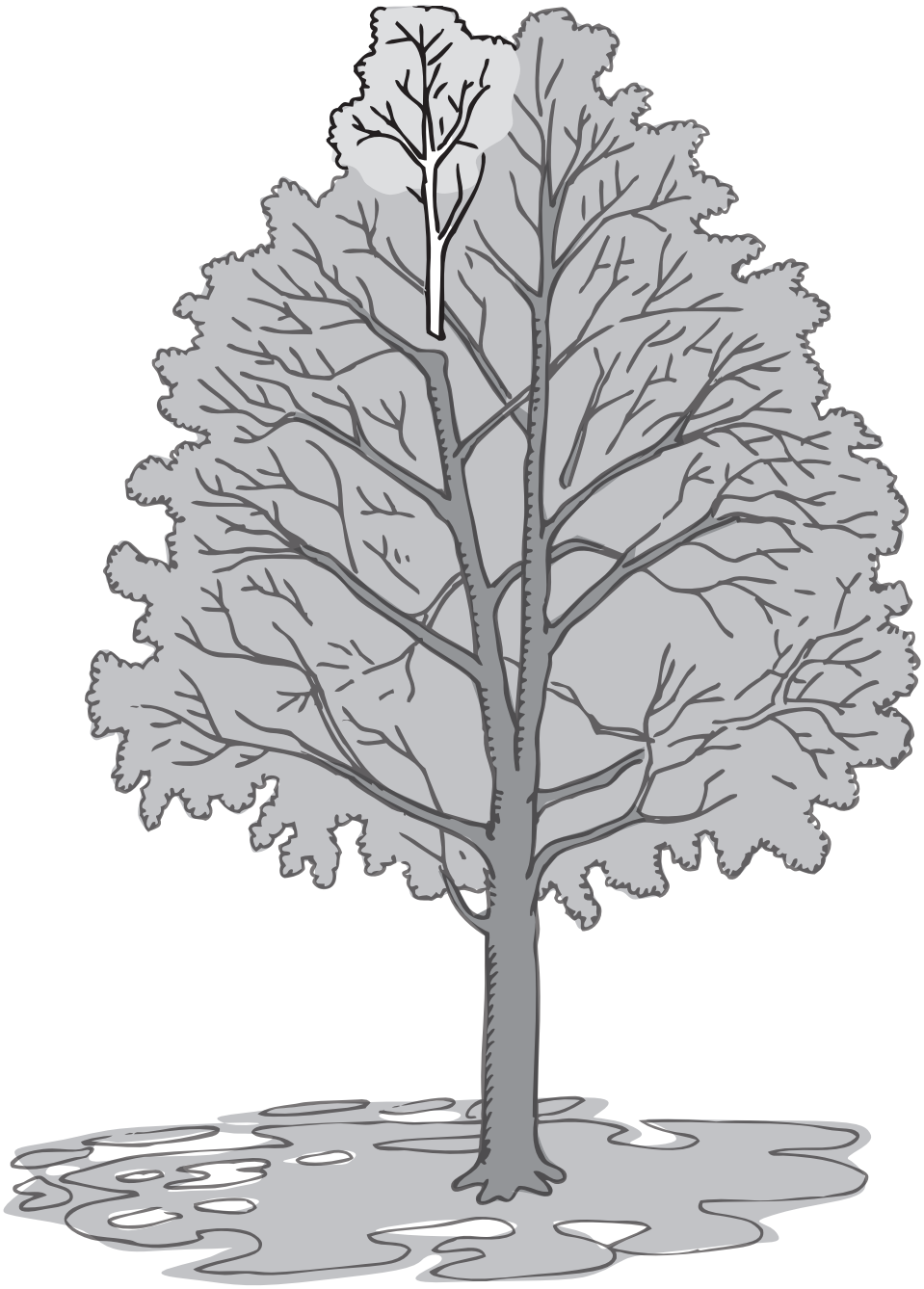
Drop crotch or reduction cuts are thinning cuts used most often to reduce the height of a woody plant for clearance; a stem or upright limb is removed at a node with an adequately sized lateral branch attached to the remaining stem or upright limb part.

Lion-tails are branches with all inner lateral branches and foliage removed, leaving foliage remaining only at branch ends. Lion-tailing is an incorrect pruning practice, resulting in sunscalding, excessive epicormic sprouting, weak branch structure and risk of breakage. If it is necessary to remove more than half of the foliage from a branch, consider removing the entire branch.

Included bark is wood growth enclosed or embedded between stems and/or branches with narrow, V-shaped, angles of attachment. Included bark prevents attachment of branches to stems or parent branches, often resulting in a crack at the point below where the branch and/or stem parts meet.



Codominant stems often form included bark. Removing some of the lateral branches from a codominant stem can reduce its growth enough to allow the other stem to become dominant.



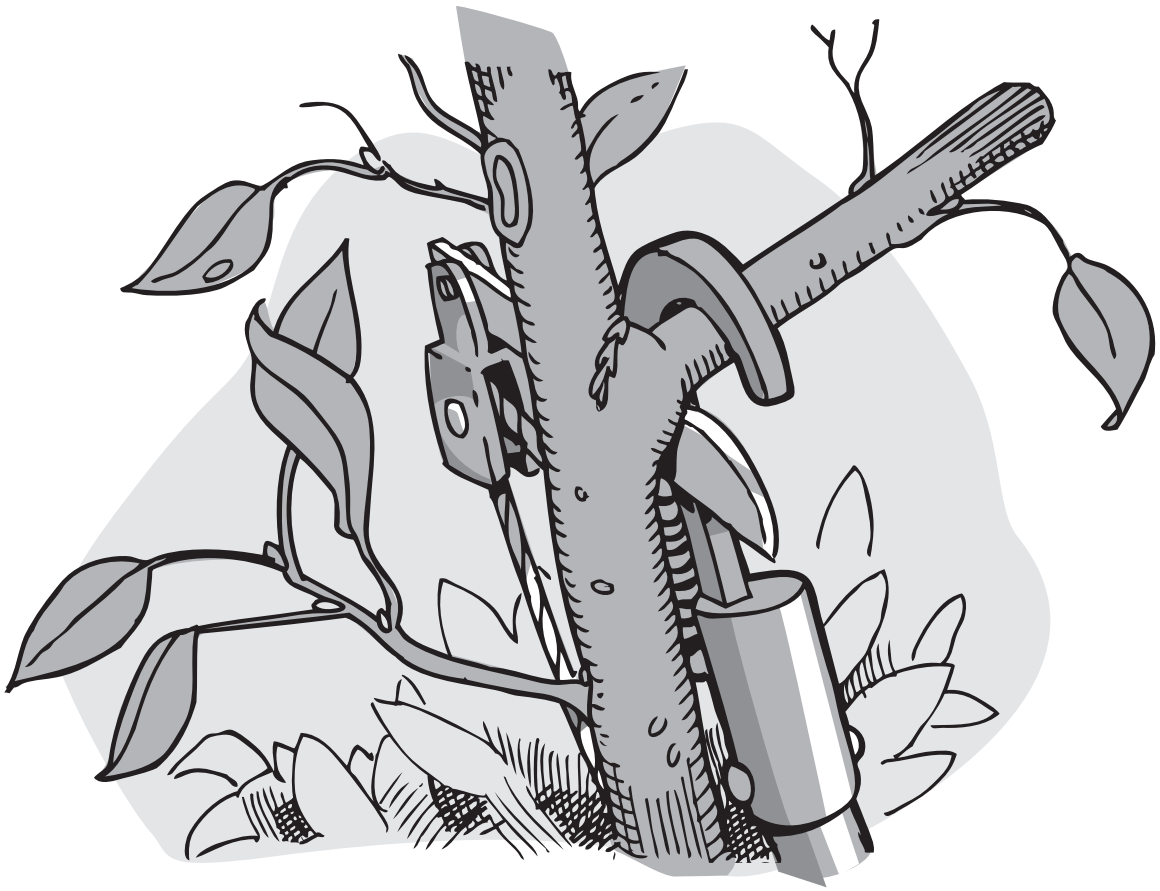
Pruning Tools

When pole saws are aloft and not in use, they must be hung securely in a vertical position; where, if knocked loose, they will not fall and injure a climber or ground person.

Never hang pole saws on electric conductors, such as wires and cables.

Cracked or crushed poles lose structural and insulating capabilities. Damaged poles must be removed from service and replaced.

Use care when letting pole saws slide through the hands, as injury may result from splinters or saw teeth.



Pole tools used in Davey operations shall be company issue, constructed with fiberglass-reinforced plastic (FRP meeting 190.269(r insulated tool requirements.

Pruners

When using a pole pruner, an arborist must be in a proper working position and the pruner handle positioned so that 1 there is a straight pull on the rope, 2 the lever arm can move far enough to complete the cut, and 3 the blade will not jam in the wood.

Cut each branch from the outer portion of the branch bark ridge down and slightly out, so as not to injure or remove the collar. Place the pruner head around the branch to be cut with the side of the hook against the remaining lateral branch or stem. An experienced arborist can give a severed branch a flip with the side of the pruner head, just as the cut is completed, so that the branch will fall in the desired direction.

It may be difficult to control the fall of a branch cut with a long-handled pole pruner or saw from the ground. If the cut limb could fall across nearby wires or damage property, prune it. Work and position yourself so that a cut limb does not slide down the pole handle and strike you.

Hand Saws

Scabbards or sheaths attached to the arborist saddle or leg shall be used to carry handsaws when not in use. Folding saws, when not in use, shall be closed and, if aloft, hooked to the arborist's saddle. Hand saws shall be carried by arborists during pruning and removal operations when climbing or working from an aerial lift.

Cutting Branches and Limbs

Preventing Struck By Injuries

Establish Positive Crew Communication

Before commencing operations, a communication protocol shall be established or reviewed between arborists aloft and personnel working on the ground. Verbal communication by voice or radio shall employ a Command and Response (C&R). “Stand Clear” as the “C” from aloft and “Clear” as the “R” from the ground are examples. Hand signals or whistles may also be used. Eye contact or arborist aloft to ground person line of sight when communicating should also be established.

The arborist in charge shall establish a plan to safely manage the worksite. Communications among arborists aloft and other workers on the ground shall be established before commencing operations. Predetermined, non-verbal communication, such as whistles, two-way hand signals, or radios may also be used.

Example:

Command: Stand clear! **Response:** Clear!, Underneath! or Stop!

A Drop Zone is the area beneath workers aloft involved in arboricultural operations where the potential exists for struck-by injuries from falling objects.

A drop zone shall be established prior to the start of pruning, rigging, or other arboricultural operations aloft.. Workers not directly involved in the operation shall stay out of the pre-established drop zone until it has been communicated by a qualified arborist or qualified arborist trainee directly involved in the operation that it is safe to enter the drop zone.

Work shall be organized so the actions of one worker will not create a hazard for coworkers.

Only qualified arborists or qualified arborist trainees directly involved in the operation shall be permitted in the drop zone when a load is being suspended by a rigging system.

It is important to make the right cuts in the proper order and place so that limbs being removed will drop in the intended direction.

An arborist shall not cut off a limb directly overhead if there is any chance that it could fall and hit him/her. Climbers should change working positions to the side or above the branch before completing the cut.

Cut branches shall not be left in trees.

Cuts:

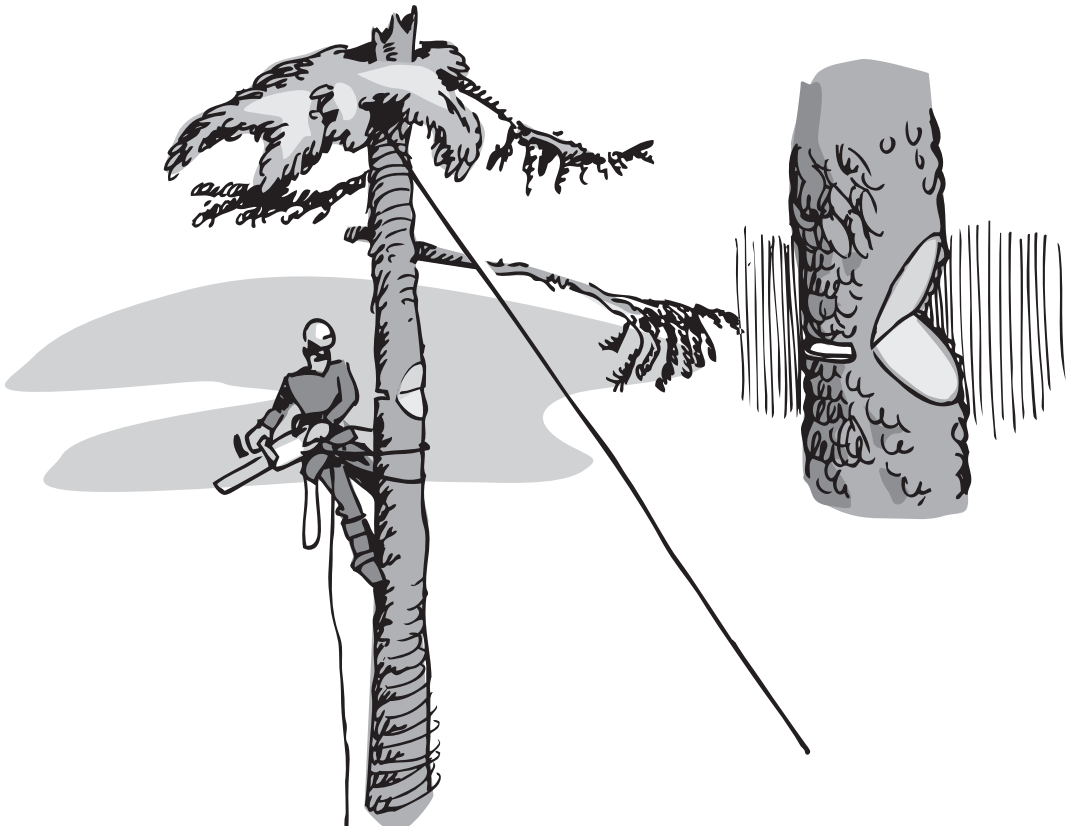
Jump (drop) cuts allow the arborist to handle heavier pieces with a minimum of effort if there is room for them to fall safely. Take care in pulling branches out of trees, as they could fall and injure you or others.

The **jump (drop) cut** is used when the arborist wants a branch to fall straight down. Two cuts are made, the first about one-fourth to one-third of the way through the limb starting at the bottom.

Take care not to pinch the saw when making this cut. The second cut is made on the top two inches out from the first under cut. On larger branches, make the two cuts closer together. The branch should break cleanly and drop straight down landing flat. This prevents 1) springing, which occurs when branch ends land first and 2) any ground damage the butt end may cause if it lands first.

Jump cuts are not recommended for heavy horizontal limbs, as they may split before the second cut is completed.

Notching is useful when handling large branches, top-heavy limbs or a piece that leans away from the desired direction of fall. A notch gives better control of fall direction and is more likely to break cleanly.



When using a notch, the back cut should be made even with center of the notch. If the back cut is made below the notch, the limb may hang up or split or may fall in the wrong direction. If the back cut is made too high, the hinge may fail.

The **pivot cut** is a single directional cut generally used when branches must be raised or lowered by ropes. It is made by sawing partway through one side only, the side opposite the direction the limb is to be pulled. This leaves some holding wood and bark to act as a pivot until the piece moves into the intended direction and is then separated from the tree for lowering to the ground.

Top Cut

Branches to be lowered directly to the ground should be cut on the top side. If a limb is to be pulled sideways, cut it on the side opposite the direction it will be pulled. If a limb is to be raised before lowering it to the ground, cut it from the bottom.

If permitted to fall free, a limb will usually strip or split back when a hinge cut is used. Don't use a hinge cut without roping, unless the tree is to be removed. Make a hinge cut far enough away from the final cut so that a split in the limb back toward the trunk will not reach the place where the final cut will be made. This splitting can also be avoided by making "kerf cuts" on either side of a notch, just below it.

Roping, Rigging and Lowering Limbs

In order to lessen the impact on potential rigging points, if the ground area is clear of obstacles, drop or jump-cut branches without using a lowering rope whenever possible. Do not drop stubs and branches without roping if they will hang up in the tree or damage objects on the ground. If you are "natural crotch" rigging, be careful

not to prematurely remove strategic rigging points that may be needed later on in a project. Conversely, arborist blocks can be anchored anywhere and do not require leaving unwanted “stubs” or “branch unions” which should be removed to avoid “hang-ups”.

- A separate workline shall be attached to limbs that cannot be dropped safely or controlled by hand.
- Arborist climbing lines and worklines shall not be secured through the same crotch.
- When a lowering rope is used, proceed in a manner that does not overload the tree structure or the rope.
- Avoid bringing the load to a sudden stop whenever possible.

Before the tree is climbed and a rigging system designed, a plan must be developed to organize the order in which branches, limbs or stem parts will be rigged and lowered. Arborists performing rigging operations shall inspect trees for their integrity to determine whether the trees have any visible defect that could affect the operation. Take into consideration:

- hazards and obstacles
- tree species, form, structure and wood characteristics
- crewmember capabilities
- available space – drop zone
- rope construction and strength; three-strand for natural crotch, braided for rigging devices
- rope placement and rigging plan

Rigging points shall be assessed for their structural integrity by a qualified arborist. Before a rigging point is chosen and established, consideration must be given to the rigging plan and the tree relative to the forces being applied to any part of the tree, including branch attachments and anchoring roots.

The tree or crane used to support a load is referred to as the rigging platform.

Consult with knowledgeable crew members regarding wood weight, fiber strength and rigging crotch reliability. Living or dead, the wood structures of each tree species react differently.

If it is determined that the tree poses a risk of failure due to the forces and strains that will be created by the design of the rigging operation, an alternative plan shall be implemented.

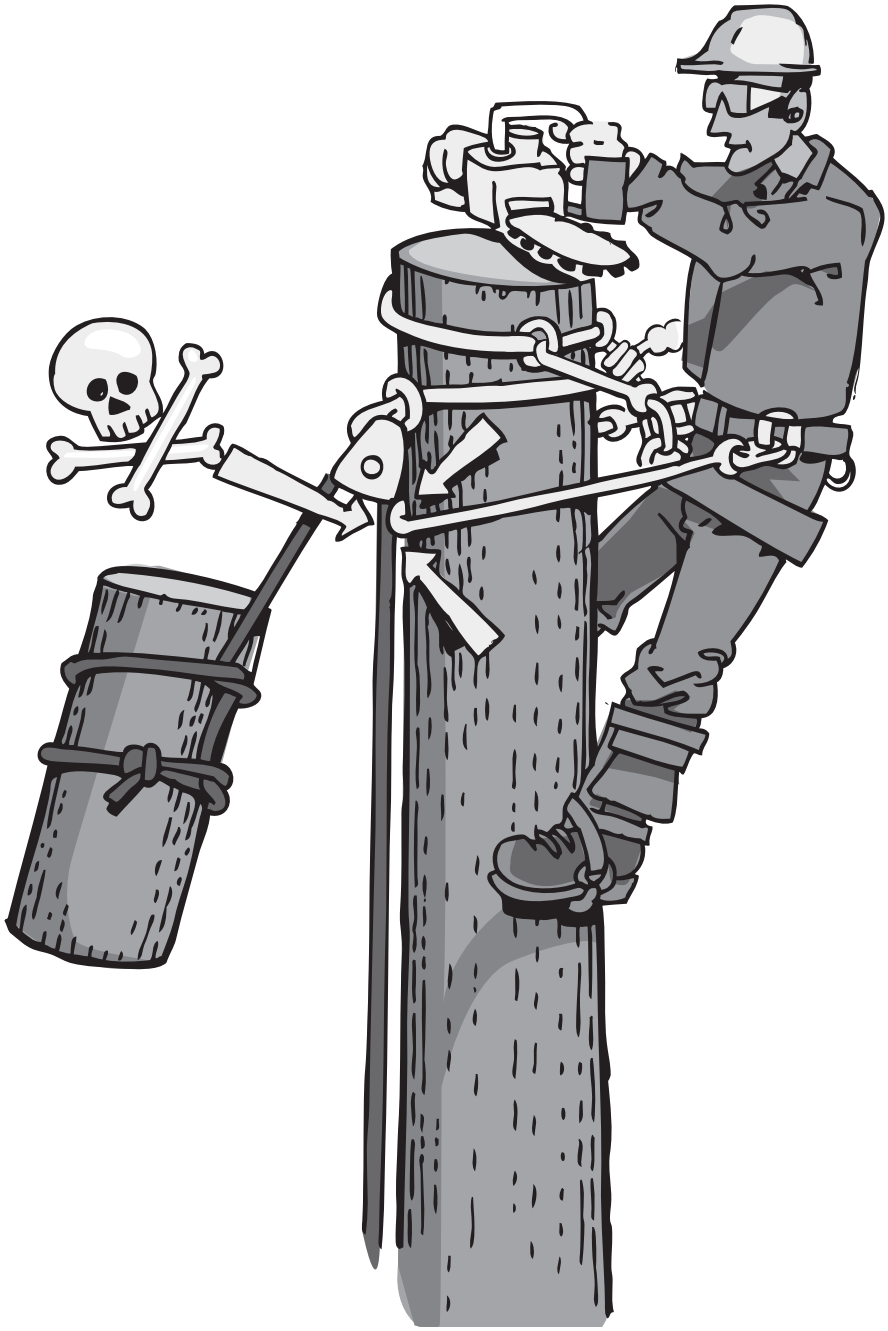
Before using any ropes, connecting links or rigging equipment, the qualified arborist shall ensure that load ratings shown on the rigging equipment, or provided by the manufacturer, are adequate for the job and shall observe all such ratings in any rigging operation. Rigging equipment shall be chosen for the specific task based on working-load limits and design specifications.

Arborists performing rigging operations shall be educated to understand and trained to estimate the potential forces at any point in the rigging system being used. The system components shall comply with working-load limits relative to the operation and the maximum potential forces.

Careful consideration shall be given to the potential forces resulting from the specific influences of rope angles (bend radius), as well as the number of lines and/or line parts that will act on any rigging point.

- The number of connecting links used for connecting components of a rigging system shall be minimized when possible.
- Care shall be taken to ensure that connecting links interface properly and in compliance with manufacturers’ specifications.
- All equipment used for rigging operations shall be in good working condition.
- Rigging equipment that has been damaged or overloaded shall be removed from service immediately.
- When the potential exists for rigging equipment to be confused with climbing equipment, the equiment shall be clearly marked to indicate their different purposes.

Climbers shall choose tie-in points that will provide proper protection while allowing for a separation between the rigging system and the climbing system. **Running rigging lines shall not be allowed to come into contact with any part of the climbing system.**

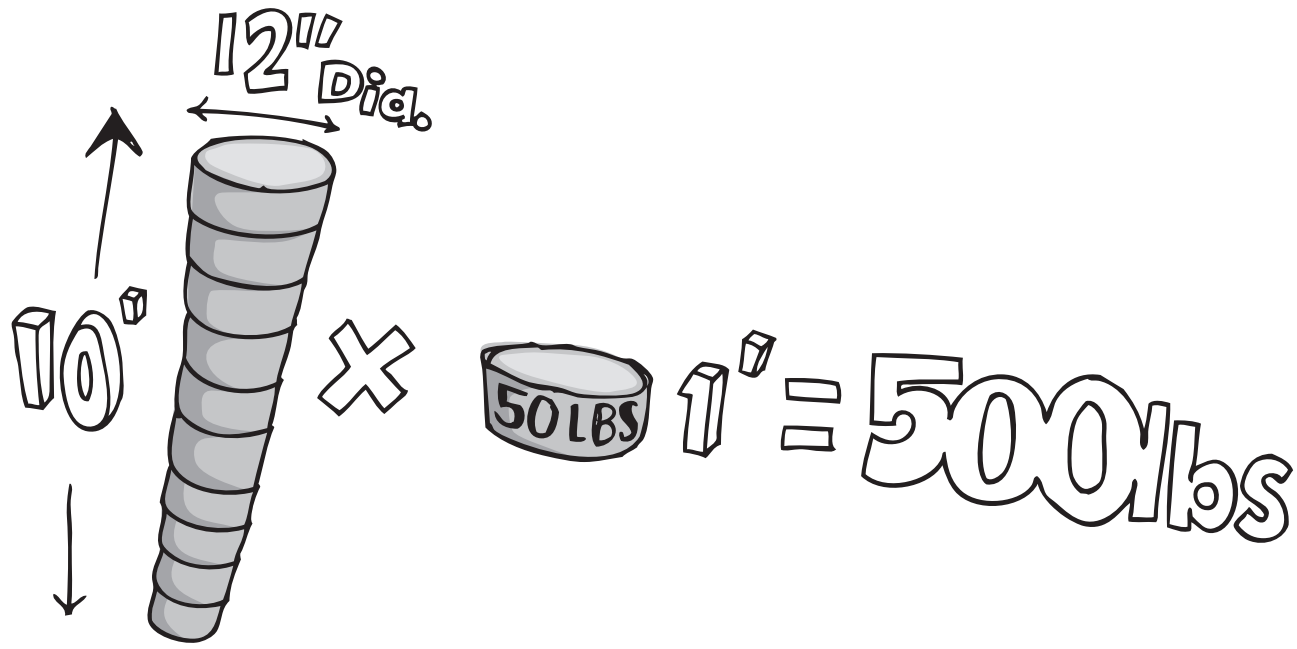


To estimate the **weight of the load**, multiply the length of wood load (in feet) by the weight of a 1-foot section (from the *Weight of Green Wood* table) using the average diameter of the log. Refer to Appendix A,Weight of Green Wood

Weight of Green Logs

Example: Say the load is a shagbark hickory limb **10 feet** long with an average diameter of **12 inches**; the *Weight of Green Logs* table indicates a 1-foot section of hickory wood at 12-inch diameter weighs **50 pounds**.

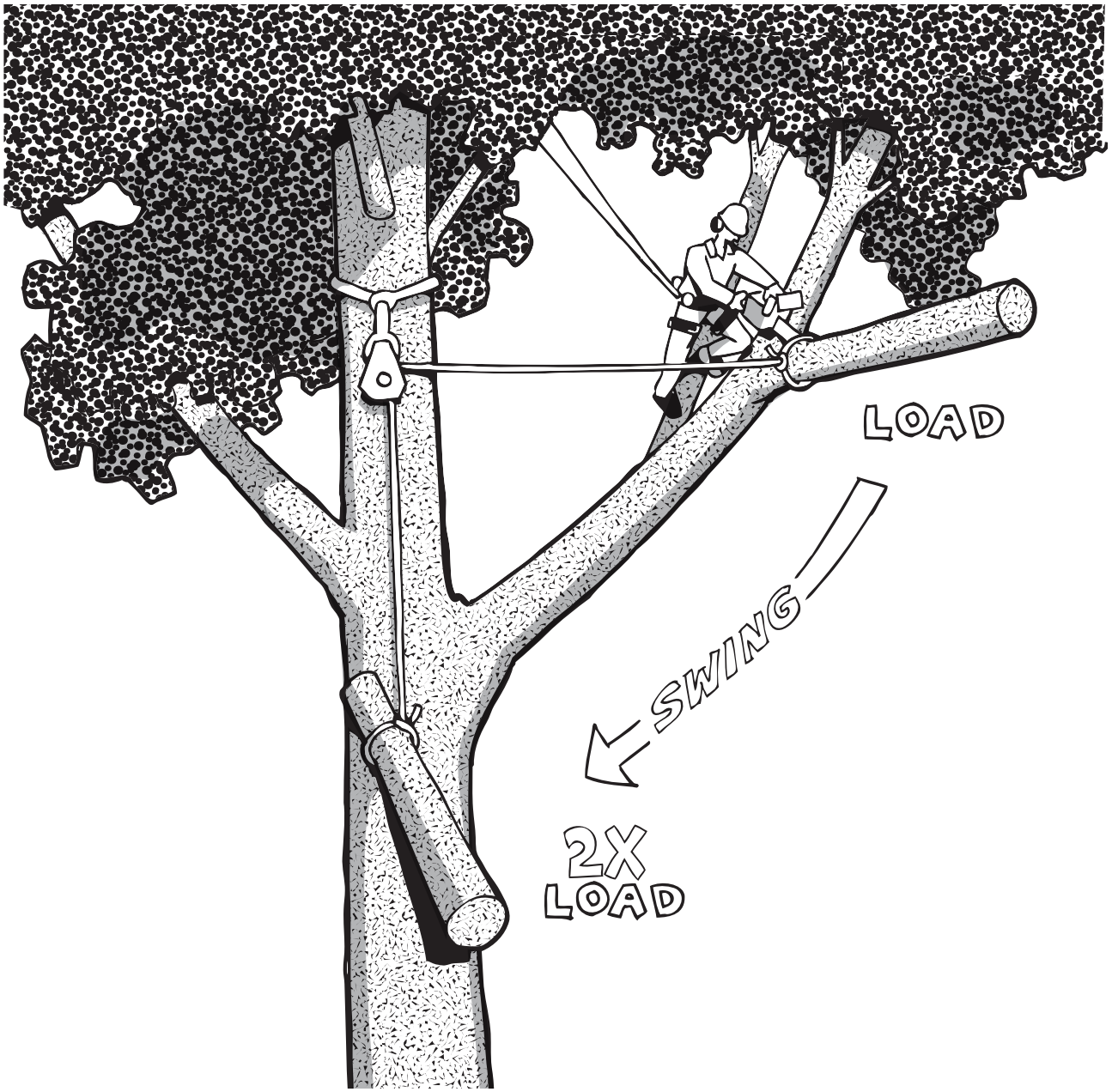
Length: **10 feet** X 1-foot section: **50 pounds** = Weight of the load: **500 pounds**



The **shock load** is the force required to suddenly stop a load that is in motion. Otherwise stated as a very rapid increase in tension from a state of relaxation or low load to a very high load.

A load that is swung will increase in weight. The greater the swing, the greater the load will increase in weight or 'foot-pounds.' This is due to gravity forces being exerted upon the load as it travels. The angle and length of the swing, amount of rope in the system and drop of the load will determine the weight increase. Additional factors are how much the tree or rigging point moves or flexes and whether or not the ground person allows the load to run.

When a load starts its swing from the same elevation as the rigging crotch or block on the supporting portion of the tree, what we will call "the rigging platform," the load will at least double its weight at the point where it bottoms-out vertically and starts to swing upward in the opposing direction and decelerates.



The following formula may be used to calculate the approximate shock load on a rope and a rigging system. This formula provides an **estimated minimum** shock load. Research and field tests almost always exceed (often significantly) the loads arrived at with this formula.

To calculate the shock load on a rigging point:

Weight of the load X total distance of drop + Weight of the load = Shock load.

Example:
1) Weight of the load: **500 pounds.**
2) Total distance of drop: the load is tied off 2 feet **above** the rigging point; that, plus 2 feet of fall **below** the rigging crotch, equals **4 feet** of total drop distance.

(**500 pounds** X **4 feet**) + **500 pounds** = at minimum **2,500 pounds** of shock load

An equal force of 2,500 pounds will be required to instantly hold the shock load weight. These two forces will combine at the point of rigging. Therefore, the rigging platform and equipment is suddenly shock loaded with 5,000 pounds of weight, perhaps more. Bear in mind that the weight will increase exponentially with each foot it drops. Another factor that must be considered is how much energy the tree will absorb. The shock load is typically higher at a point on the tree that does not move or flex (the trunk) as opposed to a point that bends, like a limb.

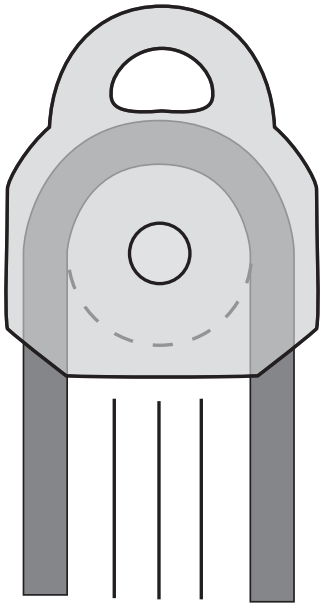
Shock loading on the stem can drastically increase the load weight and the dynamics exerted upon the platform. Large limbs that are secured with a butt catch to the stem are also subjected to the same forces. Shock load energy can be lessened by reducing the distance of drop, reducing the load weight or by gradually slowing the load.

“Think Manila”

The supporting tree or “platform” and the rigging equipment must be capable of holding the load and withstanding the sudden impact. The concern for rope breakage under load was prevalent in years past when arborists used much lower strength natural fiber rope. Low impact rigging and lighter loads were taken to avoid breaking the rope. Today the phrase “think manila” is used to convey caution to the arborist to protect not only our high strength rated synthetic ropes and modern rigging systems, but more so for the natural strengths, or perhaps weakness, of the supporting tree to prevent potentially serious accidental failure. Inspect your tree and develop a suitable plan, including provisions for low impact rigging as warranted. Then, implement the plan safely.

When conditions require rigging on the stem, available limbs or an approved arborist block should be used as a rigging crotch.

Work within the safe working limitation of the ropes and associated rigging equipment. Another consideration in rigging is the effect of a tight bend radius on the rope. If a shackle is used as a false crotch, the outer fibers of the rope will be stretched as they are sharply bent and may break, resulting in rope failure. **The diameter of the crotch or arborist block should be 4 times the diameter of the rope to avoid any sharp bends.**



4:1 bend radius

Establish Positive Crew Communication

Before commencing operations, a communication protocol shall be established or reviewed between arborists aloft and personnel working on the ground. Verbal communication by voice or radio shall employ a Command and Response (C&R). “Stand Clear” as the “C” from aloft and “Clear” as the “R” from the ground are examples. Hand signals or whistles may also be used. Eye contact or arborist aloft to ground person line of sight when communicating should also be established.

The arborist in charge shall establish a plan to safely manage the worksite. Communications among arborists aloft and other workers on the ground shall be established before commencing operations. Predetermined, non-verbal communication, such as whistles, two-way hand signals, or radios may also be used.

Example:

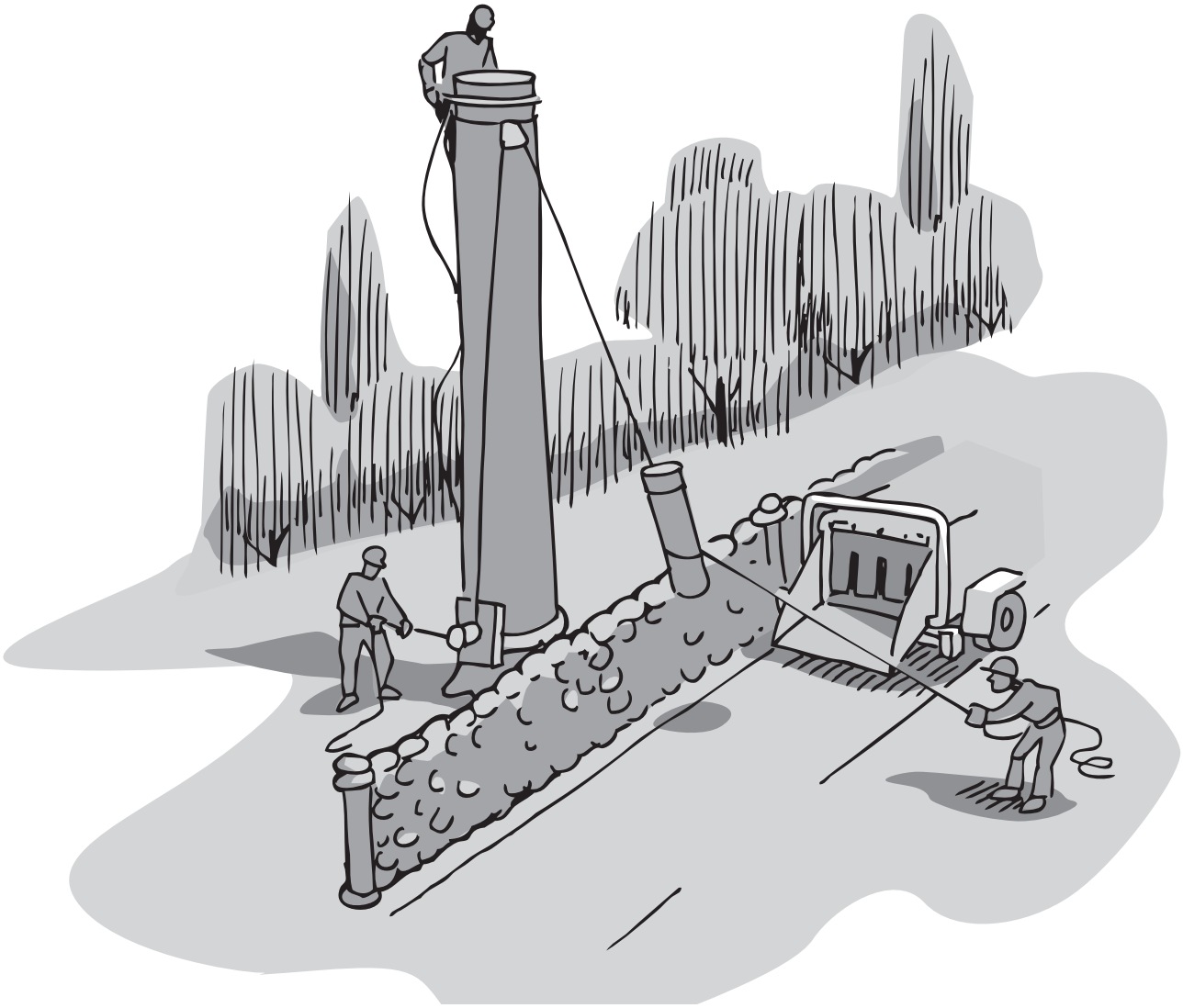
Command: Stand clear! **Response:** All clear!, Underneath! or Stop!

A Drop Zone is the area beneath workers aloft involved in arboricultural operations where the potential exists for struck-by injuries from falling objects. A drop zone shall be established prior to the start of pruning, rigging, or other arboricultural operations aloft. Workers not directly involved in the operation shall stay out of the pre-established drop zone until it has been communicated by a qualified arborist or qualified arborist trainee directly involved in the operation that it is safe to enter the drop zone.

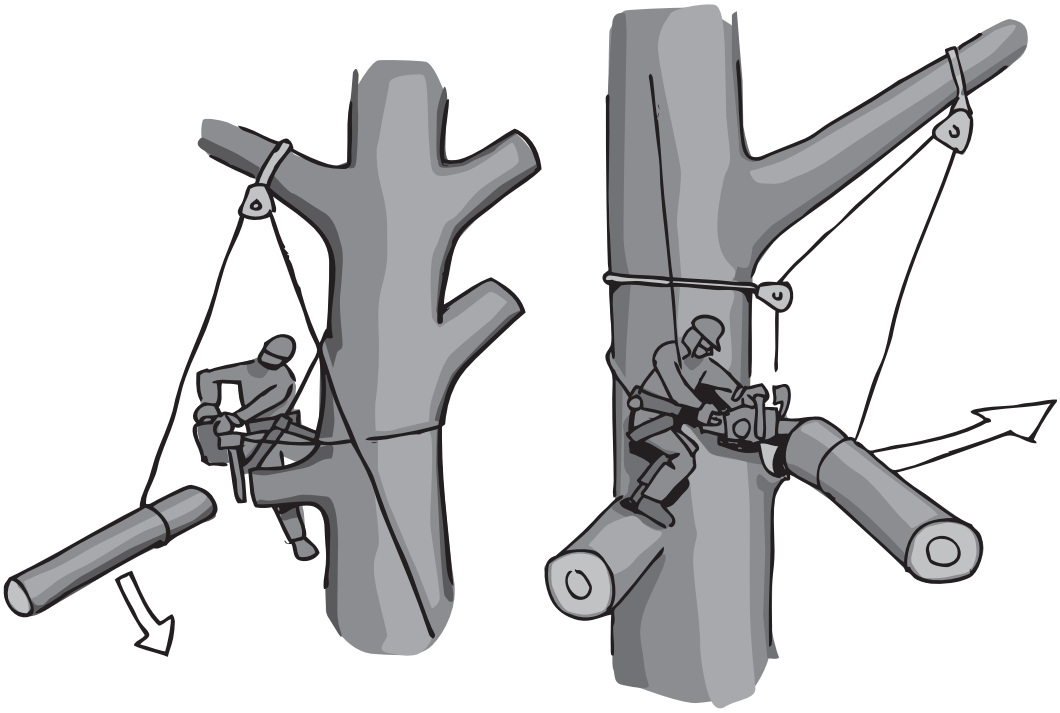
Work shall be organized and communicated so that the actions of one worker will not create a hazard coworkers.

Only qualified arborists or qualified arborist trainees directly involved in the operation shall be permitted in the drop zone when a load is being suspended by a rigging system.

Taglines or other means may be used to help control and handle suspended loads.



Arborists working aloft shall position themselves so as to be above or to the side of the piece being rigged and out of the path of movement of the piece when it has been cut.



Climbers and their climbing systems shall be positioned outside of the rigging system itself when a cut is being made or a load is being moved or lowered.

Climbers shall have an escape plan prepared.

Lowering and Braking

Shock loading may cause rigging system failure, especially when the lowering rope is tied off and limbs or stem parts are dropped onto it. It also happens when the ground person doesn't let the rope run to slow down the weight gradually.

- Too much braking power does not allow for the needed deceleration factor.
- Too few wraps and the rope handler cannot stop the limb.

Development of ground skills, for every member of the crew, is just as important as the development of climbing skills. Proper braking power for limb lowering cannot be accurately predicted until learned from experience and demonstrated in the field by crew members who have, in turn, learned from experience. Do not neglect this part of the training. The person manning a rope on the ground can prevent property damage and injury to themselves and other personnel by proper handling of heavy limbs and wood loads.

You shall always wear gloves when running ropes.

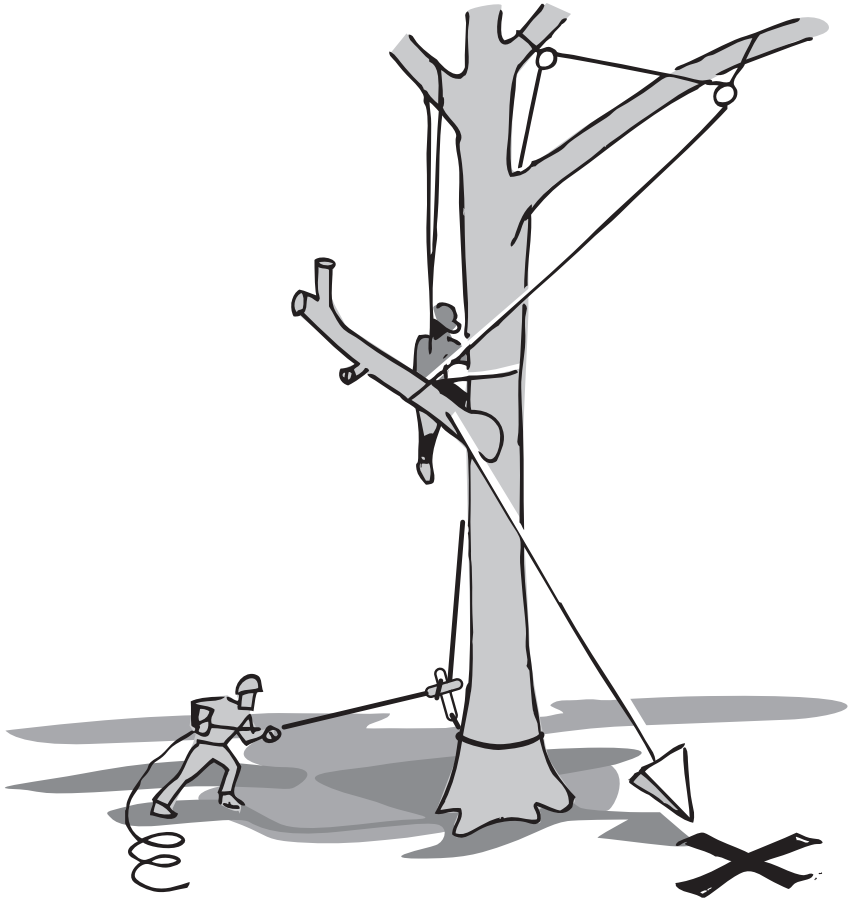
General Rope Handling Procedures

The type of crotch or hardware the lowering rope is running through, the lowering device or size of the tree being used for braking friction, and the size and kind of rope all have a direct bearing on the braking power applied to the load.

When a lowering rope is used, do not overload the rigging crotch or lowering rope. Avoid sudden stops. Shock loading, caused by suddenly stopping a falling load, can exceed the strength of the rigging crotch and lead to the failure of the rigging system.

Never stand in line with the side of the tree from which the limb is being lowered. Always take a position to one side that gives a good view of the action in the tree and also keeps you out of the line of danger if a knot gives way, the rope breaks or, in case of too few wraps, you get pulled in towards the tree or device being used for braking power. If you did not sufficiently wrap the lowering rope for braking friction, you could find yourself going up into the air and meeting the limb on its way down.

When manning a lowering line, always be sure that excess rope is spread out in front of you with no knots, twists or loops around obstacles or feet. Also, be sure that other crew members are not near the rope.



Never hold the rope in front of a knot or wrap the rope around any part of your body.

Rigging lines should be long enough to safely lower pieces to the ground. If a situation arises where an extra rope has to be used to get enough length to lower the limb all the way to the ground, secure the second rope to the first with a weaver's knot and hold on to the second rope behind the knot.

Be prepared! As a cut limb starts to fall, give enough slack to allow the limb to clear arborists in the tree, and then brake the fall gradually. With enough experience you will be able to lay the limb gently on the ground without once completely stopping the descent.

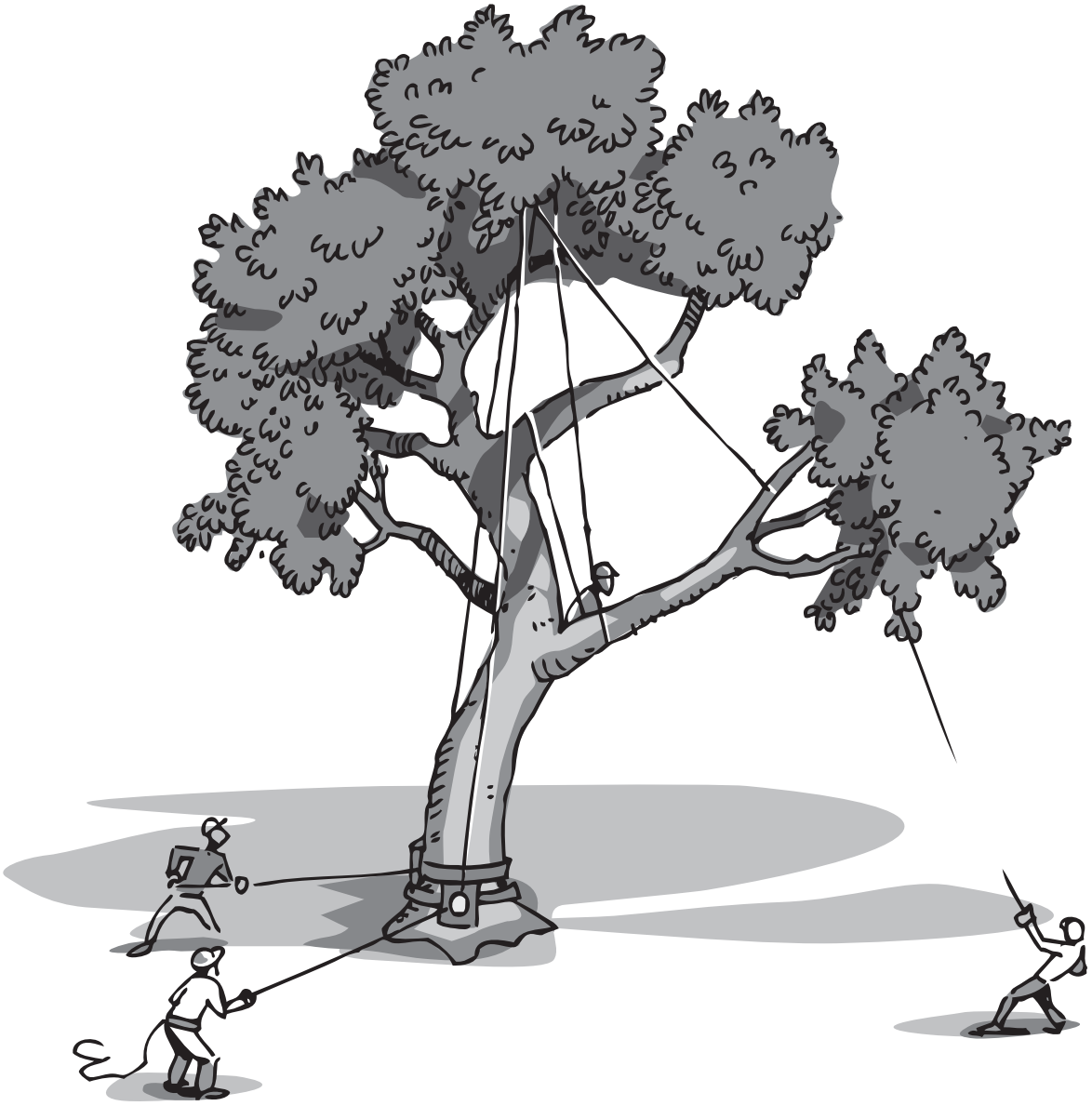
Top Line Only: When lowering limbs straight down, a work-line properly anchored above the limb is usually sufficient.

Choose an anchor above a clear area so the limb will not hang up when lowered. Don't use the same crotch for both a climbing line and the work-line.

Tie the rope around the limb above its balance point. If the rope is tied too close to the trunk, the limb will be top heavy. This will cause the butt of the line to swing up rapidly, endangering the climber and the brush end will swing down, possibly damaging whatever is under it.

Butt Line Only: A single butt line can be used when limbs can be lowered straight down the trunk and the brush will not damage anything.

Full Cradle (tip tie and butt tie): By using a top line, a butt line and a guide or “tag” line, a crew has full three axis control of a limb being lowered. This means the limb can be turned or lowered at any angle necessary. The tip line and butt line are set up just as they would be if they were used independently. The tag line should be as far out on the limb as possible for greatest leverage and control.



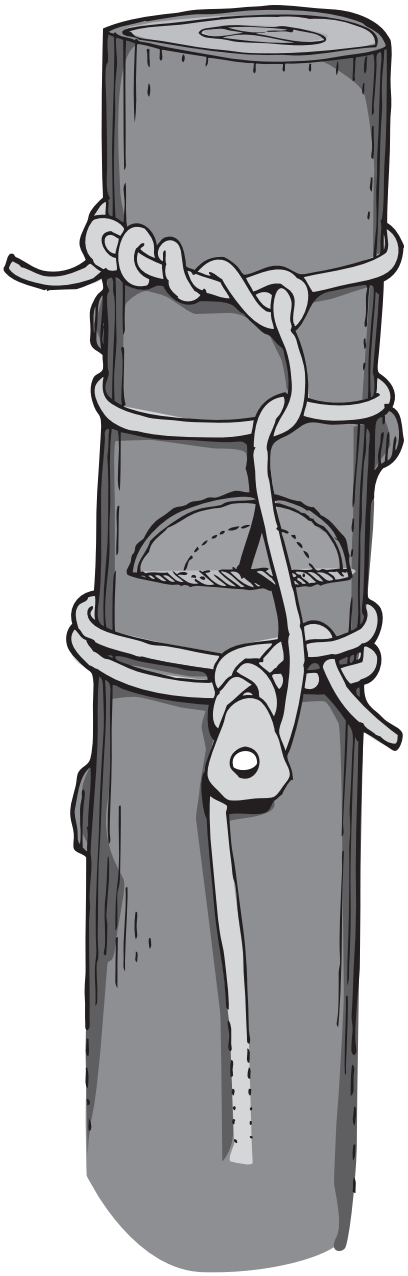
When setting up a **multi-crotch rigging system**, choose a sound crotch, preferably as high into the tree as possible, even though the first limbs removed are the lowest ones. Take advantage of multiple crotches while snaking the tail of the rope down through the branches.

Keep the initial top crotch, or crotches, for support; the other established crotches (preferably midway or farther out on the limbs) will act as **redirects** for the lowering line.

There are several advantages of having redirects or lowering points away from the trunk. For example, a limb may have a crotch in a desirable location as a rigging point, but alone, it is not strong enough to support the weight of a larger limb. The weight of the limb would be distributed through the other crotches and finally to the main or top supporting crotch. This distribution of weight is also dependent on the 'rope angle' at each anchor.

With a rigging point midway or farther out on a limb and away from the trunk, rigged limbs can be tied butt heavy or nearly balanced. This type of rigging may reduce shock loading onto the rope, the cut limb will swing away from the cutter and the limb will respond in a slower, more controlled manner. When using this same crotch system and the desired result is to have the limb brush heavy, tie closer to the trunk. When cut, the limb will jump away from the cutter. When rigging limbs, notches are recommended for directional control and to reduce the chance of splitting or ripping.

The **butt-hitch (catch)** is a rigging technique in which the rope is both crotched and secured to the same limb or stem part which is being cut. The section to be cut is secured by means of running the rope through a block or by creating a false crotch using a half hitch. The crotch and securing point are typically only a few feet away.



To rig a butt-hitch, drape the tail of the rope over the limb or around the stem, taking advantage of stubs or crotches. Cut a notch to direct the piece. Bring the hanging rope tail around the back of the lowering line and secure the end of the rope outwards from the notch. Allow enough distance to secure the rope and to ultimately make your cut; however, bear in mind, the further the distance, the greater the shock load. The securing hitches and the point at which the ropes cross at the crotch should be in line with the stem and the rope should hang in front of the open notch.

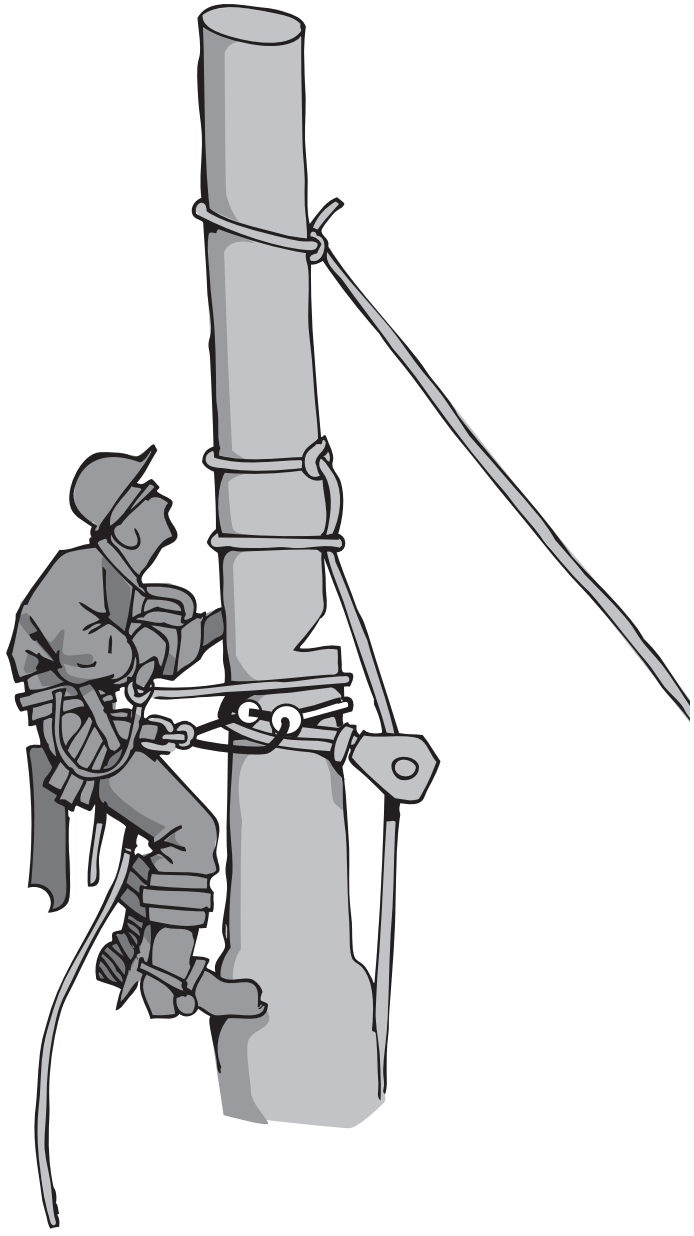
Trying to place a notch after rigging the butt catch could result in cutting the lowering rope. Failure to notch the piece could result in splitting, barber chairing or peeling the limb.

If needed, a tag (guide) line tied to the butt will help control the limb from the ground.

When using a rope to pull out a piece that is notched or jump cut, keep just enough tension on the line to prevent the saw from binding while cutting. When the back cut is deep enough to ensure a clean break, a hard jerk on the line will “jump” the piece from the stub. At the moment of break, the arborist may apply a lift and push to the butt to make the limb fall farther away from the tree.

Removing Large Vertical Limbs

A rope tied above the balance point of a vertical limb is used to control the direction in which the limb will fall. In some cases, it may be necessary to make a limb fall in the direction opposite to which it is leaning. Choose a crotch for the fall line that will let you pull the limb in the direction you want it to go.

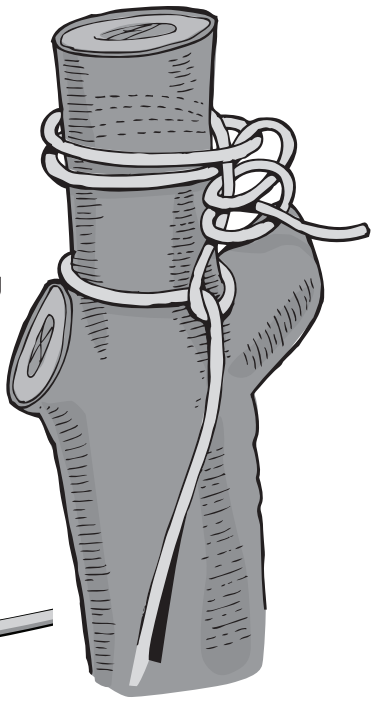


The fall of the limb is stopped by a butt rope. The butt rope should be pulled tight before the cut is completed to reduce the distance the limb will drop into the rope.

In snubbing, use a hinge cut to reduce the impact as the piece falls into the rope. Whenever it is impractical to snub to the trunk or another stub, rig heavy limbs through an arborist block.

Lowering a Limb with a Half Hitch and Clove Hitch

When lowering a limb using a natural crotch, tie a half hitch just above the stub. Tie a clove hitch locked with two half-hitches above the rigging point, and then cut between the knots and lower the limb on the stub.



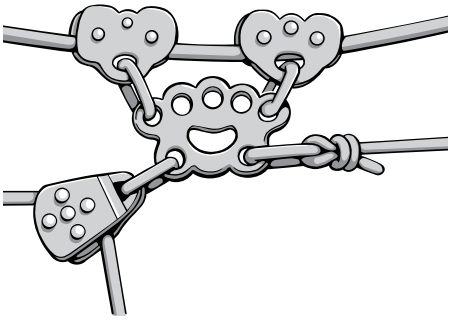
Special Rigging Systems

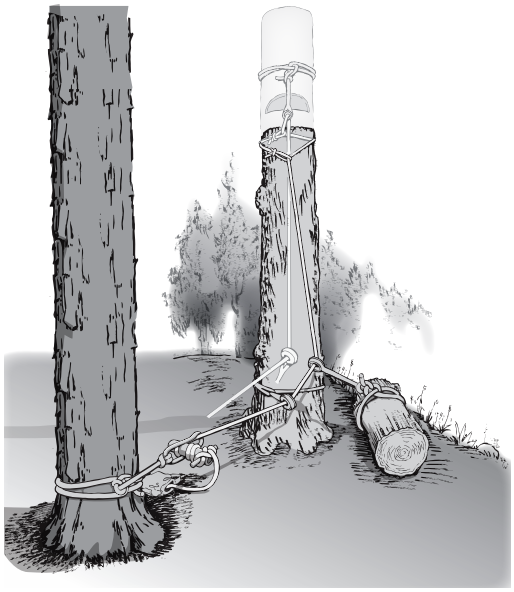
Vertical Speed Line

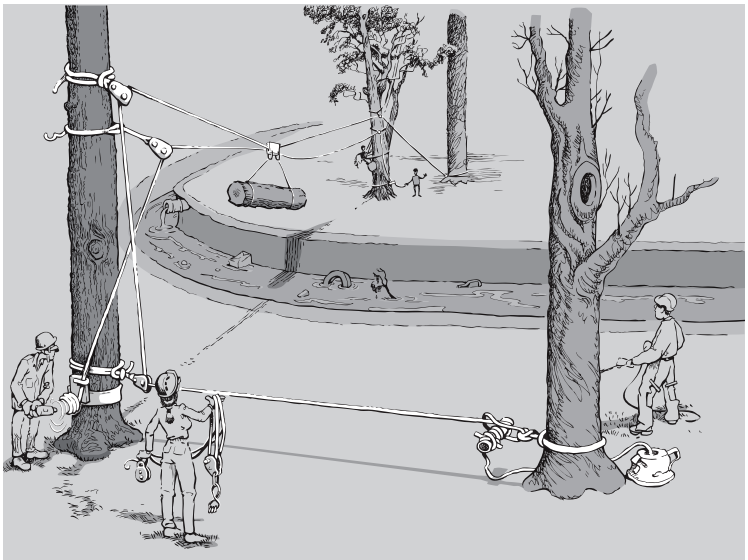
A Vertical Speed Line system can be used to restrict the movement of blocks or trunk sections during a 'blocking down' operation where the blocks are not being lowered. The blocks will land near the base of the trunk and won't be able to roll or bounce away from the base of the trunk. This is a useful system when working on slopes where the blocks could roll away from the trunk and cause damage or make clean-up more difficult.

Skyline System

A Skyline System can be used in situations where logs and debris needs to be safely moved over an obstacle such as a structure, landscape feature, or difficult terrain. Sturdy rigging points capable of supporting the loads are required before a Sky Line system can be safely implemented.







Pruning Palm Trees

Being monocots, palms have a different anatomy and form than dicot trees and require different tree care practices, particularly in regard to pruning.

Because of the way palm trees grow (i.e., they cannot be pruned or 'trained' to avoid power lines like most other trees), most palms that grow under or very close to high voltage lines have to be removed.

Palm pruning should be performed when fronds (leaves), fruit and loose petioles may create a dangerous condition. Palm fronds should be removed carefully to avoid damaging living tissue. Properly pruned palms should have only dead or dying fronds at the base of the crown removed, with the lowest remaining fronds hanging in a horizontal position (9 o'clock to 3 o'clock). Live, healthy fronds, initiating at an angle of 45 degrees or greater from horizontal, with frond tips below horizontal, should not be removed.

Severe and excessive frond pruning (‘hurricane cut’ or ‘rooster-tailing’) is characterized by the removal of fronds between the 10 o’clock and 2 o’clock positions of a palm crown. After severe pruning, the crown will have a ‘rooster-tail’ or ‘feather-duster’ appearance since only upright fronds remain.

Excessive frond removal leads to plant stress and decline. Instead of ‘protecting’ a palm from high winds, the practice of ‘hurricane cuts’ actually weakens the crown. Each frond layer adds supports to the one above; the more fronds removed, the less strength and protection there is for the growing point or bud and emerging spear leaf atop the stem. Palms are not as efficient as dicot trees at storing food reserves and are more dependent on their leaves to provide food for growth. Removing green fronds significantly reduces a palm’s ability to feed itself.

Fronds removed should be severed close to the petiole base without damaging living trunk tissue. The remaining portion is called a ‘boot’. Palm peeling (skinning, shaving) should consist of the removal of only the dead frond bases (boots) at the point they make contact with the trunk without damaging living stem tissue. Do not shave freshly pruned frond bases, which will damage the trunk, leaving the tree vulnerable to agents of disease.

Hazards: Palms' natural leaf-shedding or 'sloughing' process often leaves an accumulation of dead fronds on a palm trunk called a 'skirt'. Suffocation and struck-by accidents have occurred when frond skirts suddenly slough and slide down on or over climbers working underneath frond skirts.

Frond skirts are dirty, dusty environments that also shelter animals of concern to palm workers, such as scorpions and rats. Dry conditions and dead palm fronds present an extreme fire hazard.

Work Procedures: Arborists performing palm pruning shall be supported by an arborist climbing line and an arborist false crotch.

Palm frond skirts shall be removed from the top down.

Arborists shall never attempt to remove skirts by positioning themselves below the frond skirt or between the frond skirt and the palm trunk.

When dry conditions exist, arborists and other workers shall not smoke while working in or near dead palm fronds. All chain saws used under such conditions shall have mufflers and spark arresters in good working condition.

III. TREE REMOVAL

To make a whole tree or a tree stem fall in a desired direction, without accident, requires foresight, planning and a high degree of competence. To become proficient at tree removal, it is necessary to thoroughly understand and apply the rules, techniques and instructions outlined in this section.

For arborists, many very serious incidents occur while removing trees, perhaps more than any other single task. You must learn, promote and follow safe work procedures at all times. Injuries and property damage are preventable through education, planning, equipment maintenance and safe work procedures. 'Struck by' incidents are a leading cause of injuries and deaths in the tree care industry. They can and must be prevented.

Work Site Inspection, Planning and Preparation

Before removing a tree, you must take the time to plan. First, before any of our workers enters or works on a tree, the tree and surroundings shall be inspected:

- **Crown:** assess weight distribution and lean of the tree to be felled. Look for broken limbs or deadwood that could free-fall and strike workers, and branches or vines that may be entangled in the crown of a close tree.
- **Stem:** look for splits, loose bark, decay, cavities, rot and foreign objects, especially if these conditions exist in cutting areas.
- **Roots:** note the condition of the tree's root system. Extra rigging may be needed if roots are damaged, shallow or exposed.
- **Height:** make sure there is enough room for the tree to fall safely; the radius of the felling area must be greater than the tree's height, preferably 1½ to 2 times the height.
- **Diameter:** determine the necessary length of the saw bar and the procedure for cutting. Over-mature trees with doubtful wood strength must be inspected closely.
- **Electrical Hazards:** look for branches that may contact electrical conductors.

Other factors that need to be considered:

- surrounding area conditions, including other trees, in felling range of the tree to be removed
- species and form of the tree
- wind force and direction
- any existing support systems installed in the crown
- location and means to protect people, property and electrical conductors
- underground installations that could be damaged from felling impact, such as buried utilities, irrigation lines and septic and drainage systems
- size and terrain characteristics or limitations of the work area
- evidence of bees/wasps or wildlife habitation in the tree

Note: If, upon inspection, the crew leader (foreman) feels that working in or felling a specific tree(s) poses a danger to life or property, the crew leader is to contact their supervisor or manager to explain the situation and to develop a hazard abatement plan before proceeding further with work on the trees in question.

Work Site Preparation

When a choice is available, trees should be felled on as level a surface as possible. Stumps, logs and rocks may cause the tree to roll or spring when the tree lands on them.

If the work site is a lawn, take precautions to avoid damaging soil and turfgrass. Before felling a spar, remove protruding stubs that will dig into a lawn. The area of a lawn expected to be impacted by the top of a spar can be blanketed with brush, tires, plywood or a layer of branches and wood sections to distribute the load and cushion the fall.

When it is necessary to reduce or remove branches before removing a tree, the foreman will attempt to determine whether the tree can withstand the strain of lowering procedures. If not, other means of removing the tree need to be considered.

Sectional Tree Removal

A drop zone shall be established prior to the start of sectional or piecing-down tree removal operations. Non- involved workers shall be clear of the drop zone, where practicable, beyond the length of the tree. Workers shall stay out of the drop zone until it has been communicated by the worker aloft directly involved in the piecing-down tree removal operation that it is safe to enter.

Determine the equipment required for the project. Ropes, arborist blocks, porta-wraps, lowering devices, bucket trucks and cranes are tools that, when properly utilized, aid in safe and efficient tree removal.

Techniques and designs of rigging plans may vary with every individual tree. There are no blueprints to follow that will allow for all situations that a crew may encounter, but you must always apply Davey safe work procedures.

The tree or crane used to support a load is referred to as the rigging platform.

Felling the entire tree or removing sections of the stem without rigging equipment are options that must be considered if 1) there is a safe drop zone available, and 2) the stem is being climbed.

The single stem removal phase of a tree removal operation requires an understanding of:

- Weight of the load,
- Rigging platform strength,
- Equipment limitations, and
- Tree reaction dynamics.

When practicable, avoid heavy loads on the stem. The equipment, platform and climber are stressed at a much greater level when subjected to a jarring increase in weight due to shock loading.

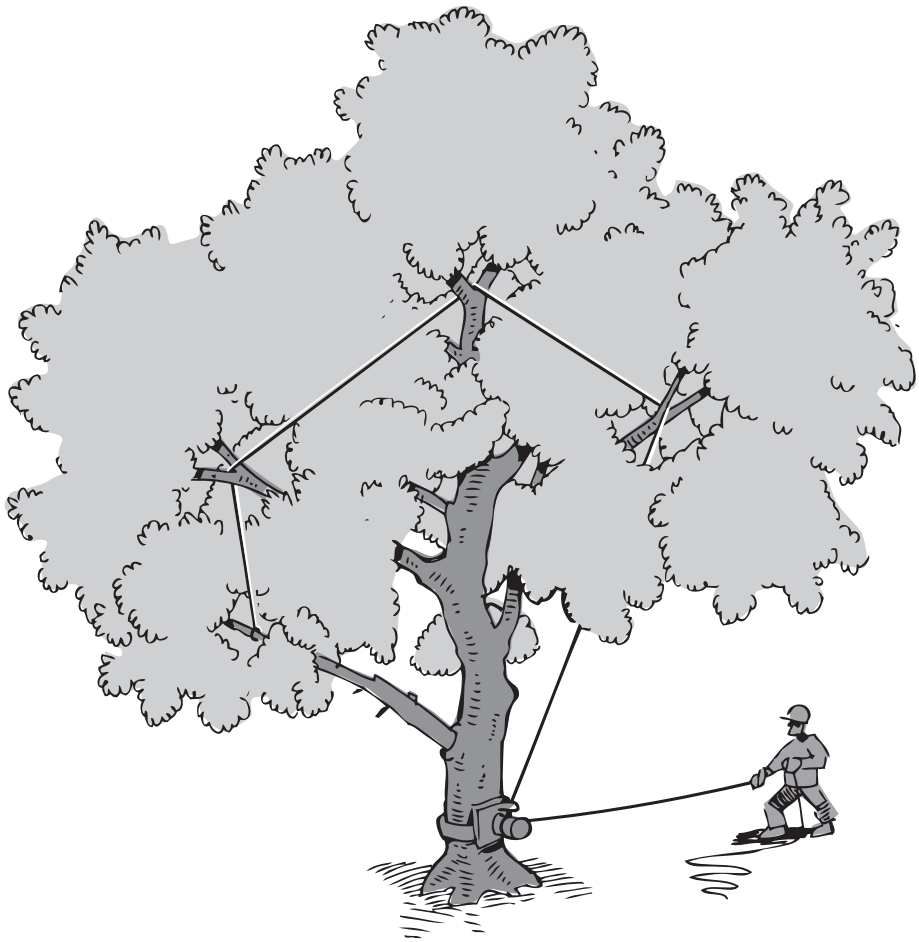
The spars, limbs or leaders being worked on and the spars being used for tie-in and/or rigging points shall be assessed for structural integrity and potential reaction forces that could cause a spar to split when it is cut.

Steps shall be taken to prevent spars from splitting or tearing during the rigging operation, and climbers shall take steps to prevent the systems from trapping, pinning or entangling themselves should the tree split or the rigging fail. Consider the use of load binders as one possible means of preventing splitting. Consider the use of a notch and bore/plunge cut with a releasing strap, if competent in this method.

The nature of trees is that they carry their weight most effectively vertically. With this information, we can gather that the strength of the rigging platform is in its vertical attitude. The farther away from its center of balance, the greater the likelihood that the platforms could be side loaded. When rigging, control the load with wraps or friction brakes vertically down the stem, or as close to the base of the tree as feasible, to reduce dynamics that cause side load impact.

Branch and Multiple Leaders Rigging

When removing the branching and multiple leader structure, place the rigging lines as high into the crown as possible. Be sure to select crotches suitable for absorbing the weight of additional loads. The platform may have to support as much as 2 to 20 times the weight of the load.



When possible, use multiple crotches for rigging to distribute the weight of the load across a wider area. A weaker “V–crotch” can be held together when the rigging crotches are located above the union of the two opposing stems. The use of multiple crotches can also benefit the rigger by allowing use of smaller crotches for the purpose of re-directing a load to a desired area of the yard or positioning the lowering line directly above the load to reduce the amount of swing.

Twin trunks should be treated as two trees in the removal process.

To make a whole tree or a tree stem fall in a desired direction, without accident, requires foresight, planning and a high degree of competence. To become proficient at tree removal, it is necessary to thoroughly understand and apply the rules, techniques and instructions outlined in this section.

When practicable, fell trees in one piece. Felling is defined as the falling (cutting) of an entire tree or stem, in one operation, performed from ground level.

Precision Tree Felling Plan

The six steps in a **Precision Tree Felling Plan** for arborists are designed to help assess the risks associated with felling a particular tree and to provide guidelines to help ensure accurate and safe directional felling.

1. Risk Assessment (site and tree)
2. Height Assessment
3. Lean(s) Plural - Side, Back, Front
4. Escape Route/Retreat path
5. Notch and Hinge
6. Back Cut

Risk Assessment (site and tree)

1. Visually examine the entire tree for structural soundness: root decay or dieback, trunk decay, hollows, dead or broken branches, splits or cracks.
2. Check the site for hazards such as utility wires, trees or other obstacles that may be struck by the falling tree, rough terrain, or weather conditions.
3. If the risk is not acceptable: the job should not be done until the concern(s) are addressed and the risk is reduced to an acceptable level.

Height Assessment

1. Estimate tree height. If you can see the top and bottom of a tree, you can estimate its height using a straight stick.
2. Determine where co-workers shall be safely positioned to prevent struck by injury.
3. Those co-workers who are handling pull lines are to be outside of the tree/spar striking distance; at least 1.5 times the height of the tree from the base of the tree being felled - further when possible. All other workers who are not involved, shall be a minimum of 2 times the height of the tree, from the base of the tree being felled.

Lean Assessment (Side, Back, Front)

1. Determine the direction (if any) of trunk lean.
2. Back lean may require a pull line and mechanical advantage to bring the tree over center.
3. Excessive front lean may require a bore cut to eliminate the chance of a ‘barber chair’.
4. All trees will require the identification of the ‘Good’ or high side and the ‘Bad’ or low side. The final back cut should be performed from the ‘Good’ or high side.

Escape Routes / Retreat Path

1. The best escape route for the sawyer is 45 degrees from the edge of the notch and opposite the felling direction.
2. The sawyer’s escape route shall be cleared of obstacles and hazards to a minimum of 10 feet from the base of the tree.
3. Workers on the pull rope shall also have and use a clear escape route when the tree begins to fall.

Notch and Hinge Plan

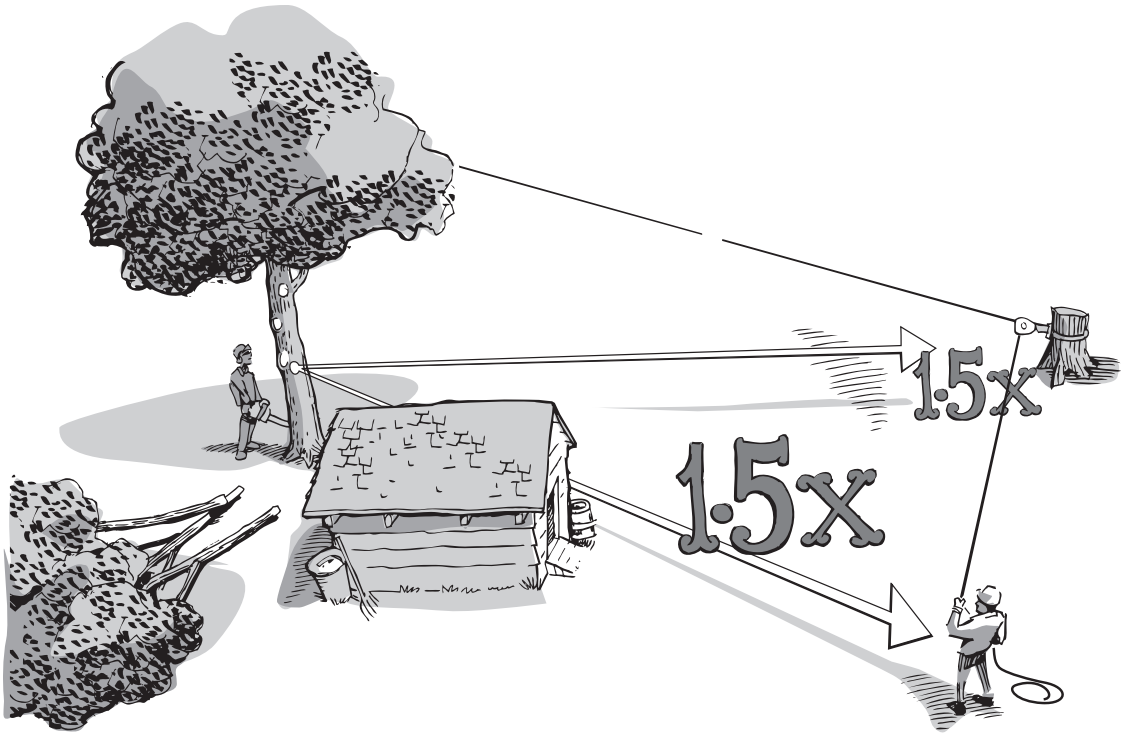
1. If the tree has no side lean, the notch should face in the target direction.
2. If side lean is present, the notch may need to be adjusted to compensate.
3. The open-face notch should be wide enough to allow complete closure as the tree lands.
4. A vertical tree requires a 70 to 90 degree notch, a back-leaner may require more than 90 degrees, and a forward leaner may require less than 70 degrees.
5. When making the notch, stand next to the tree facing the direction of the fall. Use the site lines on the saw to align the notch.
6. Make the top cut first. This allows the sawyer to see down the first cut and make the bottom cut more precisely helping to prevent by-pass at the notch apex.

Back cut plan

1. Determine the amount of hinge wood (thickness) required based on the species and soundness of the wood fibers in the hinge. A rule of thumb is 10% of the diameter of the tree.
2. Determine the type of back cut to be used. A bore cut may be safest in forward leaners. Wedges may be required to lift or support one side of the hinge against the lean.
3. Give an audible warning and receive acknowledgement (command & response) before starting the back cut.

After inspection

The crew leader shall assess the number of workers necessary for the tree removal operation, develop a tree removal work plan, and communicate the work plan and job task assignments in a job briefing with the crew prior to beginning the tree removal work. A command/response system to manage the safety of the drop zone shall be discussed and established during the job briefing prior to the start of tree removal operations.



Wedges, block and tackle, rope or other appropriate devices shall be used when there is a danger that the tree, or trees, being removed may fall in the wrong direction or damage property. All limbs shall be removed to a height and width sufficient to allow the tree to fall clear of any wires and other objects in the vicinity.

Tackle blocks and pulleys and their connecting links shall be inspected immediately before use and removed from service if they are found to be defective.

Decide whether there is a need for a ground-level anchoring point to secure a pull line and, if so, whether you have one sturdy enough to control the loads. The anchor point must be well outside the felling strike zone. When using a re-direct the Worker shall remain at least 1 1/2 time the height of the tree from the base of the tree.

Attaching a pull rope to any vehicle or mobile equipment for the purpose of moving the vehicle or mobile equipment to pull on the rope to gain tension and leverage on a tree or branch is not a Davey approved safe work practice and shall not be performed or permitted by any employee.

Remember, a tree cannot be steered with a pull rope in the direction of fall or after the back lean is overcome with the pull line. Direction and safety is maintained with the notch and hinge cuts.

Respect the hazards presented by a dry tree, tree stem or dead tree. Dry wood may retain compression strength but will lose the strength of flexibility in green wood. Dry wood, including tree species noted for strength, such as oak, may fracture and fail under load, whereas the same tree, when green, would flex, recover and safely support the same amount of loading.

Before felling risk trees, remove dead stubs that present a hazard to the felling operation. Dead stubs can deflect a tree from the intended line of fall or deflect the butt portion, endangering the chain saw operator.

Tree Height & Strike Zone Assessment

Assessing tree height and the size of the strike zone are critical steps in the manual tree felling process. The drop or strike zone of a tree is a circular area with the tree in the center and a radius equal to the height of the tree or trunk being removed. When the tree or trunk falls it has the potential to directly strike anything or anyone within the strike zone.

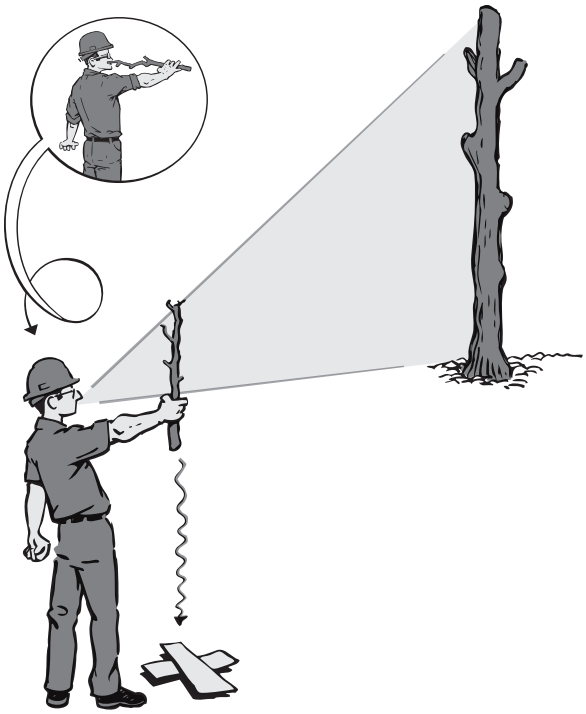
The tree worker or team of tree workers directly involved with the felling operation (except the feller/sawyer) shall be at least 1.5 times the height of the tree from the base of the tree before it is felled. This will place them well outside the strike zone to allow for tree bounce or breakage that may eject or throw pieces of wood or debris upon impact. All tree workers and others not directly involved with the felling operation shall be at least 2 times the height of the tree from the base of the tree if practicable. These zones extend 360 degrees around the base of the tree.

If the team identifies a tree(s) in the strike zone of a tree being felled that is likely to be struck and knocked over or broken towards the workers, the strike zone(s) of that tree(s) need to be identified and taken into account when positioning workers. Example: it is possible for a 50 foot tree to create a strike zone larger than 50 feet if it strikes and breaks or knocks down another tree when it falls.

Stick Trick

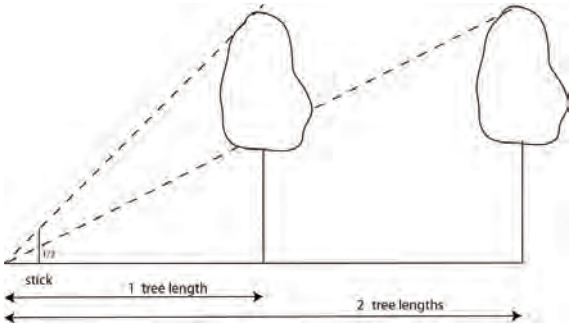
In order to determine if a tree will fit in a felling area and safely position workers during felling operations, it is necessary to accurately estimate the height of the tree. If you can see the top and bottom of a tree, you can accurately estimate its height using a straight stick. While standing straight with your head up, hold your arm straight and level with the ground and so that the distance from your eye to your hand is equal to the distance from your hand to the top of the stick. The stick needs to be plumb and your arm level.

While sighting with the top of your hand at 'felling notch level' on the trunk, carefully move backward or forward until the top of the stick aligns with the top of the tree. You are now standing approximately where the top of the tree will land.



You can mark the ground at the estimated height of the tree and pace the distance to the trunk (for example 30 paces). If you pace 1.5 times that distance (45 paces) away from the trunk you can mark that point as approximately 1.5 times the height of the tree. 60 paces would put you approximately 2 times the height of the tree.

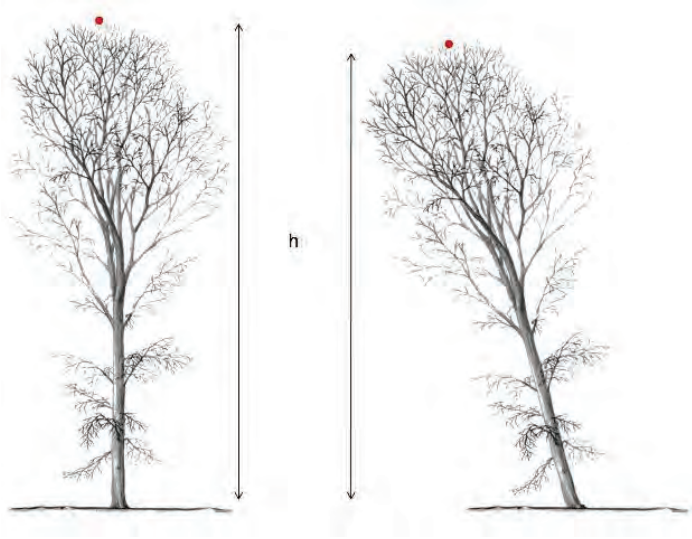
Another way to determine twice the height of the tree is using the 'stick trick' and sighting 1/2 way down the stick rather than at the top. If you align the top of the tree 1/2 way down the stick, you will be approximately 2 times the height from the base of the tree.



Aligning the top of the tree ½ down the stick will put you at approximately twice the height of the tree.

There are three common potential errors in estimating tree height with the 'stick trick'. Be mindful of these error precursors and allow for a larger margin of error on the safe side:

- Tree top is not visible or misinterpreted. It is sometimes difficult to judge the top of a deciduous tree with a full crown.
- Misinterpretation of tree height of leaning trees. If a tree is leaning toward or away from you, it will appear shorter than it really is. Allow one additional foot of distance for each foot of lean.



- Grade changes can affect height estimates. If the ground you are standing on is 3 feet above the base of the tree, move backward 3 feet. If the ground is 3 feet below the base of the tree, move 3 feet forward. This adjustment for grade difference is effective if the grade difference is equal to or less than your height.

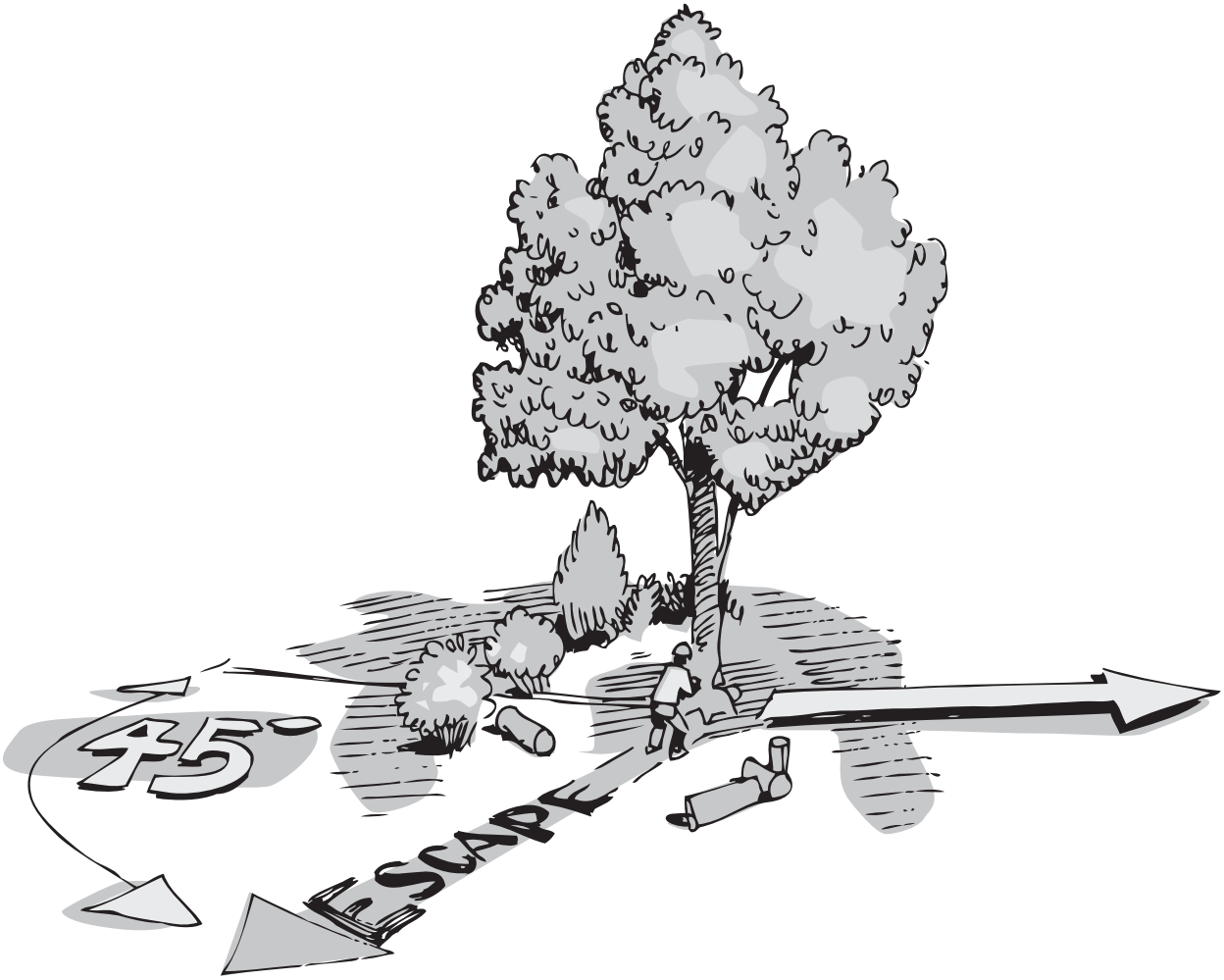
With a little practice on the 'stick trick' it is possible to become quite accurate when estimating the height of trees. This in turn will allow accurate assessments of strike zones and safe positioning of workers during the manual tree felling process.

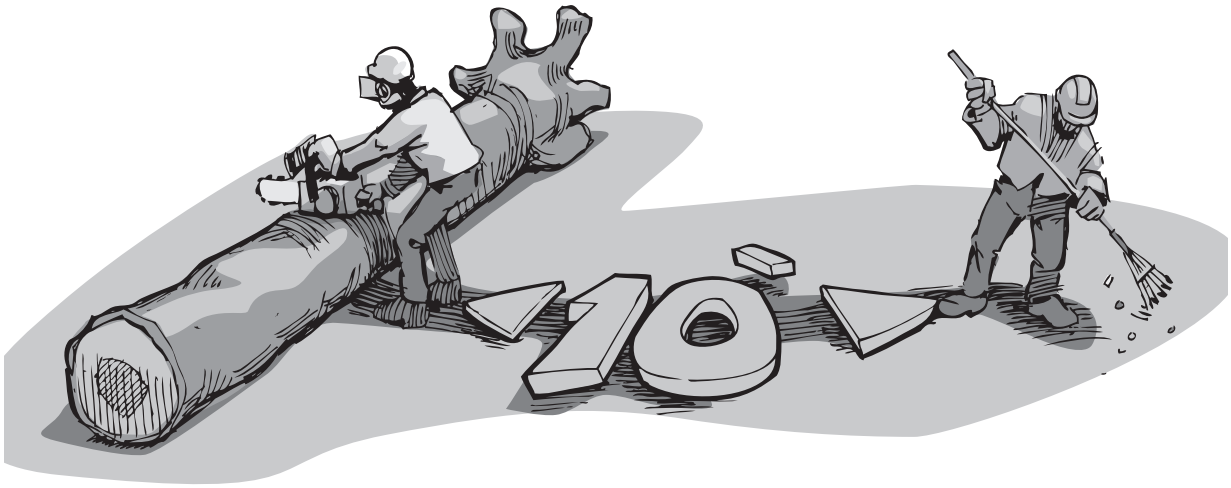
Remember, it is the height of the tree and the size of its strike zone that determines where workers are to be positioned, not the length of a pull rope. If the rope is not long enough to allow the 'puller' to stand at least 1.5 tree lengths away from the base of the tree, a longer rope or joining two ropes with a weaver's knot to lengthen the pull rope is required before the tree is felled.

In a manner similar to the tree feller/sawyer, tree workers manning pull ropes shall have and use a clear escape or retreat route - moving 45 degrees away from the fall of the tree when it begins to fall. This further decreases exposure to struck-by injury caused by ejected or flying debris from the falling tree.

Escape Route

- A planned escape route for all workers shall be prepared before cutting any standing tree or trunk.
- Obstacles must be cleared from the area around the tree and all escape routes.
- To ensure saw operators' safety when removing a tree, they must have escape routes at 45° angles opposite the felling direction.
- Remove brush, suckers, stone and debris surrounding the base of the tree, as these are a hindrance to the saw operator's movements.
- Never stand in the falling tree area and never exit the falling tree area from directly opposite the direction of fall. Trunk rebound may create an additional hazard, especially if the tree is being felled uphill.
- There must always be at least 10 feet between the chain saw operator and the other workers. Workers returning to the work area shall not enter until the chain-saw operator has acknowledged that it is safe to do so.





Keep bystanders, children and animals out of the work area.

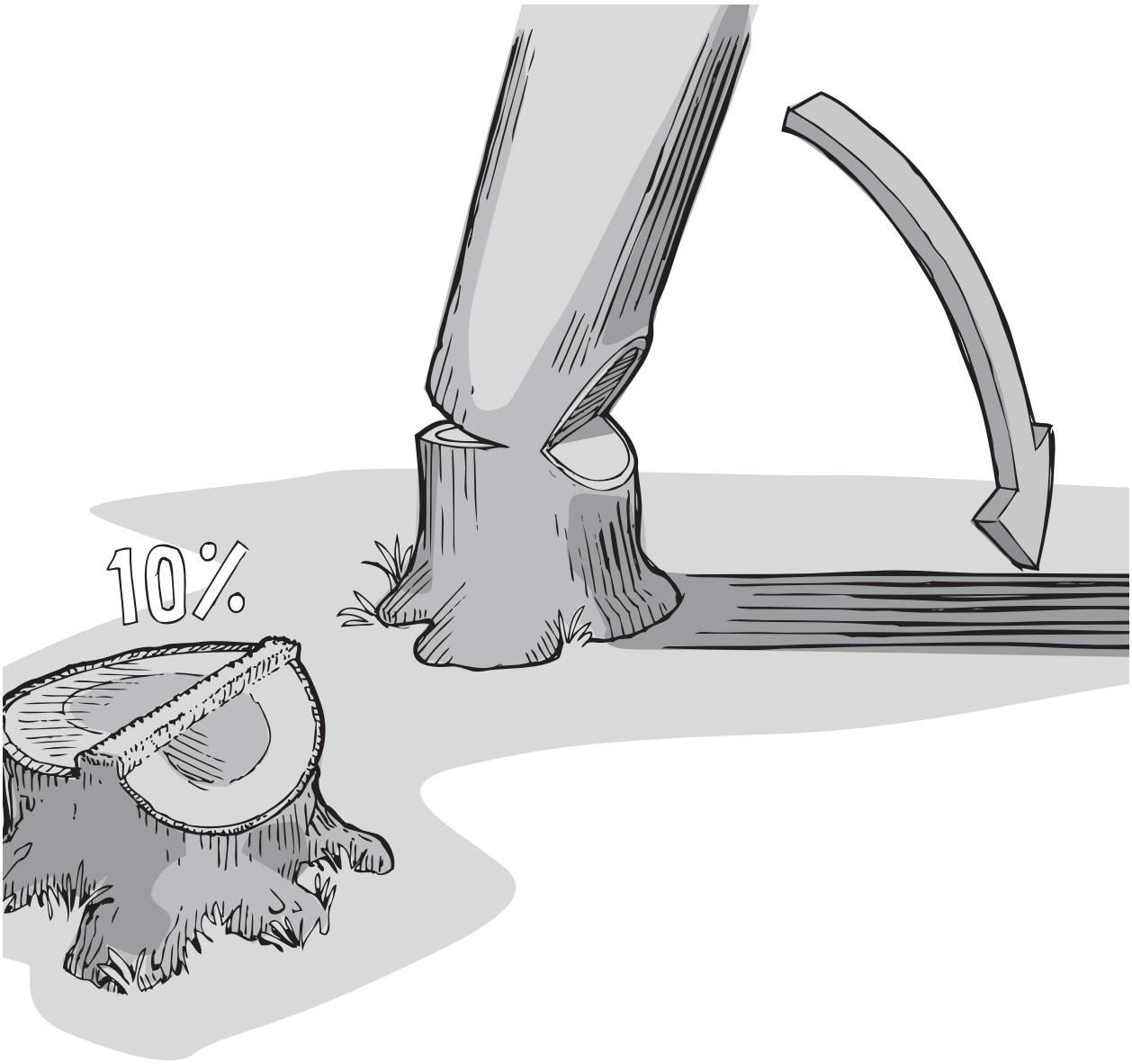
Workers shall not approach mechanical tree removal or mechanical clearing operations, such as a with a rotary or flail mower, until the operator has acknowledged that it is safe to do so.

Notches and Back Cuts

When felling trees, a combination of notches and back cuts are used by the chainsaw operator from the ground to create a hinge that will fell a tree in the desired direction of fall.

The most important thing to know is not what you cut, but what you don't cut. The hinge is an uncut strip of holding wood connecting the tree to the stump between the notch and the back cut. Hinges must be left intact to successfully direct tree fall.

A maximum of 10% of the tree's diameter must be left as a hinge of holding wood. Do not use greater than 10%, as it can cause splitting and the hinge to chunk out, instead of working as a hinge. For example: A tree with a 25-inch diameter should have a holding wood hinge of 2 ½ inches wide. The holding wood is measured from the apex or deepest point of the notch to the end of the back cut.



Knowing the characteristics and condition of the wood will help determine the holding strength of the hinge wood. Making felling cuts low to the ground will generally leave the widest part of the tree for a longer hinge. The length and width of the hinge controls side to side weight control.

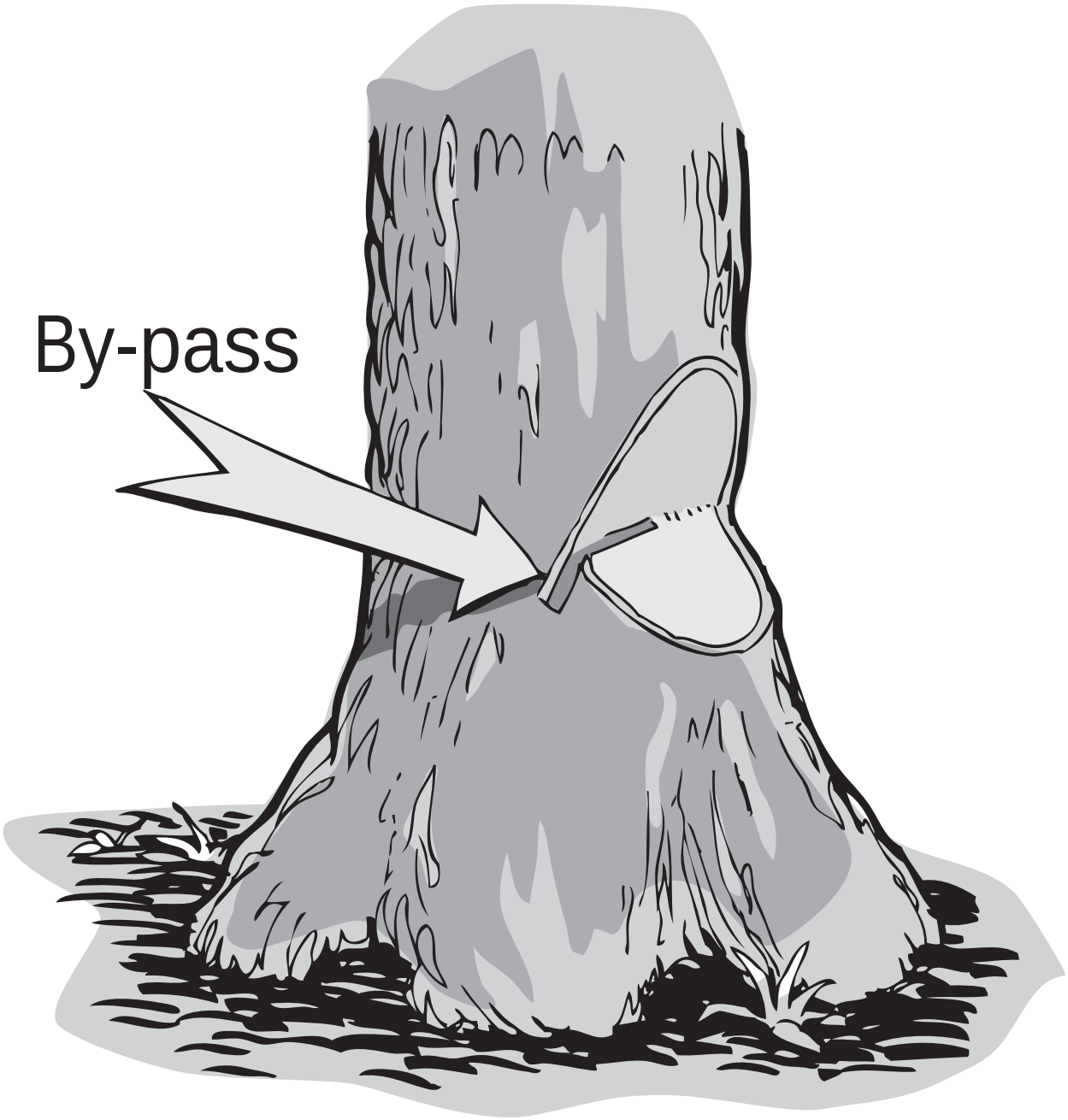
Notches shall be used on all trees and trunks greater than 5 inches in **D**iameter at **B**reast **H**eight (DBH).

A notch may also be used for trees or trunks greater than 2 inches DBH when additional directional control is desired.

The notch determines the direction of fall. The 'back' or apex of a notch must be at a right angle (90 degrees) to the direction of intended fall. Sighting with the saw felling sights could be helpful in lining up the notch and back cut in the intended direction of fall.

Notch depth should not exceed one-third the depth or 100% of the diameter (width) of the tree in the direction of fall. The notch depth is sometimes dictated by the lean of the tree. The notch should span a minimum of 80% of the tree's face (diameter) in the direction of fall.

The two facing cuts that form a notch, the **shelf cut** and the **top cut**, shall not cross at the point where they meet at the apex of the notch.



Cuts made deeper or beyond the notch apex are called by-pass cuts or “dutchman.” By-pass cuts defeat the purpose of a notch and must be corrected to avoid an uncontrollable snap cut or an explosive ‘barber chair.’

Because the notch and hinge controls the direction of the fall, the back cut must be at a right angle (90°) to the intended direction of fall or pull. The back cut shall not penetrate into the predetermined hinge area. A back cut that overlaps the notch cut, even though it may be several inches higher, will cause the notch to break vertically. Without holding wood for directional control, the tree will fall in the direction of greatest sustained influence, being the direction of greatest lean, pull or wind.

Notch height

If appropriate, notches should be made at the point most convenient and comfortable for the chain saw operator, with freedom of movement for escape. Cut stumps high (to be lowered later) when:

- The base of the tree has an odd shape that presents a problem
- There are multiple stems or trunks
- In deep snow

A notch must be cut in the soundest part of the tree; if there is decay, cut either above or below the decay.

Once felling cuts have been made, a tree shall not be left unattended until the felling has been completed.

Notches shall be open 45 degrees or greater and large enough to guide the fall of tree or trunk to prevent splitting. Any notch technique open less than 70 degrees requires a “stump-shot” or back cut 1- 2 inches higher than the apex of the notch. The notch cuts used shall be either:

- An open-face (70 to 90°) notch.
- A standard or conventional notch,
- Humboldt notch, or

Open-face or ‘70 to 90°’ notch (preferred): This notch is designed to hold the tree in the direction of fall until the tree is horizontal to the ground. An open-face notch is made by forming two cuts that are between 70 and 90 degrees of deflection.

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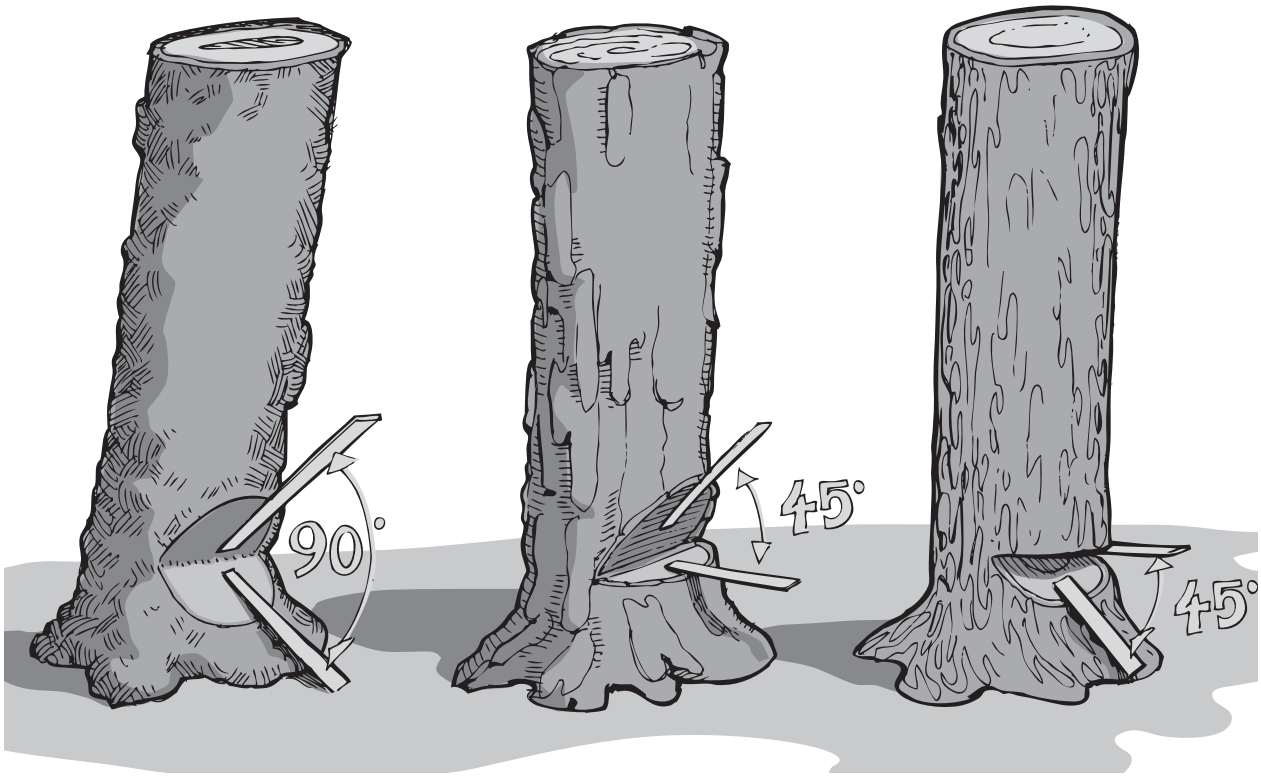


The open-face notch will keep the butt of the tree close to the stump. With holding fibers of the hinge wood providing and maintaining directional control, wind, weight or interference from other influences, such as brushing the crown of another tree, has reduced effect on diverting the tree’s path to the ground target. Some trees with strong fibers may stay attached to the stump after the tree falls.

With an open-face notch (greater than 70 degrees), the back cut should be at the same level as the apex of the notch.

Conventional or 45 Degree notch

This is the notch which has been most commonly used for tree felling. It is formed by making one cut, the shelf cut, parallel or horizontal to the ground, and the other cut, the top cut, at an angle of 45 degrees.

Make the horizontal shelf cut first, then the angled top cut. Otherwise, the weight of a larger notch section could pinch the bar or slide along the bar and be thrown.

The back cut of a conventional notch is made horizontal and shall be 1 to 2 inches above the apex of the notch to provide an adequate platform to prevent rebound of the tree or trunk. This also provides the most effective hinging action and creates a 'step block' on the stump that prevents the log from sliding backward if the crown twists or hangs up in another tree.

The tree should remain in control of the hinge for 45º of the felling path to the ground. Past 45º, the momentum of the falling tree should break the holding wood and fully release the tree towards the ground target area.

Humboldt notch

This is also a 45º notch, with the angled cut made from below as the shelf cut and the top cut made parallel or horizontal to the ground. It is similar to the Conventional notch, but inverted in the tree face.

The back cut to a Humboldt notch is made horizontal and shall be 1 to 2 inches above the apex of the notch to provide an adequate platform to prevent rebound of the tree or trunk.

The advantage to the Humboldt notch is that it leaves a flatter end on the butt log and will leave a smaller stump if the tree is on a hillside.

The facing or notch cuts, holding wood or hinge, and the back cut are the three most crucial factors in felling a tree in the desired direction while minimizing butt/trunk rebounds, dangerous splitting or barber-chair situations. The leverage applied to a standing tree is maximized when cuts are low to the ground, whether you are using a felling tool, rope, wedges or a natural lean.

Trees with backward lean or heavy forward lean may pose some difficulty and even present a dangerous hazard called 'barber chair.' When the back cut is made from the rear of the tree towards the notch, tensioned vertical fibers can split and separate in an instant. There is no controlling the split tree. It can roll, spin or spear off the splintered trunk in any direction. The saw operator must react instantly to avoid serious injury or death.

Hazards of by-pass cuts When the back cut is made and the tree begins to move, a by-pass or Dutchman cut will close first and may stop forward movement of the tree. The tree's momentum or pull of the rope may not be enough to break the hinge fibers. This can create several hazardous situations:

- The sudden stop of the tree's movement can cause the stem to split and 'barber chair.'
- The saw operator may have to re-enter the stump area of a loaded tree to cut the holding wood fibers of the hinge that controls the direction of fall.
- The narrow by-pass surfaces meet and the holding wood fibers directly behind the by-pass break, and the primary notch has not influenced the tree's direction of fall. Weight, wind or remaining unbroken hinge fibers will now have the greater influence over the direction of fall.
- The by-pass cut extends into the area of wood designated for holding wood. If the back cut overlaps the by-pass in a notch, the vertical fibers will split between the two cuts, much the same way a snap or block cut would. Weight, wind and pull will now influence the tree's direction of fall.

All of these situations endanger the chain saw operator and increase the likelihood that the tree will fall off target.

Before making the back cut:

There shall be a command, such as "stand clear," from the saw operator and a response, such as "all clear," from the workers supporting the removal operation. Prearranged, two-way hand signals may also be used. Only designated persons shall give such signals.

Warn everyone in the area that a tree will be falling. Give this warning before you start the saw motor, so you can be certain everyone hears the warning.

Workers on a pull line must be alert and the rope pulled taut before any back cut is started. The rope must not be pulled so tightly as to break the tree prematurely.

All workers in the vicinity shall be out of range when the tree or trunk falls. All persons not engaged in the felling operation shall be kept clear of guide ropes and other rigging.

Visual contact should be maintained by all workers with the tree or trunk until it is on the ground, watching for falling or flying limbs. Workers shall not reenter the drop zone before assessing and addressing hazards in nearby trees (hangers) and tensioned wood created by the fall of the tree including spring poles.

The back cut shall be above the level of the horizontal face cut, in order to provide an adequate platform to prevent kickback. This requirement does not apply to "open face" felling where two angled face cuts, rather than a horizontal face cut, are used.

Once the back cut is made far enough in, toward the holding wood, the tree can be pulled to start falling in the direction of the notch.

Chain saw operator's movements

When the back cut has been completed, the chain saw operator shall immediately retreat from the base of the tree at a 45º angle to the falling tree using the planned and cleared escape route.

- Always leave the stump area of any tree being felled, regardless of size, when it starts to fall.
- Don't turn your back on a falling tree.
- Keep sight of your path of movement away from the stump, but do not lose sight of the falling tree.
- Be alert for falling deadwood or other materials from adjacent trees.
- Discard the saw if it hampers your escape.
- A 15' to 20' retreat from the stump is suggested when possible.

When the tree strikes the ground, the butt portion may move a considerable distance, depending on trees, terrain, etc. Be aware of the danger presented to the operator by such movement.

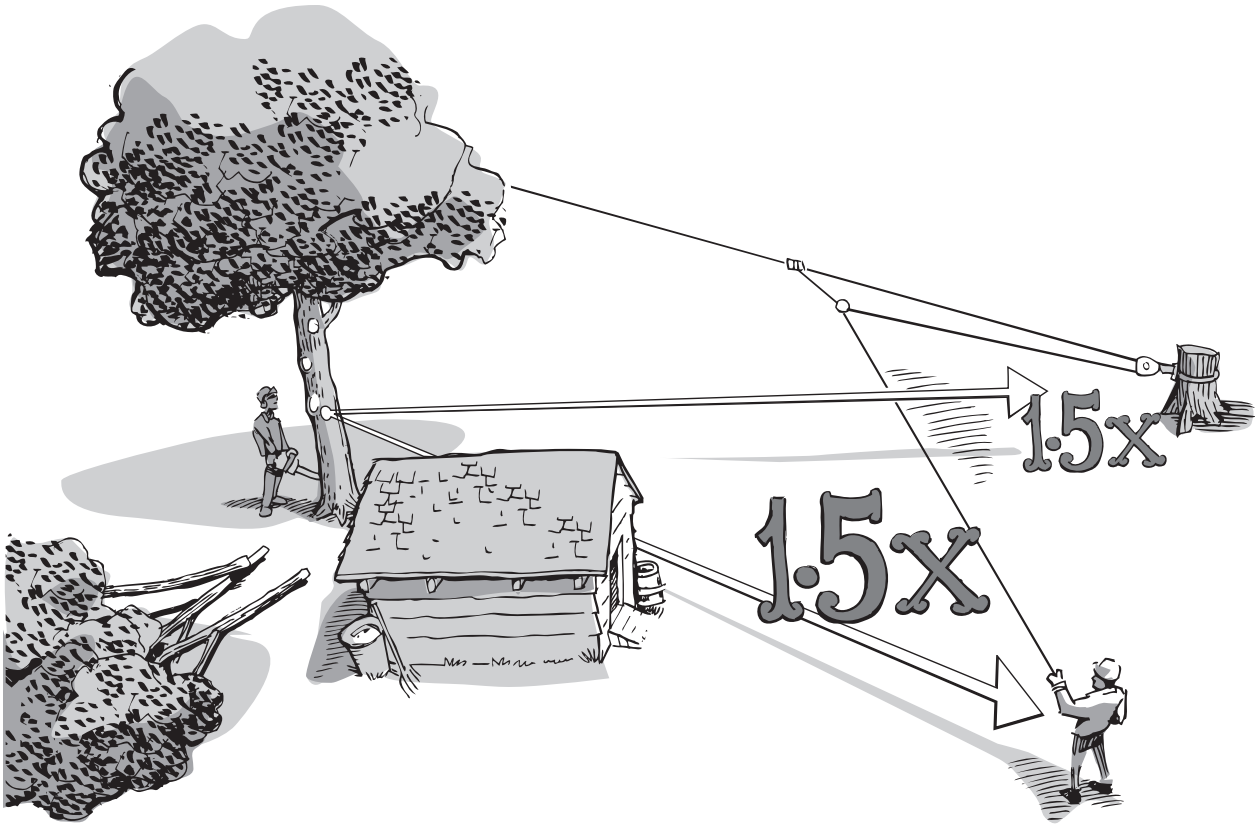
Leaning trees:

- The greater the lean towards the direction of fall, the deeper the notch should be, but not to exceed past 100% of the full diameter (width) of the tree in the direction of fall.
- The greater the lean away from the direction of fall, the shallower the notch, but to a minimum of 80% of the diameter (width) of the tree in the direction of fall.
- Consider use of a bore cut and release strap if you have proficiency in this technique.

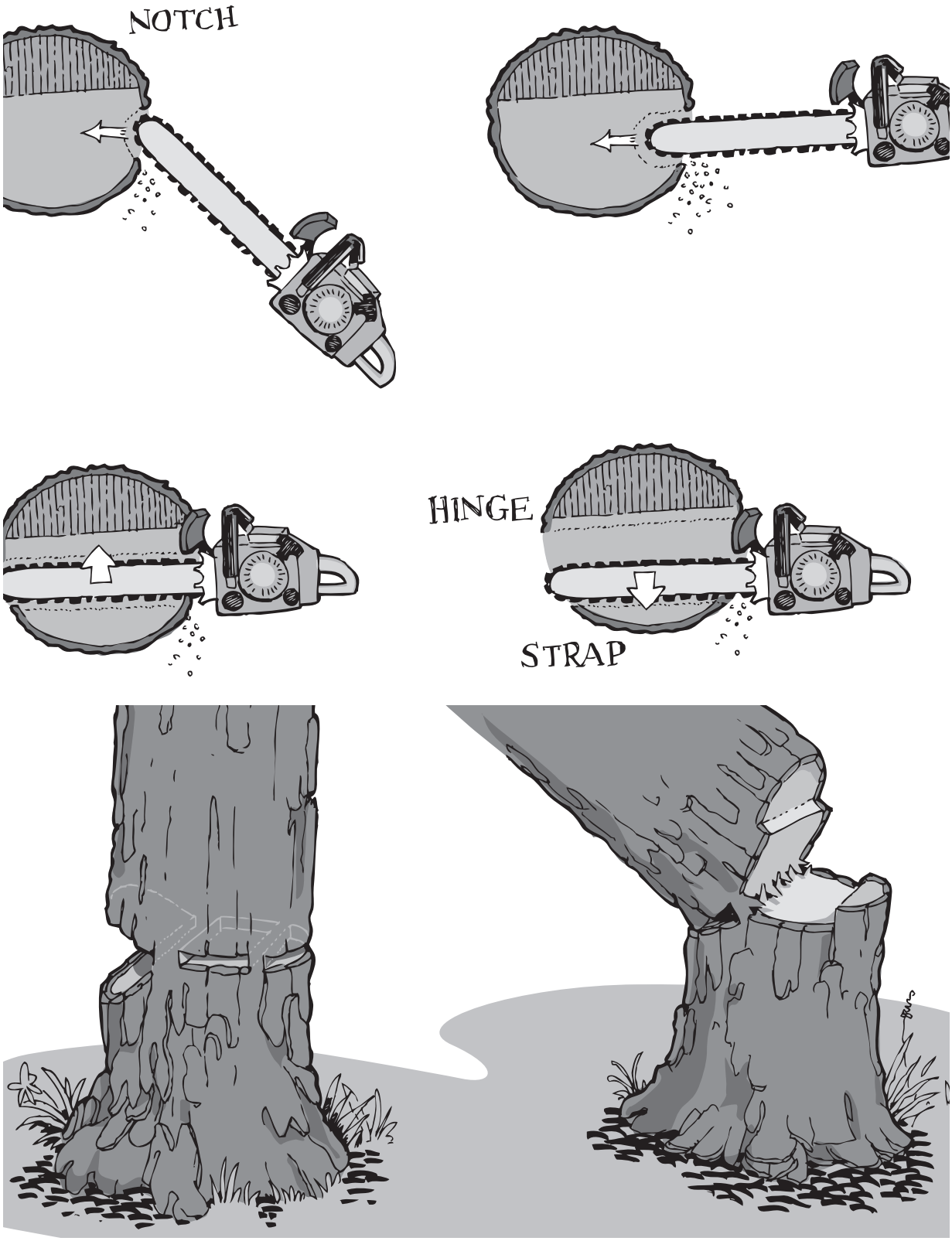
Trees with a considerable lean away from the direction of fall should be topped or lightened on the back side prior to felling.

Trees with slight side lean can be guided to the target by directing the front line of an even hinge. Offset the side lean in the opposite direction, utilizing the felling sites on your saw. If the tree leans two foot left, offset the aim two foot to the right of the target.

Tackle blocks or a winch, anchored securely in the direction to which the tree is to fall, are the best means of pulling the tree over. Wedges, driven into the back cut on the underside of the lean, may also be of assistance in 'straightening' the tree.



The bore cut is another method to reduce the potential of a barber-chair. Proper chain saw control and safety must be maintained to avoid chainsaw kick back. The bore (or plunge cut) method should not be attempted by an inexperienced saw operator.



The bore cut is placed well behind the notch. To plunge, the saw is running at maximum RPM and the lower quadrant of the bar tip (or 'starting corner') is pushed into the wood.

After the entire bar tip is into the wood, turn the bar and push the full length of the bar tip first into the tree while maintaining full throttle.

After the cut is completely through the tree, cut towards the notch to set up the appropriate amount of hinge wood.

With the hinge wood established, cut towards the rear of the tree. Leave a small section of uncut wood, or strap, at the rear of the tree. This technique can also be usefull when working with back leaning trees. Before removing the back strap, a wedge can be inserted into the bore cut to keep the tree from setting back on the saw, and then aiding in lifting the tree toward the desired felling direction.

Check that the work area is clear and that the crew is prepared to fell the tree. Release the strap by either cutting from the center cut outward or cutting from the outside towards the center cut. Exit the area as soon as the tree begins to fall.

Lodged trees

Lodged trees are generally caused by either storm damage or a catastrophic structural failure of a tree's major leaders or of the whole tree trunk or root system. The removal of the resulting suspended load calls for your careful evaluation, planning, communications and execution.

Use extreme care when removing a tree that is lodged in another tree, against a structure or on utility lines, and has not fallen to the ground.

The circumstances of a damaged or uprooted tree will likely create site-specific hazards and necessitate appropriate responses in work methods. Before starting work, perform a hazard assessment of the work area to eliminate or minimize exposure to hazards at the tree and the surrounding area.

Consider the following as part of your hazard assessment:

- The tree species, length and diameter of the lodged tree or tree sections. Consult the Green Log chart for approximate tree weights.
- Visually inspect the tree that has fallen for evidence of structural defects, hollow, cracks or rot, particularly in the portions of the tree that are providing support and are under pressure.
- Visually inspect the supporting trees, structure or utility lines for damage and indications of potential failure under the load of the fallen tree.
- Is the fallen tree trunk (stem) still attached to its roots and the ground, or is it freely supported by the ground or other surface?
- What is the condition of the tree crown? Are there broken limbs aloft?
- Is the site accessible to mobile equipment, such as an aerial lift and/or a crane? What mobile equipment is at your disposal? Is it necessary?
- What manual equipment, such as come-a-longs, bull ropes, tag lines, blocks and rigging equipment is at your disposal?
- Do you have sufficient visibility and lighting?
- Are your chainsaws of sufficient power? Is the bar length longer than the trunk or leader diameter so that you can make single efficient release cuts in the tree?
- Are there electric supply or communication lines at the worksite?
- Do the supply lines need to be **D**e-energized, **I**solated and **G**rounded?
  If the answer is "Yes," stop and contact your supervisor or the electric utility to have the lines de-energized before proceeding with tree removal work. See the Davey Tailgate - Electric Hazard Abatement Plan for details of two-way communication with the electric utility to implement **DIG**.
- What will be your work area and drop zone?

- What will be the direction of fall?
- Are there immovable objects in the fall direction?
- Are pedestrian, vehicular and/or animal controls necessary?
- What will be the retreat path so the workers can reach safety?
- Is your crew sufficiently prepared to successfully conduct this operation?
  If “Yes,” develop your work plan.
  If “No,” stop and contact your supervisor for guidance.

After taking these and other considerations, you may identify and start to develop your work plan with the crew.

Next, communicate the plan to the crew in a pre-job briefing and revisit the plan with the crew during the project. Conduct a new job briefing if there are newly identified hazards, conditions and/or changes to the work plan.

General Precautions for Lodged Tree Removal

Climbing up the inclined trunk of a lodged tree and attempting to shake it loose is strictly forbidden.

Avoid cutting the tree supporting a lodged tree.

If the top of the tree is too firmly lodged to be pulled out, an adjacent tree may be climbed and limbs from the lodged tree carefully removed. If possible, install a bull rope in the host tree and tie off the lodged tree. The use of come-a-longs, rigging lines and arborist blocks should make the removal process safer, easier and more efficient.

When working in an adjacent tree, the climber must crotch high enough so that the highest limbs on the lodged tree can be removed first. Once the arborist has removed obstructing limbs and moved to a safe position, the pulling operation may then be resumed.

If the butt of the tree is free of the stump, a bull rope or winch line, long enough to place all workers and equipment outside of the falling or rebound radius, may be fastened to the tree butt to affect a pulling operation. The rope should be pulled as directly back from the direction of fall as possible. When a bull rope or winch line is used and tensioning force is exerted, be extremely alert to the hazard presented by whipping rope ends, should the rope break if over tensioning is not prevented.

If the tree trunk is not detached from the roots, or if the trunk or leader butt end is not free at the bottom or ground end, it may be necessary to cut it free. There are considerable pressures within the wood of a lodged tree butt (stem) caused by bind and suspension. Cutting off sections of the butt of the lodged tree should be done with great caution because you will be releasing the internal pressures caused by supporting the bottom end weight.

Determine the approximate direction of the pressure. Determine the retreat path for the arborist to take after cutting. Keep other workers two times the height of the tree away from the tree.. Use a notch and back cut to create a hinge to control and slowly direct movement when working with tensions. The arborist should cut only to a point to affect the hinging function of the notch and back cut. The arborist should retreat on the pre-determined path prior to the final release of overhead tree or trunk wood. Never turn your back on a falling tree or trunk as you retreat.

Additional Precautions for Lodged Tree on Utility Lines

When a tree or leader falls and is lodged on utility lines, additional hazards are created by the load tension energy within the utility lines, poles and apparatus that are supporting the tree.

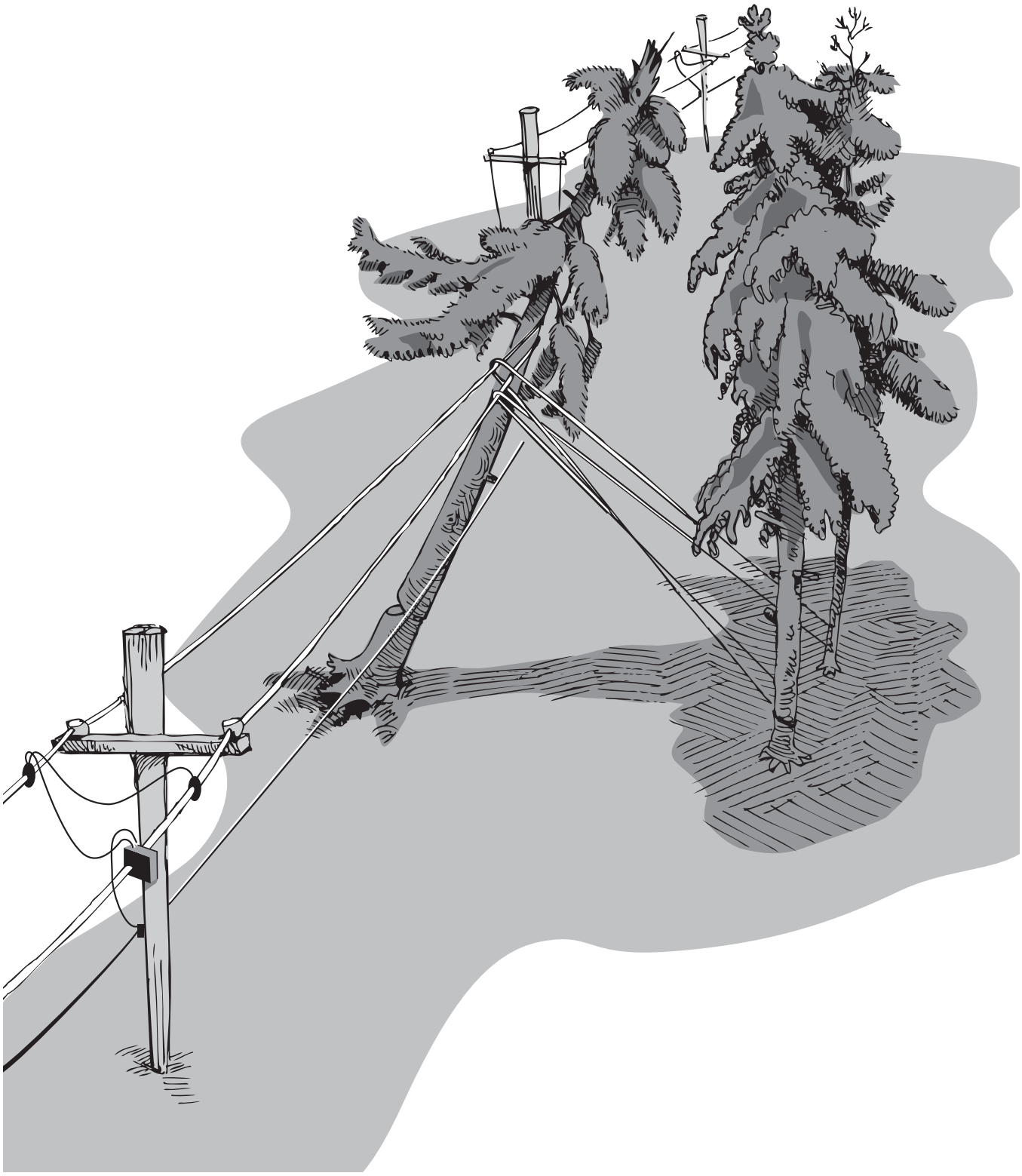
The site specific circumstances and hazards will necessitate appropriate responses in work methods. Before starting work, perform a hazard assessment of the work area to eliminate or minimize exposure to hazards at the tree and surrounding area. In addition to the topics listed in the previous hazard assessment, consider the following:

- Visually assess the condition of the electric supply lines and/or communications lines supporting the tree. Are points of attachment intact? Are the utility poles at either end of the section(s) broken, cracked or obviously bent over? Cross arms broken? Guy wires broken? Transformers or other apparatus broken? Do not contact any substance (insulating oil, etc.) that has come out of any transformer or other electrical component; it may contain PCB or other harmful substances.
- Is there an electric utility line crew at the site with you?
- Have the affected electric supply lines been **D**e-energized, **I**solated and **G**rounded?
  If “No,” stop and contact your supervisor or the electric utility to have the lines de-energized before proceeding with tree removal work. See the Davey Tailgate - Electric Hazard Abatement Plan for details of two-way communication with the electric utility to implement **DIG**.
- Should the utility lines be anchored with ropes to hold back release tension? Are there anchor points available at the site?
- Can the utility line crew render any assistance to you? Is there a crane or utility digger derrick available and accessible to assist you in the removal process?
- Should the tree or section be lifted rather than cut? Is lifting the section safely practicable at this location?
- Can a tip-tied pull line or lines be used to pull the tree or section to vertical and off the lines? With the aid of a winch or come-along? After notching and undercutting the wood?
- If the wires are not anchored and the tree is not going to be pulled or lifted, can the tree be cut from the ground with a notch and back cut so as to release the tree from the wires safely in the intended direction? Can the arborist retreat unobstructed out of the drop zone prior to the release of the tree from the wires?
- Is your crew sufficiently prepared to successfully conduct this operation?
  Yes – Develop your work plan.
  No – Stop and contact your supervisor for guidance.

Reminder:

If a tree is lodged on a utility line(s) and the top is being removed, cut at a point where freeing of the conductors from tension will not flip the cut sections of the top back toward the arborist doing the work. The cut should be made as far from the de-energized utility line(s) as is practicable.

If anchor points are available below the utility lines or on the ground, they may be used to secure ropes to the utility lines and hold back the release force of the wires. A separate rope should be placed on each line to prevent it from springing back. Tying down the utility lines may also enable the removal of the tree or trunk from a stabilized upper support point.



Rotten and Hollow Trees

Rotten or hollow trees are apt to break off prematurely if taken down with the conventional notch and back cut; hence, additional care is required. A bore cut release may be preferable. Low impact rigging is essential and the use of block and tackle is advisable. Caution: Too much pressure applied to the rigging may cause this type of tree to collapse or split, causing loss of control.

An inspection is necessary before any cutting is done to determine the amount of sound wood. This may consist of a visual examination and it may be necessary to test with a drill.

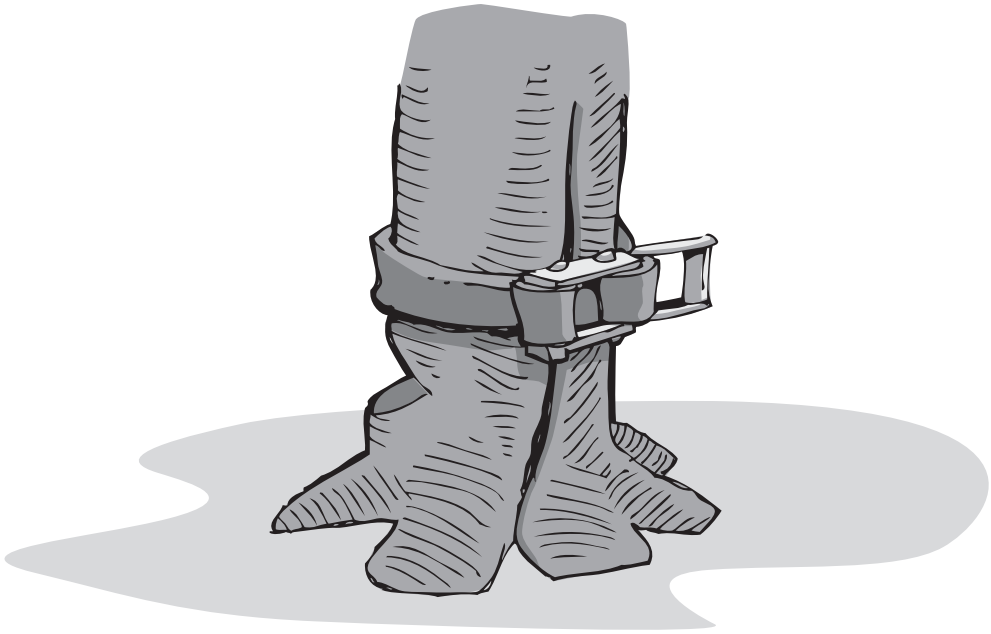
If you determine that the tree cannot be removed safely in one piece, the tree should be topped.

If you determine that the wood is sounder either above or below the normal cutting area, sawing should be done in one of these areas, providing it can be done safely.

Split Trees

Split trees are to be evaluated during the planning process for intended direction and hinge function and if it is determined safe to fell or be removed vertically in sections.

If there is the expectation of premature splitting or breaking, consider whether the tree should be bound with webbing straps.



- In certain tree removal situations, it may be advisable to install a series of binding straps around the trunk to reduce the possibility of trunk failure during the removal process. Trees with vertical cracks or splits in the trunk or with weak or splitting main branch unions are candidates for this technique. This technique should be used with extreme caution on trees with hollow trunks, as the forces created in the binding process have the potential to cause the trunk to fail.
- Polyester ratcheting webbing binding straps are generally available in 2-, 3-, and 4-inch widths. The average breaking strength of these straps are 10,000 lbs., 15,000 lbs. and 20,000 lbs., respectively. Polyester straps are preferred over nylon, as they are more resistant to abrasion and stronger when wet. The width of the straps should be determined by the size and configuration of the tree trunk.
- When installing straps to help prevent further splitting of an existing vertical split in a trunk, place the first strap around the lower trunk above the notch and final felling cut. Straps should then be placed at

2- to 4-foot intervals up the trunk to the end of the split or the main branch union. Spacing of the straps should be determined by trunk diameter and the size of the split.

- When installing straps to help support a weak or splitting main branch union, the first strap should be installed below the main branch union. Subsequent straps should be spaced down the trunk at 2- to 4-foot intervals to the end of the split or to a point just above the notch and final felling cut. In this situation, additional support for the main branch union may be provided by installing an appropriate sized rigging rope in the crown of the tree in a “temporary support cable” configuration.
- In all applications, the straps shall be snug to the trunk. Over-tightening will place unnecessary forces on the trunk and may result in damage to the ratchet handle.

Trees Larger in Diameter Than Saw Bar Length

1. Providing the tree is sound, make the face notch in the felling direction. An open-face notch can provide saw access to the center of the tree.
2. Start the back cut from the leaning side, removing no more than half the diameter. Establish the desired hinge on the leaning side of the tree.
3. Finish the existing half of the diameter from the side of the tree opposite its lean. Establish the desired hinge.
4. Cut any remaining wood holding from the back.

Always finish the cut from the side of the tree opposite its lean. Bore cuts can be utilized to establish the wood removal according to lean situations. Trees with diameters of up to three times the bar length can be taken with variations of this technique.

Manual Land Clearing

Manual land clearing is defined as the removal of trees or stems using chainsaws or other cutting tools where there are no structures or objects that need to be avoided and pull ropes are not used to pull or drop a tree and/or trunk from the ground. This practice is restricted to utility right of way clearing or locations with similar physical characteristics.

Davey standard operating procedure for tree felling is to use a pull rope to aid in tree felling. Therefore, a Davey crew leader may apply manual land clearing work procedures only after he/she has requested and received the approval of the Davey manager or supervisor responsible for the project and the crew(s).

The six steps in a **Precision Tree Felling Plan** for arborists are designed to help assess the risks associated with felling a particular tree and to provide guidelines to help ensure accurate and safe directional felling.

1. Risk Assessment (site and tree)
2. Height Assessment
3. Lean(s) Plural - Side, Back, Front
4. Escape Route/Retreat path
5. Notch and Hinge
6. Back Cut

Risk Assessment (site and tree)

1. Visually examine the entire tree for structural soundness: root decay or dieback, trunk decay, hollows, dead or broken branches, splits or cracks.
2. Check the site for hazards such as utility wires, trees or other obstacles that may be struck by the falling tree, rough terrain, or weather conditions.
3. If the risk is not acceptable: the job should not be done until the concern(s) are addressed and the risk is reduced to an acceptable level.

Height Assessment

1. Estimate tree height. If you can see the top and bottom of a tree, you can estimate its height using a straight stick.
2. Determine where co-workers shall be safely positioned to prevent struck by injury.
3. Those co-workers who are handling pull lines are to be outside of the tree/spar striking distance; at least 1.5 times the height of the tree from the base of the tree being felled - further when possible. All other workers who are not involved, shall be a minimum of 2 times the height of the tree, from the base of the tree being felled.

Lean Assessment (Side, Back, Front)

1. Determine the direction (if any) of trunk lean.
2. Back lean may require a pull line and mechanical advantage to bring the tree over center.
3. Excessive front lean may require a bore cut to eliminate the chance of a 'barber chair'.
4. All trees will require the identification of the 'Good' or high side and the 'Bad' or low side. The final back cut should be performed from the 'Good' or high side.

Escape Routes / Retreat Path

1. The best escape route for the sawyer is 45 degrees from the edge of the notch and opposite the felling direction.
2. The sawyer's escape route shall be cleared of obstacles and hazards to a minimum of 10 feet from the base of the tree.
3. Workers on the pull rope shall also have and use a clear escape route when the tree begins to fall.

Notch and Hinge Plan

1. If the tree has no side lean, the notch should face in the target direction.
2. If side lean is present, the notch may need to be adjusted to compensate.
3. The open-face notch should be wide enough to allow complete closure as the tree lands.
4. A vertical tree requires a 70 to 90 degree notch, a back-leaner may require more than 90 degrees, and a forward leaner may require less than 70 degrees.
5. When making the notch, stand next to the tree facing the direction of the fall. Use the site lines on the saw to align the notch.
6. Make the top cut first. This allows the sawyer to see down the first cut and make the bottom cut more precisely helping to prevent by-pass at the notch apex.

Back cut plan

1. Determine the amount of hinge wood (thickness) required based on the species and soundness of the wood fibers in the hinge. A rule of thumb is 10% of the diameter of the tree.
2. Determine the type of back cut to be used. A bore cut may be safest in forward leaners. Wedges may be required to lift or support one side of the hinge against the lean.
3. Give an audible warning and receive acknowledgement (command & response) before starting the back cut.

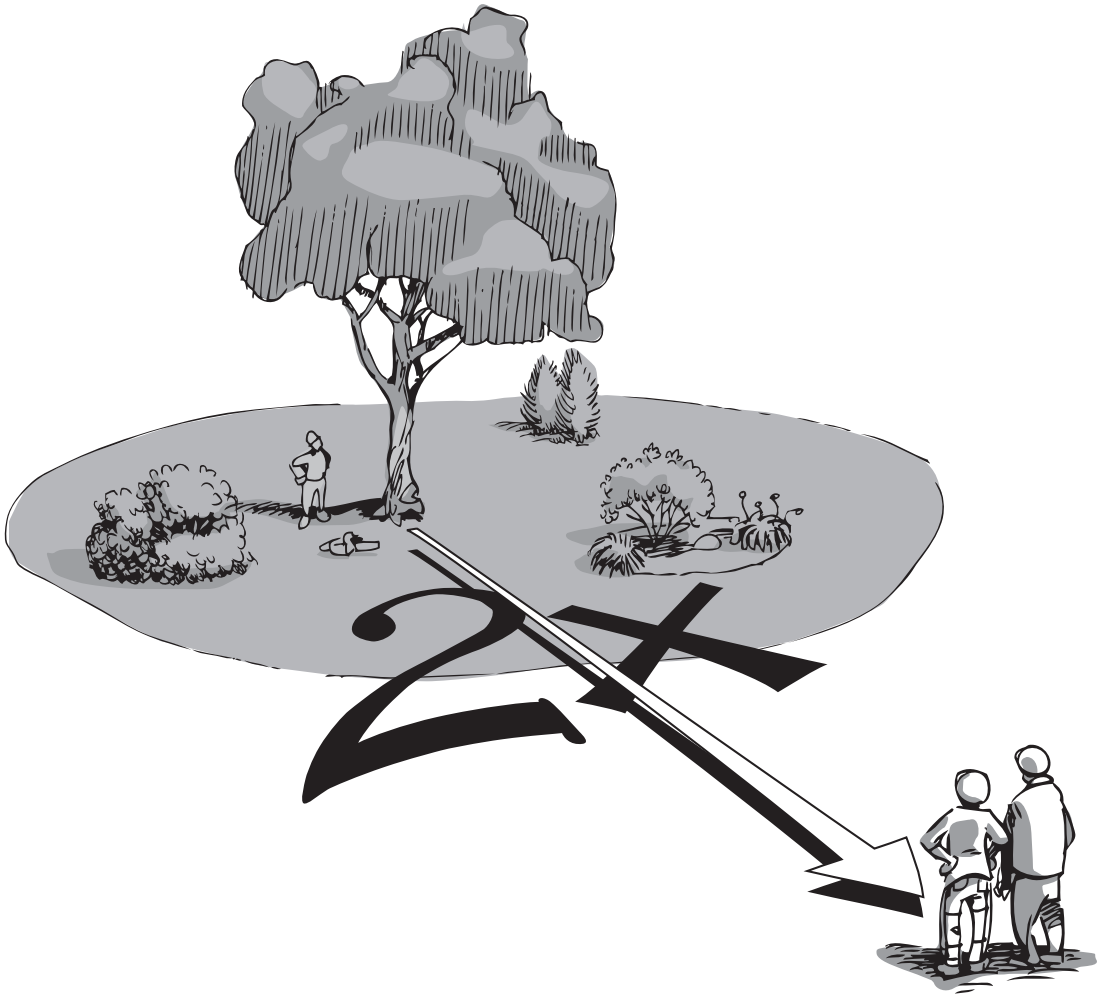
General Work Procedures

Trees/stems shall not be felled in a manner that may create a hazard for a worker, other person or other targets, including, but not limited to, ropes, power lines, buildings, structures and machines.

The immediate supervisor shall be consulted when unfamiliar or unusually hazardous conditions necessitate the supervisor's approval before cutting is commenced.

In **manual tree felling** operations, non-involved workers shall be positioned at a distance from the tree of at least two (2.0) times the height of the tree or trunk being removed until the chainsaw operator and/or crew leader communicates that it is safe to approach more closely.

Workers involved with the fellling operation other than the chainsaw operator, including but not limited to those who handle ropes/taglines, come-a-longs / winches, etc., shall be positioned at a distance from the tree of at least one and one-half (1.5) times the height of the tree or trunk being removed until the chainsaw operator and/or crew leader communicates that it is safe to approach more closely.



While manual felling is in progress, arborist machinery and equipment not directly involved in the felling shall not be operated within two tree lengths of trees being manually felled.

No worker shall approach the arborist felling a tree closer than two tree lengths of trees being felled until the arborist has acknowledged that it is safe to do so, unless a team of workers is necessary to manually fell a particular tree by using tag lines or other arborist tree removal techniques.

Each danger tree shall be felled, removed or avoided. Before work is commenced in the area of a danger tree, each danger tree, including lodged trees and snags, shall be felled or removed using mechanical or other techniques that minimize worker exposure. If the danger tree is not felled or removed, it shall be marked and no work shall be conducted within two tree lengths of the danger tree, unless the crew leader demonstrates that a shorter distance will not create a hazard for workers.

Each danger tree shall be carefully checked for signs of loose bark, broken branches and limbs, or other damage, before they are felled or removed. Accessible loose bark and other damage that may create a hazard for a worker shall be removed or held in place before felling or removing the tree.

Felling on any slope where rolling or sliding of trees or logs is reasonably foreseeable shall be done uphill from, or on the same level as, previously felled trees.

Domino felling of multiple trees is prohibited.

Before felling is started, the chainsaw operator shall plan and clear a retreat path. The retreat path shall extend diagonally away from the expected felling line, unless the chainsaw and/or crew leader demonstrates that such a retreat path poses a greater hazard than an alternate path. Once the back cut has been made the chainsaw operator shall immediately move a safe distance away from the tree on the retreat path, never turning his/her back to the tree.

Before each tree is felled, conditions such as, but not limited to, snow and ice accumulation, wind, lean of tree, dead limbs, and the location of other trees, shall be evaluated by the workers and precautions taken so a hazard is not created for the crew or a worker.

When a spring pole or other tree under stress is cut, no worker other than the chainsaw operator shall be closer than two tree lengths when the stress is released.

A notch shall be made in each tree greater than 5 inches Diameter Breast Height being felled. The notch shall be of a size so the tree will not split and will fall in the intended direction.

The back cut shall leave sufficient hinge wood to hold the tree to the stump during most of its fall so that the hinge is able to guide the tree's fall in the intended direction.

The back cut shall be above the level of the horizontal face cut in order to provide an adequate platform to prevent kickback. This requirement does not apply to "open face" felling where two angled face cuts, rather than a horizontal face cut, are used.

IV. LIMBING AND BUCKING

Work plans for limbing and bucking operations shall be communicated to all workers in a job briefing before work begins.

When more than one worker is limbing or bucking a tree, each shall be positioned and their duties organized so that the actions of one worker will not create a hazard for any other worker. Only one worker shall cut a single tree or single tree part during limbing and bucking operations.

Chain saws should be operated away from the vicinity of the legs and feet. Natural barriers, such as limbs between the saw and the body, should be employed where possible, while ensuring proper balance. While operating a chain saw, the preferred working position is on the uphill side of the work. When necessary to prevent rolling, logs shall be blocked with wood or other suitable material.

The worker shall make sure of firm footing before and during limbing and bucking. The worker shall not stand on loose chunks or logs that will roll when the log being bucked is sawed off.

Trees, limbs or saplings ('spring poles') under tension shall be considered hazardous. Appropriate cutting techniques and precautions shall be followed.

Wedges should be used, as necessary, to prevent binding of the guide bar or saw chain when bucking up trunks of trees.

Cant hooks or peaveys should be used as an aid in rolling large or irregular logs to complete bucking.

If mechanized equipment is to be used, the equipment operator shall establish an effective means of communication with other workers. Workers shall not approach mechanized equipment operations until the equipment operator has acknowledged that it is safe to do so.

Limbing

Anticipate and plan for compressed wood - tension wood

Examine the downed tree

Once a tree is down, it may still have fibers attaching the trunk to the stump. Before cutting them off, check that there is no side-to-side tension in the trunk. Otherwise, it may spring when you cut it off. If there is tension in the trunk, decide which way the trunk will spring and stand on the opposite side to cut.

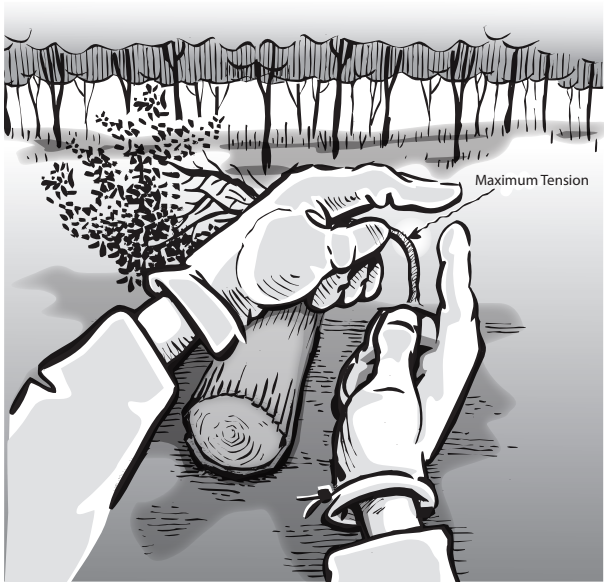
Spring poles

Be sure there are no 'spring poles' under the fallen tree. Spring poles are saplings or smaller trees bent over and trapped under felled trees, logs or limbs. If mistaken for a branch and cut, spring poles can whip up and strike the operator. It is best to take note of where they are and avoid them until you have the tree totally limbed out, and then roll the trunk off the saplings.

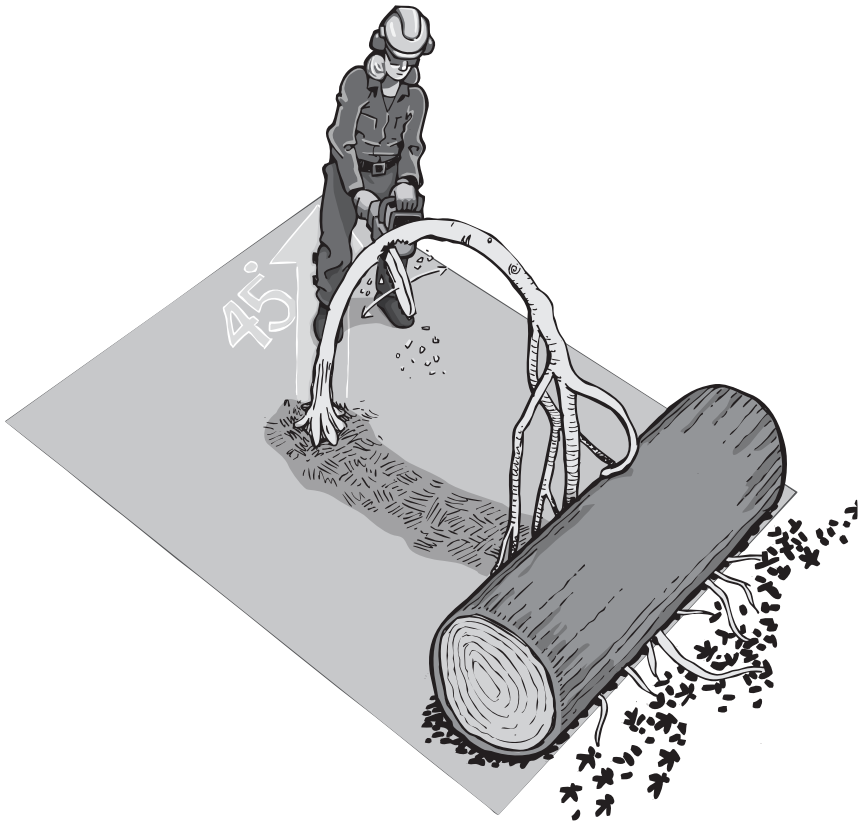
If you need to cut a spring pole while it is still under tension, do it with extreme care, for it is much like defusing a bomb. **Do not attempt to make a cut at the top of a spring pole.**

A technique that can successfully defuse the spring pole:

- Stand to the side of the spring pole so you can see the base and the bend in the pole in front of you.
- Place your two index fingers in front of you and form a 90º angle with the finger tips touching.
- Visually place the vertical finger along where the trunk should be and the horizontal finger across the top of the bent stem.
- Bend the finger tips down together until they point to the area on the trunk of greatest pressure; the middle of the arc.



- Stand at 45º to the rear and shave upward from underneath the stem. Do not cut straight into the stem as compression can pinch the chain. The stem will be completely disarmed when the stem, and bend have straightened.



- Standing at 45º is critical when removing spring poles that may have side pressure. If you stand to the side, the cut stem may come at you quickly if it is side loaded. Try to determine side pressure, if possible, during first evaluations and stand 45º to the rear of the springpole, away from side pressures.

When Limbing

If on a sloped terrain, always stand on the uphill side of the trunk. Otherwise, work on the left-hand side of the trunk, resting the saw on the trunk, and cutting on the opposite side.

Never straddle the trunk; stay on one side or the other.

Never lean over the saw bar. Lower your body position. Position yourself to maximize reaction time. Stay close to the saw; don't stretch to cut limbs.

Do not move your feet until the chain is completely stopped or when the guide bar is on the opposite side of the trunk.

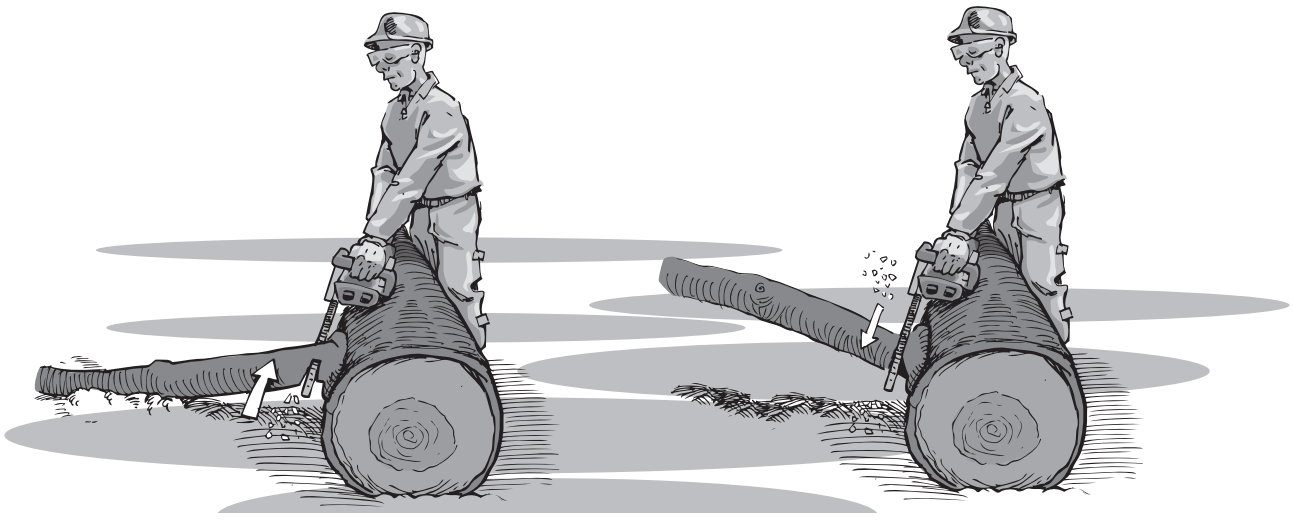
Accelerate the saw before starting into each limb, and never try to change direction in the middle of a cut. Instead, remove the saw and start the cut over again.

Rest the saw engine on the trunk and slide it on the trunk when you want to move. (You don't have to carry the saw.) Saw through each limb, using the trunk as a pivoting point.

Do not cut with the tip of the bar. Watch that it does not make contact with any limbs (a short bar is advantageous here).

All branches that hang out from the trunk should be cut from the top side downward.

All branches on the ground, under pressure, should be cut from the bottom side upward.



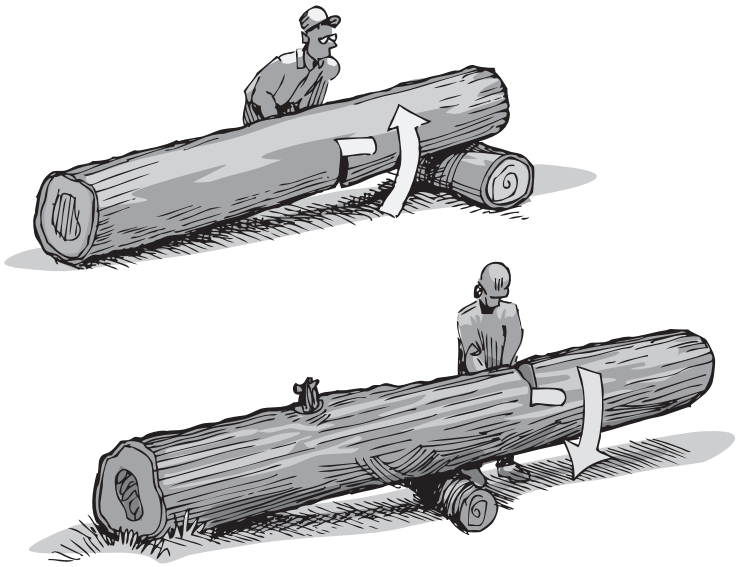
Bucking (Cross Cutting)

The trunk is bucked or cross cut into manageable sections. Look to see where the trunk is supported and determine which way the two halves will fall apart when cut.

If the log extends far beyond each support or the log is only supported on one side of the cut, the two halves (at the end) should fall apart upwards. Therefore, if you cut from the top downward, the cut should continue to open and you will avoid pinching the saw.

If the supports are at each end of the log, the two halves should fall downward; therefore, the cut should be made from the bottom side upward and, again, the cut should continue to open, avoiding a pinch. If you do get the saw pinched, shut the saw off and try to reopen the closed cut, either by using a pry pole or wedge or by cutting the log with another saw. Do not try to pull the saw free—you can deform the handle, damage the saw crankshaft, guide bar or tip sprocket, or be injured by the saw chain, if the saw is suddenly released.

Always use a notch and hinge to slow down and/or control movement if the log or section is supported above ground or over an obstacle.



Handling of Wood and Brush on the Ground

Grounds workers handling brush should not attempt to pick up the brush or limb wood from under a tree where the climber is working without fully communicating their intentions and getting an “all clear” from the climber or bucket operator. Verbal and visual two-way communication must be maintained to prevent struck-by injuries.

Brush and logs shall not be allowed to accumulate at the site of the operation. Pending removal, debris should be piled so that it will not interfere with the operation or where workers might stumble over it.

Do not try to lift logs or other loads that are too heavy. The loads should be reduced by the use of machinery, if available, or cutting logs to a shorter length, securing the help of other crew members or the use of hand or motor-driven winches.

Wear Davey issued work gloves as hand protection when handling brush or logs when there is likely risk of lacerations or severe abrasions to your hands.

When lifting, first clear the path you intend to walk, carrying limbs, brush or tools. Do not carry a load you cannot see over and around. Make certain your path is clear.

1. Keep feet parted, one alongside and one behind the object.
2. Keep back straight; nearly vertical.
3. Tuck your chin in.
4. Grip the object with the whole hand.
5. Tuck elbows and arms in.
6. Don’t twist or rotate at the waist.
7. Keep body weight directly over feet.
8. Start the lift with a thrust of the rear foot.

To place an object on a truck or trailer, first, set the object on the edge and push it far enough on the support to be sure it will not fall. Release it gradually as you set it down. Move it into place by pushing with the hands and body.

Truck-loaded brush shall be kept within the bed, held down tightly by the use of a rope or cable binding. This gives better vision, prevents scraping other vehicles in traffic or striking pedestrians. Eight feet overall width is the allowance limit of the truck and load. Red flags should be placed on the end of brush, extending beyond the end of the truck. When brush loading is completed, do not ride on the load.

When wood and chips are piled on a public dump, the foreman should make sure that all requirements of that particular dumping ground or landfill have been fulfilled.

V. TREE SUPPORT SYSTEMS

Tree support systems are used to provide supplemental support to leaders, individual branches and/or entire trees. Cables, braces and guys provide supplemental support by limiting the movement of the branches, leader or an entire tree. When a tree has a structural defect or condition that poses a high risk of failure, which can result in injury or property damage, a supplemental support system can often reduce the risk. The arborist needs to ensure that the system will achieve its objective of providing added support without increasing the risk of tree failure by changing the dynamics of the tree.

While installing the tree support system, the tree worker may find additional defects. These defects must be reported to a supervisor, the sales representative, district manager and/or the client. Often the additional defects will require more pruning or cables or the removal of the entire tree.

Additional information on tree support systems can be obtained from your District Manager, your Technical Advisor, the Davey Institute and the ISA publication, “Best Management Practices – Tree Support Systems.”

Safety

Most materials used in support systems are electrically conductive.

To avoid potential electrical shock and be in compliance with ANSI Z133 safety standards, cables/braces/guys should not be installed over or within 10 feet (greater for voltages over 10k, see Z133) of energized electric wires.

Installation, maintenance or in-tree inspections of systems are not to be undertaken when thunderstorms are threatening.

As with all arborist operations, PPE, including hardhat and eye protection, must be worn at all times by the crew. Hearing protection must also be worn when exposed to the noise of power tool use.

Due to the risk of injury from dropped hardware or tools, ground workers must avoid the drop zone directly below a worker aloft installing the system.

The safety rules on hand and power tools apply to support systems work.

When replacing cables, it is not always necessary to remove the old cable. However, if it is to be removed, the new cable must be installed first. Whether removing an old cable for replacement or for branch/tree removal, the tension should be removed from the old cable before cutting the old cable. Tension is removed using a come-along or other device. The tree worker must be in a position to avoid cable recoil or branch failure if they occur.

VI. TREE LIGHTNING PROTECTION SYSTEMS

Lightning is an extremely powerful and pervasive force of nature. When lightning strikes trees near homes or other structures, it can create additional risk to people, animals, buildings and other property. A lightning struck tree, if it survives, may have suboptimal growth and stability, thus, creating continuing risk. Lightning protection systems installed in trees are effective in reducing some of these risks.

The purpose of a tree lightning protection system is to provide a preferred path to ground for lightning strikes. To accomplish this, a conductor is installed from near the tree's highest point and down the trunk and major limbs to a grounding system.

Additional information on tree lightning protection systems can be obtained from your District Manager, your Technical Advisor, the Davey Institute and the ISA publication,"Best Management Practices – Tree Lightning Protection Systems."

Safety
Materials used in tree lightning protection systems are electrically conductive.

To avoid potential electrical shock systems shall not be installed over or within 10 feet (greater for voltages over 10k, see Z133) of energized electric wires.

Ground conductors should not cross underground power lines or communications lines.

Installation, maintenance or in tree inspections of systems are not to be undertaken when thunderstorms are threatening.

As with all arborist operations, PPE, including hard hat and eye protection, must be worn at all times by the crew. Hearing protection must also be worn when exposed to the noise of power tool use.

Due to the risk of injury from dropped hardware or tools, ground workers must avoid the drop zone directly below a worker aloft installing the system.

The safety rules on hand and power tools apply to lightning protection work.

Weight of Green Wood

Weight of a one-foot section based on average diameter inches

Common name	Weight (lb/cf)	10"	12"	14"	16"	18"	20"	22"	24"	26"	28"	30"	32"	34"	36"	38"	40"
Ailanthus	50	27	39	53	70	88	109	132	157	184	214	245	279	315	353	394	436
Alder, red	46	25	36	49	64	81	100	121	144	170	197	226	257	290	325	362	401
Apple spp.	55	30	43	59	77	97	120	145	173	203	235	270	307	347	389	433	480
Ash, Black	52	28	41	56	73	92	113	137	163	192	222	255	290	328	367	409	454
Ash, blue	50	27	39	53	70	88	109	132	157	184	214	245	279	315	353	394	436
Ash, Oregon	50	27	39	53	70	88	109	132	157	184	214	245	279	315	353	394	436
Ash, pumpkin	50	27	39	53	70	88	109	132	157	184	214	245	279	315	353	394	436
Ash, white	50	27	39	53	70	88	109	132	157	184	214	245	279	315	353	394	436
Ask, green	52	28	41	56	73	92	113	137	163	192	222	255	290	328	367	409	454
Aspen, Bigtooth	43	23	34	46	60	76	94	113	135	158	184	211	240	271	304	338	375
Aspen, quaking	50	27	39	53	70	88	109	132	157	184	214	245	279	315	353	394	436
Baldcypress	51	28	40	54	71	90	111	135	160	188	218	250	285	321	360	401	445
Basswood, American	41	22	32	44	57	72	89	108	129	151	175	201	229	258	290	323	358
Beech, American	54	29	42	58	75	95	118	142	170	199	231	265	301	340	382	425	471
Birch, Gray	46	25	36	49	64	81	100	121	144	170	197	226	257	290	325	362	401
Birch, paper	52	28	41	56	73	92	113	137	163	192	222	255	290	328	367	409	454
Birch, river	57	31	45	61	80	101	124	150	179	210	244	280	318	359	403	449	497
Birch, sweet	65	35	51	69	91	115	142	172	204	240	278	319	363	410	459	512	567
Birch, yellow	59	32	46	63	82	104	129	156	185	217	252	289	329	372	417	464	515
Blackgum	58	32	46	62	81	102	126	153	182	214	248	285	324	366	410	457	506
Boxelder	50	27	39	53	70	88	109	132	157	184	214	245	279	315	353	394	436
Buckeye, yellow	50	27	39	53	70	88	109	132	157	184	214	245	279	315	353	394	436
Butternut	46	25	36	49	64	81	100	121	144	170	197	226	257	290	325	362	401
Catalpa, northern	41	22	32	44	57	72	89	108	129	151	175	201	229	258	290	323	358
Cedar, Alaska yellow	45	25	35	48	63	79	98	119	141	166	192	221	251	284	318	354	393
Cedar, Atlantic white	36	20	28	38	50	64	79	95	113	133	154	177	201	227	254	283	314
Cedar, eastern red	37	20	29	40	52	65	81	98	116	136	158	182	207	233	261	291	323
Cedar, incense	45	25	35	48	63	79	98	119	141	166	192	221	251	284	318	354	393
Cedar, northern white	36	20	28	38	50	64	79	95	113	133	154	177	201	227	254	283	314
Cedar, Port-Orford	42	23	33	45	59	74	92	111	132	155	180	206	234	265	297	331	366
Cedar, southern red	37	20	29	40	52	65	81	98	116	136	158	182	207	233	261	291	323
Cedar, western red	27	15	21	29	38	48	59	71	85	99	115	132	151	170	191	213	236
Cherry, Black	45	25	35	48	63	79	98	119	141	166	192	221	251	284	318	354	393
Chestnut, American	55	30	43	59	77	97	120	145	173	203	235	270	307	347	389	433	480
Chinaberry	50	27	39	53	70	88	109	132	157	184	214	245	279	315	353	394	436
Chinkapin, gian/golden	61	33	48	65	85	108	133	161	192	225	261	299	341	384	431	480	532
Coffeetree, Kentucky	50	27	39	53	70	88	109	132	157	184	214	245	279	315	353	394	436
Cottonwood, Black	46	25	36	49	64	81	100	121	144	170	197	226	257	290	325	362	401
Cottonwood, eastern	50	27	39	53	70	88	109	132	157	184	214	245	279	315	353	394	436
Cottonwood, Fremont	40	22	31	43	56	71	87	106	126	147	171	196	223	252	283	315	349
Cucumbertree	49	27	38	52	68	87	107	129	154	181	209	240	274	309	346	386	427
Dogwood, flowering	53	29	42	57	74	94	116	140	166	195	227	260	296	334	374	417	462
Dogwood, pacific	53	29	42	57	74	94	116	140	166	195	227	260	296	334	374	417	462
Elm, American	56	31	44	60	78	99	122	148	176	206	239	275	313	353	396	441	488
Elm, cedar	61	33	48	65	85	108	133	161	192	225	261	299	341	384	431	480	532
Elm, rock	54	29	42	58	75	95	118	142	170	199	231	265	301	340	382	425	471

Weight of Green Wood

Weight of a one-foot section based on average diameter inches

Common name	Weight (lb/cf)	10"	12"	14"	16"	18"	20"	22"	24"	26"	28"	30"	32"	34"	36"	38"	40"
Elm, slippery	53	29	42	57	74	94	116	140	166	195	227	260	296	334	374	417	462
Elm, winged	53	29	42	57	74	94	116	140	166	195	227	260	296	334	374	417	462
Fir, Balsam	45	25	35	48	63	79	98	119	141	166	192	221	251	284	318	354	393
Fir, California red	48	26	38	51	67	85	105	127	151	177	205	236	268	302	339	378	419
Fir, Douglas (coast)	38	21	30	41	53	67	83	100	119	140	162	186	212	239	268	299	331
Fir, Douglas (mountain)	35	19	27	37	49	62	76	92	110	129	150	172	195	221	247	276	305
Fir, grand	45	25	35	48	63	79	98	119	141	166	192	221	251	284	318	354	393
Fir, noble	30	16	24	32	42	53	65	79	94	111	128	147	167	189	212	236	262
Fir, Pacific silver	42	23	33	45	59	74	92	111	132	155	180	206	234	265	297	331	366
Fir, subalpine	28	15	22	30	39	49	61	74	88	103	120	137	156	176	198	220	244
Fir, white	47	26	37	50	66	83	102	124	148	173	201	231	262	296	332	370	410
Gum, red	50	27	39	53	70	88	109	132	157	184	214	245	279	315	353	394	436
Hackberry	50	27	39	53	70	88	109	132	157	184	214	245	279	315	353	394	436
Hemlock, eastern	50	27	39	53	70	88	109	132	157	184	214	245	279	315	353	394	436
Hemlock, mountain	44	24	35	47	61	78	96	116	138	162	188	216	246	277	311	346	384
Hemlock, western	41	22	32	44	57	72	89	108	129	151	175	201	229	258	290	323	358
Hickory, Bitternut	64	35	50	68	89	113	140	169	201	236	274	314	357	403	452	504	558
Hickory, mockernut	65	35	51	69	91	115	142	172	204	240	278	319	363	410	459	512	567
Hickory, nutmeg	62	34	49	66	87	110	135	164	195	228	265	304	346	391	438	488	541
Hickory, pignut	68	37	53	73	95	120	148	179	214	251	291	334	380	429	480	535	593
Hickory, shagbark	64	35	50	68	89	113	140	169	201	236	274	314	357	403	452	504	558
Hickory, shellbark	64	35	50	68	89	113	140	169	201	236	274	314	357	403	452	504	558
Hickory, water	70	38	55	75	98	124	153	185	220	258	299	343	391	441	495	551	611
Holly, American	57	31	45	61	80	101	124	150	179	210	244	280	318	359	403	449	497
Honeylocust	60	33	47	64	84	106	131	158	188	221	256	294	335	378	424	472	523
Hophornbeam, eastern	60	33	47	64	84	106	131	158	188	221	256	294	335	378	424	472	523
Hornbeam, (musclewood	53	29	42	57	74	94	116	140	166	195	227	260	296	334	374	417	462
Juniper, Alligator	40	22	31	43	56	71	87	106	126	147	171	196	223	252	283	315	349
Juniper, Utah	57	31	45	61	80	101	124	150	179	210	244	280	318	359	403	449	497
Larch, western	48	26	38	51	67	85	105	127	151	177	205	236	268	302	339	378	419
Laurel, California	53	29	42	57	74	94	116	140	166	195	227	260	296	334	374	417	462
Locust, Black	58	32	46	62	81	102	126	153	182	214	248	285	324	366	410	457	506
Madrone, pacific	60	33	47	64	84	106	131	158	188	221	256	294	335	378	424	472	523
Magnolia, Mountain or F	49	27	38	52	68	87	107	129	154	181	209	240	274	309	346	386	427
Magnolia, southern	59	32	46	63	82	104	129	156	185	217	252	289	329	372	417	464	515
Magnolia, sweetbay	49	27	38	52	68	87	107	129	154	181	209	240	274	309	346	386	427
Maple, Bigleaf	47	26	37	50	66	83	102	124	148	173	201	231	262	296	332	370	410
Maple, black	55	30	43	59	77	97	120	145	173	203	235	270	307	347	389	433	480
Maple, red	50	27	39	53	70	88	109	132	157	184	214	245	279	315	353	394	436
Maple, silver	46	25	36	49	64	81	100	121	144	170	197	226	257	290	325	362	401
Maple, striped	47	26	37	50	66	83	102	124	148	173	201	231	262	296	332	370	410
Maple, sugar	55	30	43	59	77	97	120	145	173	203	235	270	307	347	389	433	480
Mesquite spp.	59	32	46	63	82	104	129	156	185	217	252	289	329	372	417	464	515
Oak, black	64	35	50	68	89	113	140	169	201	236	274	314	357	403	452	504	558
Oak, Bur	63	34	49	67	88	111	137	166	198	232	269	309	352	397	445	496	550
Oak, California black	64	35	50	68	89	113	140	169	201	236	274	314	357	403	452	504	558

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Weight of Green Wood

Weight of a one-foot section based on average diameter inches

Common name	Weight (lb/cf)	10"	12"	14"	16"	18"	20"	22"	24"	26"	28"	30"	32"	34"	36"	38"	40"
Oak, California white	63	34	49	67	88	111	137	166	198	232	269	309	352	397	445	496	550
Oak, canyon live	76	41	60	81	106	134	166	201	239	280	325	373	424	479	537	598	663
Oak, cherrybark	64	35	50	68	89	113	140	169	201	236	274	314	357	403	452	504	558
Oak, chestnut	63	34	49	67	88	111	137	166	198	232	269	309	352	397	445	496	550
Oak, English	52	28	41	56	73	92	113	137	163	192	222	255	290	328	367	409	454
Oak, Gambel	63	34	49	67	88	111	137	166	198	232	269	309	352	397	445	496	550
Oak, laurel	64	35	50	68	89	113	140	169	201	236	274	314	357	403	452	504	558
Oak, live	76	41	60	81	106	134	166	201	239	280	325	373	424	479	537	598	663
Oak, northern red	64	35	50	68	89	113	140	169	201	236	274	314	357	403	452	504	558
Oak, Oregon white	63	34	49	67	88	111	137	166	198	232	269	309	352	397	445	496	550
Oak, overcup	63	34	49	67	88	111	137	166	198	232	269	309	352	397	445	496	550
Oak, pin	64	35	50	68	89	113	140	169	201	236	274	314	357	403	452	504	558
Oak, post	64	35	50	68	89	113	140	169	201	236	274	314	357	403	452	504	558
Oak, scarlet	64	35	50	68	89	113	140	169	201	236	274	314	357	403	452	504	558
Oak, southern	64	35	50	68	89	113	140	169	201	236	274	314	357	403	452	504	558
Oak, swamp chestnut	63	34	49	67	88	111	137	166	198	232	269	309	352	397	445	496	550
Oak, swamp white	63	34	49	67	88	111	137	166	198	232	269	309	352	397	445	496	550
Oak, water	64	35	50	68	89	113	140	169	201	236	274	314	357	403	452	504	558
Oak, white	63	34	49	67	88	111	137	166	198	232	269	309	352	397	445	496	550
Oak, willow	64	35	50	68	89	113	140	169	201	236	274	314	357	403	452	504	558
Osage-orange	62	34	49	66	87	110	135	164	195	228	265	304	346	391	438	488	541
Pecan	62	34	49	66	87	110	135	164	195	228	265	304	346	391	438	488	541
Persimmon, common	63	34	49	67	88	111	137	166	198	232	269	309	352	397	445	496	550
Pine, Bishop	45	25	35	48	63	79	98	119	141	166	192	221	251	284	318	354	393
Pine, eastern white	35	19	27	37	49	62	76	92	110	129	150	172	195	221	247	276	305
Pine, gray	45	25	35	48	63	79	98	119	141	166	192	221	251	284	318	354	393
Pine, jack	50	27	39	53	70	88	109	132	157	184	214	245	279	315	353	394	436
Pine, Jeffrey	47	26	37	50	66	83	102	124	148	173	201	231	262	296	332	370	410
Pine, knobcone	50	27	39	53	70	88	109	132	157	184	214	245	279	315	353	394	436
Pine, limber	45	25	35	48	63	79	98	119	141	166	192	221	251	284	318	354	393
Pine, loblolly	53	29	42	57	74	94	116	140	166	195	227	260	296	334	374	417	462
Pine, lodgepole	39	21	31	42	54	69	85	103	122	144	167	191	218	246	276	307	340
Pine, longleaf	55	30	43	59	77	97	120	145	173	203	235	270	307	347	389	433	480
Pine, Monterey	50	27	39	53	70	88	109	132	157	184	214	245	279	315	353	394	436
Pine, pitch	50	27	39	53	70	88	109	132	157	184	214	245	279	315	353	394	436
Pine, pond	51	28	40	54	71	90	111	135	160	188	218	250	285	321	360	401	445
Pine, ponderosa	45	25	35	48	63	79	98	119	141	166	192	221	251	284	318	354	393
Pine, red	42	23	33	45	59	74	92	111	132	155	180	206	234	265	297	331	366
Pine, sand	38	21	30	41	53	67	83	100	119	140	162	186	212	239	268	299	331
Pine, shortleaf	52	28	41	56	73	92	113	137	163	192	222	255	290	328	367	409	454
Pine, slash	58	32	46	62	81	102	126	153	182	214	248	285	324	366	410	457	506
Pine, spruce	45	25	35	48	63	79	98	119	141	166	192	221	251	284	318	354	393
Pine, sugar	49	27	38	52	68	87	107	129	154	181	209	240	274	309	346	386	427
Pine, table mountain	54	29	42	58	75	95	118	142	170	199	231	265	301	340	382	425	471
Pine, Virginia	50	27	39	53	70	88	109	132	157	184	214	245	279	315	353	394	436
Pine, western white	35	19	27	37	49	62	76	92	110	129	150	172	195	221	247	276	305

2018

Weight of Green Wood

Weight of a one-foot section based on average diameter inches

Common name	Weight (lb/cf)	10"	12"	14"	16"	18"	20"	22"	24"	26"	28"	30"	32"	34"	36"	38"	40"
Pinyon, common/two-ne	40	22	31	43	56	71	87	106	126	147	171	196	223	252	283	315	349
Poplar, Balsam	40	22	31	43	56	71	87	106	126	147	171	196	223	252	283	315	349
Poplar, yellow	49	27	38	52	68	87	107	129	154	181	209	240	274	309	346	386	427
Redwood	50	27	39	53	70	88	109	132	157	184	214	245	279	315	353	394	436
Sassafras	44	24	35	47	61	78	96	116	138	162	188	216	246	277	311	346	384
Sequoia, giant	59	32	46	63	82	104	129	156	185	217	252	289	329	372	417	464	515
Serviceberry spp.	61	33	48	65	85	108	133	161	192	225	261	299	341	384	431	480	532
Silverbell spp.	44	24	35	47	61	78	96	116	138	162	188	216	246	277	311	346	384
Sourwood	53	29	42	57	74	94	116	140	166	195	227	260	296	334	374	417	462
Spruce, black	35	19	27	37	49	62	76	92	110	129	150	172	195	221	247	276	305
Spruce, Engelmann	39	21	31	42	54	69	85	103	122	144	167	191	218	246	276	307	340
Spruce, red	35	19	27	37	49	62	76	92	110	129	150	172	195	221	247	276	305
Spruce, sitka	33	18	26	35	46	58	72	87	104	122	141	162	184	208	233	260	288
Spruce, white	35	19	27	37	49	62	76	92	110	129	150	172	195	221	247	276	305
Sweetgum	50	27	39	53	70	88	109	132	157	184	214	245	279	315	353	394	436
Sycamore, American	52	28	41	56	73	92	113	137	163	192	222	255	290	328	367	409	454
Tamarack (native)	47	26	37	50	66	83	102	124	148	173	201	231	262	296	332	370	410
Tanoak	65	35	51	69	91	115	142	172	204	240	278	319	363	410	459	512	567
Tupelo, water	56	31	44	60	78	99	122	148	176	206	239	275	313	353	396	441	488
Walnut, black	57	31	45	61	80	101	124	150	179	210	244	280	318	359	403	449	497
Willow, black	51	28	40	54	71	90	111	135	160	188	218	250	285	321	360	401	445
Yew, pacific	55	30	43	59	77	97	120	145	173	203	235	270	307	347	389	433	480

2018

⚠WARNING

This table provides <u>estimates</u> of log weights only. Additionally, moisture content and bark thickness may alter the estimate.

Due to the many variables involved in estimating log weights, estimated weights should be considered an approximation only. If the log weight is critical to the safety of persons or property and the estimated weight is at or near an equipment's limitation, adjust the work plan, removal method, and/or equipment. Failure to do so could result in property damage, serious injury, or death.

APPENDIX D
Fall Prevention Plan

DAVEY
Proven Solutions for a Growing World

Fall Prevention Plan

Purpose

The purpose of this procedure is to provide continuous fall protection while accessing work aloft from aerial device. Fall protection will be utilized by (described system). Work performed at this location has been identified as posing a fall hazard; therefore, this procedure shall be followed to provide continuous fall protection. This procedure does not address additional hazards not specifically related to fall protection.

If there are any questions regarding these procedures, **contact your supervisor immediately.** The procedure described here supplements and is subordinate to existing Occupational Safety and Health Administration (OSHA) regulations and equipment manufacturer's instructions.

Field Application

When an active fall protection is to be used the following shall be submitted with the Health and Safety Plan: detailed DTE FPP, Davey CDP training certification for the competent fall protection person/aerial device operator, manufacturer product sheets on the elements of the fall protection system hardware including selected anchorage device, connector and lanyard.

Task Description

Aerial Device Operation

Important checklist before the start of any work activities at height:

1. Follow fall protection training and procedures.
2. Have successfully completed fall hazard training before working from heights.
3. Use the "Buddy System" at all times when working at an elevation (minimum of two people at any work site).
4. Discuss fall prevention procedures with coworkers and supervisors to ensure that all of those involved have a clear understanding of the outlines.
5. Assemble all equipment needed for fall protection and rescue procedures in accordance with manufacturer's instructions.
6. Perform pre-use inspection of all equipment in accordance with manufacturer's requirements.
7. Follow Electric Hazard Abatement Plan if MAD cannot be maintained.
8. Do not use this fall protection system equipment for any other purpose than as described in this procedure.

Fall Protection Equipment List

- [x] Full body harness
- [ ] Self retracting lanyards
- [x] Shock absorbing lanyards
- [ ] Positioning lanyard
- [ ] Guardrail
- [ ] Choker
- [ ] Beam clamp
- [ ] Horizontal lifeline
- [ ] Vertical lifeline
- [ ] Rope garb
- [x] Other

Aerial lift will possess a guardrail and also have a position lanyard with a fixed length not to permit the occupant more slack than necessary to perform work safely within the guard rails.

Identified Fall Hazards

- [x] Fall from lift equipment
- [ ] Hole/floor opening
- [ ] Unprotected edge
- [ ] Non-standard use of ladder
- [ ] Scaffold
- [ ] Other

Fall Prevention Procedures *(Step by step description of how equipment will be implemented.)*

1	Trained manager and crew - Davey Career Development Program training for aerial device operation and fall protection use, and care
2	Davey Safety approved PPE, inspected daily, proper fit, 100% use
3	Daily pre-trip truck inspection, daily pre-flight aerial device inspection
4	Pre job site hazard ID, job plan, task assignments and job briefing
5	Set-up aerial device on suitable locale, outriggers and chocks down
6	Emergency response gear out, traffic control in place to prevent struck by vehicle vehicle
7	Secure harness/lanyard system to anchorage or lift, visual condition check, fit check
8	Operate aerial device in compliance with Davet Safety and Training Manual Section 10 Mobile Equipment
9	Coordinate safe work procedures with ground personnel, utilize a spotter if circumstances warrant
10	Complete task, secure aerial device, remove and secure fall protection

DAVEY
Proven Solutions for a Growing World

Fall Prevention Plan

Rescue Information

Normal first aid procedures should be performed by certified individuals and will determine if the situation requires EMS.

Dial **911** or telephone number for your local area if not serviced by 911 emergency call number.

Phone Locations	**First Aid Kit Locations** *(If other, please list.)*	**AED Location if applicable to site**

Rescue Considerations

When personal fall arrest systems are used, the job site supervisor or designated competent person must assure that employees can be promptly rescued or can rescue themselves should a fall occur. The availability of rescue personnel, ladders, or other rescue equipment should be verified before work begins. In some situations, equipment that allows employees to rescue themselves after the fall has been arrested may be desirable, such as devices which have descent capability.

Rescue Plan *(Step by step description of how equipment will be implemented.)*

1	Buddy system or phone/radio communication
2	Self rescue
3	If self-rescue is not possible
4	At onset of work place emergency response gear at site
5	Crew members, in accordance with prior training, will assess situation, risks, mitigation capabilities, notify EMS 911, and
	apply Emergency Response and Aerial Rescue Procedures per Davey Safety and Training Manual Section 14 Climbing and
	Section 10 Mobile Equipment - Aerial Device, as applicable to work at hand without becoming victims themselves.
6	Coordinate and cooperate with EMS and Davey management

DAVEY

Aerial Device Operator Fall Arrest System Program

Policy:

Davey (its parent and subsidiary company's) utilizes Aerial Lift Devices covered by "29 CFR 1910.67(c)(2)(v). A personal fall arrest or travel restraint system that meets the requirements in subpart I of that standard, shall be worn and attached to the boom or basket when working from an aerial lift." This applies during its arborist and landscape operations subject to ANSI Z133 Arboricultural Safety Requirements, and utility line clearance tree trimming operations also covered by 29 CFR 1910.269, and telecommunications work covered by 29 CFR 1910.268.

All Davey (parent and subsidiary company's) operators of Aerial Devices shall at-all-times wear a properly fitting, Company issued full-body harness with an energy-absorbing lanyard secured to the aerial device anchorage whenever the operator is in the aerial device platform (bucket) for any purpose, from cradle to cradle. This is a Davey Critical Safe Practice subject to mandatory Critical Penalties if violated. There is zero tolerance for violation.

Roles and Responsibilities

The Davey Corporate Safety Department is the Program Administrator – the Corporate Safety Director is the designated the qualified person responsible for managing the Fall Protection program, including specifying the fall protection system selected for aerial lift device operations, monitoring changes in fall protections systems available and evaluating suitability for approval and adoption, communicating with operations on and through the Field Safety Support team supervising implementation, educating, mentoring and inspecting the system use, care, condition and procedural compliance during job observations, including verification of employee initial education, job skill training, and certification of demonstrated proficiency through the Davey Career Development Program (CDP) of training, and ongoing Tailgate Safety Training.

Davey supervision is responsible for training personnel in fall protection inspection, care and use, performing Job Observations on a regular basis, ensuring that all equipment is kept in good repair and that sufficient supply of fall protection gear is available to the workforce, responding quickly to eliminate workplace hazards, ensuring that employees understand and follow safe job procedures, initiating the Safe Practice Violation Notices Policy if violations occur, reviewing Job Briefings and Daily-Weekly Aerial Inspections conducted and that appropriate hazard ID and mitigation are identified and communicated, ensure that Quarterly Fall Protection System Inspections are conducted, communicating with their manager and the Safety Department around fall protection.

Employees must comply with Davey safe work practices including this fall protection program at all times when working with an aerial lift device and must utilize the fall protection system provided, must participate in the CDP training program towards attaining certification of demonstrated proficiency, weekly Tailgate safety meetings and other forms of ongoing safety education/training, must participate in the job hazard identification and Job Briefing process at the worksite, must participate in the regular

inspection of the fall protection system and communicate aerial device deficiencies or hazards if identified, and perform work in a safe, efficient manner.

What you must know about fall arrest systems:

All Davey operators must be aware that they could suffer the risk of injury or death from a fall or ejection from an aerial device if not secured with fall protection. Therefore, All Davey operators shall utilize properly fitting fall arrest equipment whenever in the aerial device platform (bucket). In the event of a fall, the full body harness distributes the forces throughout the body and the energy-absorbing lanyard helps arrest the forces generated during the fall. Fall Protection Equipment shall be Davey Company Safety Department approved and Company issued.

What you must know about fall protection equipment:

You must read, become familiar with, and follow the harness and lanyard manufacturers' warnings and instructions before using the fall protection equipment. Every piece of fall arrest equipment must be pre-use inspected daily by the aerial device operator. The older a piece of equipment is and the more use it gets, the more important inspections become. Service life of a harness and lanyard is approximately 5 years based upon use, condition at time of inspection, and specific manufacturers product guidance. Replace any defective equipment identified. Replace any harness and lanyard involved in a fall. If there is any doubt about the safety of the fall protection equipment, do not use it, refer questionable equipment conditions to your manager / supervisor. Do not use the aerial device unless secured with fall protection equipment in good serviceable condition.

Documenting Pre-Use Inspection:

The required daily operator's pre-use inspection of fall protection equipment shall be documented on the Aerial Daily-Weekly Inspection form. Quarterly Inspection of all harnesses and lanyards utilizing the fall protection system manufacturer's inspection guidance is required and is supplemental to the daily operator's pre-use inspection. Please utilize the Peer Gear Inspection process to perform the Periodic Inspection and the Quarterly Inspection Checklist to document it. Submit completed checklist for each harness and lanyard in your area of responsibility to safetytrainingrecords@davey.com. If you identify fall protection equipment that is not in good, serviceable condition document the specific conditions on the form, remove that fall protection equipment from service, contact your manager/supervisor.

How to inspect the harness webbing and lanyard:

Consult the manufacturer's instructions. Before each use inspect the entire surface of webbing for damage. Bend the webbing in an inverted "U" holding your hands six to eight inches apart to ensure that the unit is free of burns, cuts, abrasions, kinks, knots, broken strands, and excessive wear. Broken webbing strands generally appear as tufts on the webbing surface.

Rotate the lanyard and inspect from end to end for; fuzzy, worn, broken, or cut fibers, broken stitches in the outer cover, tears, stretch marks, or other evidence of impact

loading. Weakened areas have noticeable changes from the original diameter. Replace the lanyard if the shape and diameter is not uniform throughout.

What you must look for during the tongue and buckle inspection:

Inspect the waist strap by flexing in an inverted "U" as you did with webbing. Check for cut fibers, damaged stitches, and loose, distorted, corroded or broken grommets. Verify that rivets are straight, tight and cannot be moved. The body side of the rivet base and outside rivet burr should be flat against the material.

Belts without grommets should be checked for torn or elongated tongue holes that could allow the buckle tongue to slip. Replace when tongue holes are excessively worn or elongated. Do not cut, alter, or punch additional holes.

Inspect all types of buckles for distortion and sharp edges. On tongue buckles, the outer and center bars must be straight. Carefully check corners and attachment points of the center bar. They should overlap the buckle frame and move freely back and forth in their sockets. The roller should turn freely on the frame. Friction buckles should be checked to ensure they do not slip once secured**.**

What you must know about hardware; forged steel snaps, carabineers, and D-rings.

Inspect all hardware for cracks, corrosion, or pitted surfaces. Ensure they are not bent, free of burrs, clean, and functioning properly. D-ring bars should be 90 degrees to the long axis of the belt and pivot freely. Inspect double-locking snaps for hook and eye distortions. The keeper (latch) should be seated into the snap nose without binding and should not be distorted or obstructed. The keeper spring should exert enough force to close the keeper firmly and prevent the gate from opening inadvertently.

How to properly adjust the harness:

When properly adjusted, the single “D” attachment point on the harness should be in the upper middle portion of your back. The leg strap buckles should lie at your sides just below the hips. The chest strap MUST be located across the upper chest area. Any Velcro hook/loop fastener should be clean and require a notable force to separate, if there is little or no resistance, cease use and replace immediately. All straps should be adjusted so they are snug and comfortable, but not loose. A good practice is to judge fit is to pass your thumb between the strap and body; it should do so smoothly but snuggly.

How to clean and store your equipment after use:

Basic care prolongs the life of the harness/lanyard and contributes to its performance.

Wipe off surface dirt with a cloth dampened in plain water. Use a solution of water and mild soap to work up a thick lather using a vigorous back and forth motion. Rinse the webbing with clean water, hang freely to dry away from direct heat, out of direct sunlight. Always store your equipment in a clean, dry area, free of fumes, sunlight, or corrosive materials. Store it in such a way that it does not warp or distort the belt or harness

straps. Remove sawdust build-up from Velcro straps to assure good function, replace the strap if necessary.

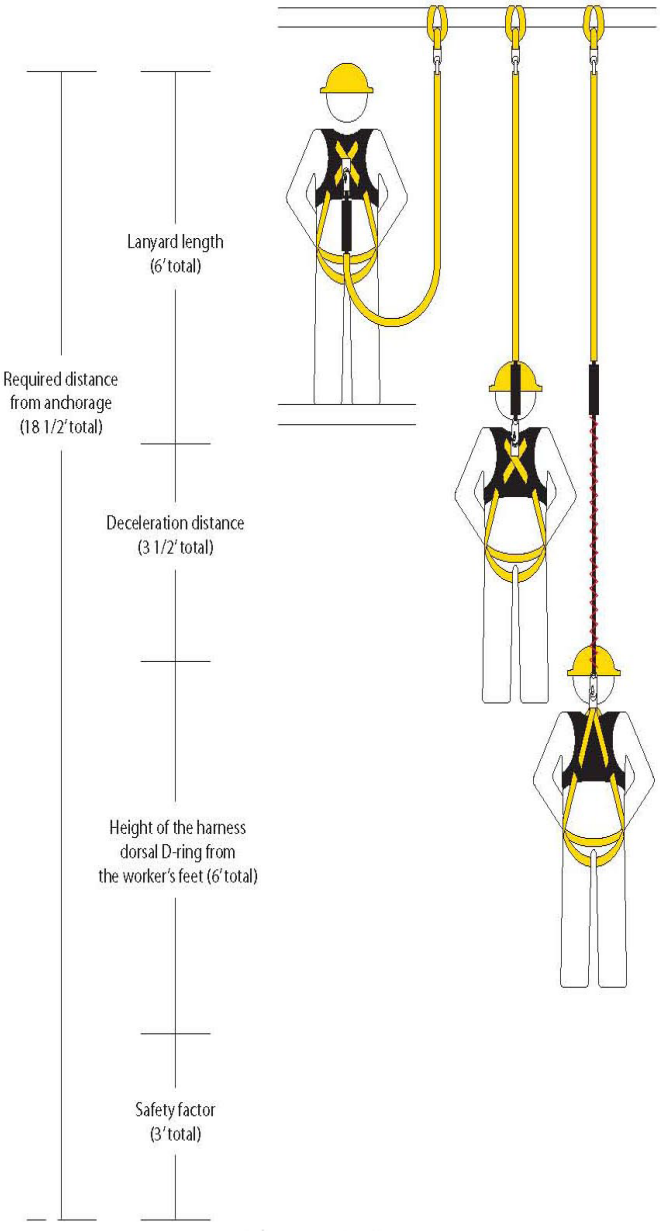
Other considerations you must be aware of and follow:
Be mindful of impact hazards from physical levels below the aerial device that you could fall into or onto. Position the aerial lift to avoid levels below such as buildings, and other structures; or energized electric supply lines, or tree structure; if you were to fall or be ejected from the platform (bucket). Be sure you have effective traffic control in place to reduce the risk of a motorist striking the aerial lift truck.

- ◊ All employees who are undergoing documented training through the Davey Career Development Program to become aerial lift device operators shall be trained under the supervision of a qualified employee to demonstrated understanding and proficiency in this Fall Protection Use Policy as well as Aerial Device Emergency Procedures contained in Safety and Training Manual Section 10, pages 28 - 32.
- ◊ Safety operates starting by properly setup the aerial lift device in a stable locale with all of the unit's outriggers lowered, and the aerial device smoothly operated from the upper controls by the operator.
- ◊ You must allow for your potential fall distance of the deployed fall arrest lanyard and harness so that you avoid striking a level below. See - Fall Distance Calculation.
- ◊ Empty pockets prior to putting the harness on to reduce leg strap compression injury risk should the operator fall into the system.
- ◊ Be certain all connecters including leg straps are always properly secured when wearing a harness.
- ◊ You must verify that your coworker is properly secured when they are in the aerial device platform. *If deficient, call an All Stop until correction is made.*
- ◊ Put on or take off the harness while standing in the aerial device platform (bucket) if practical, or while you are standing on the ground.
- ◊ Never disconnect the lanyard, *even momentarily*, from the anchorage or from the harness while it is in use aloft providing your fall protection.
- ◊ Never put on or take off the harness from an elevated surface such as a truck bed or cab protector.
- ◊ Never wear any type of fall protection (fall arrest or climbing gear) while performing work on the ground.
- ◊ Never approach closer than 20 feet of a chipper or other mechanized equipment while wearing any type of fall protection (fall arrest or climbing gear).
- ◊ Never store your fall protection equipment in the platform (bucket) overnight, even with the cover on.
- ◊ Never store your fall protection equipment with saw, sharp edged tools, gas and oil or other chemicals.
- ◊ Never use your fall protection equipment or the aerial lift anchor point as a rigging device, or the aerial device as a crane.
- ◊ Never wear a full body harness intended for a fall arrest setting with a non-energy absorbing lanyard.
- ◊ Never re-use a harness lanyard system once it has arrested the fall of a person.
- ◊ Never re-use a lanyard that shows evidence of having been deployed.

◊ In the event you fall into your harness lanyard system, call for assistance and deploy the provided trauma strap that allows you to stand in the strap and avoid potential suspension trauma by maintaining blood flow to the lower extremities.

Report any fall to your supervisor. Seek medical aid immediately if injured.

FALL DISTANCE CALCULATION



ANCHORAGE CONNECTOR

Anchor: The point of attachment for lanyards and lifelines, also called a tie off point. Must be capable of handling a 5,000 lb load in the direction a fall would occur. (Roof Truss, I-Beam)

Anchorage connector: Used to join the anchor point to the connecting device. (Beamer, Cross Arm Strap)

BODY WEAR

Full body harness distributes the weight of impact across the body in a fall. It keeps the user upright if hanging from the dorsal D-ring. Completes the connection of Anchor to connector to harness.

CONNECTING DEVICE

Connects the harness to the anchor or anchorage connector.

DECELERATION DEVICE

Device that slows and reduces energy in a fall. It lowers forces the body receives upon impact. (Shock Absorbing Lanyard, Rope Grab, Retractable Lifeline)

APPENDIX E
Tidewater Inc. Team Certifications

HANS WHITE

Firm:

Job Title(s): Senior Radiation Protection Technician, Site Supervisor

Percent Availability:
- 100%

Certifications/Training:
- OSHA 40-HAZWOPER (2009)
- HAZWOPER 8-hour Annual Refresher
- ANSI 3.1 Qualified
- MARSSIM 2012
- DOT Subpart H Function Specific Training
- USACE/NAFAC Construction Quality Management for Contractors (2022)
- Contractor Safety - National Safety Council
- CFR 49 Subchapter C Subpart 1 Class 7 Radioactive Material Specific (2022)

Complete list available upon request

Qualifications:
Thirteen (13) years of experience performing radiological remediation and MARSSIM surveys. Expertise in performance of Scoping, Characterization, Remedial Action Support, and Final Status Surveys. Additional qualifications include radiation protection, operational health physics, radioactive waste shipment, and MARSSIM. Prior government work includes being Radiation Protection Technician, where he supported a broad spectrum of activities for the remediation, packaging, transport, and disposal of radiologically contaminated soils and materials.

Proficient in radiological field instrumentation, GPS, MARSSIM surveys, and laboratory equipment/ processes.

Clients:
- SMUD
- US Army Corp of Engineers
- Navy
- National Park Service
- Navy Submarine Base New London
- UC Berkeley / UC Davis
- Military Ocean Terminal Concord

Complete list available upon request

RELEVANT PROJECT EXPERIENCE

Tidewater, Inc. (2013 - present) Sr. Radiation Protection Technician / Radiation Protection Technician
Great Kills National Park Remedial Investigation/Feasibility Study, Staten Island, NY (2014 - present).
Responsible for management for implementation of the RI/FS field investigations to characterize potential chemical and radiological contamination. Tasks included the training field teams on radiological surveys, analysis of radiological data to determine potential risk rankings, removal of highest risk locations, and confirmation sampling of risk removal. Additional responsibilities included entry of all data/information collected for the project into project databases.

Responsible for management for implementation of the Time Critical Removal Action Radiological removal action support surveys to remove radiological contamination posing a risk to the Park employees and members of the public. Tasks included the analysis of radiological data to determine potential risk rankings, removal of highest risk locations, and confirmation sampling of risk removal. Additional responsibilities included entry of all data/information collected for the project into project databases.

Spring Creek Park / Dead Horse Bay National Park Remedial Investigation, Queens / Brooklyn, NY (2017 - present)
Sr Radation Protection Technician and lead Performed radiological surveys in support of Remedial Action Support and sampling. Operations included the performance of gamma walkover surveys for berm installation, post fire survey and fire protection, as well as, quantitative measurements, water sampling, and personnel/equipment frisking;for potential contamination.

Radiation Protection Technician Rancho Seco Nuclear Generating Station 1, Herald, CA (2013-present).
Supported SMUD for characterization and decommissioning of equipment and facility identified as the Interim Onsite Storage Building (IOSB) at Rancho Seco, CA. Responsible for performing radiological coverage oSf facility for license termination, which included scanning, static measurements, dose measurements, radiological support, and sample collection/analysis for the purpose of DOT compliance.

NASNI Remediation, North Island Naval Air Station, San Diego, CA (2022)
Mr White works in support of Tidewater projects including the radiologically impacted shoreline sediments shipping campaign at Naval Air Station North Island where he prepped 120 intermodal containers for shipment to meet waste profile at Waste controls Specialists. Other projects include TRIGA reactor decommissioning project in San Diego. Supported Amgen Radiosynthesis Laboratory decommissioning including material packaging support for shipment to Philotechnics Oak Ridge processing facility to meet acceptance criteria for RADPAK.

SM-1A. Fort Greely, Delta Junction, Alaska, AK (2019-2020)
Performed all field tasks. Operations included the performance of gamma walkover surveys, INSITU measurements, paint sampling, soil sampling, and personnel/equipment frisking for potential contamination.

Cabrera Services (2009 - 2013) Radiation Protection Technician
Confirmed Site (CS)-10, McClellan, CA.
Performed the remedial action support surveys of the removal of contaminated sites and transportation of materials, which included personnel and equipment release surveys and performance of Final Status Survey. Additional tasks included the release survey of a 4 acre tent for free release materials and equipment. Operations included the performance of gamma walkover surveys and personnel/equipment frisking for potential contamination.

Complete work experience upon request

Certificate of Training

Hans White

has successfully completed the 40 hr HAZWOPER course in accordance with the requirements of 29 CPR 1910.120.on February 11-15, 2009.

Ralph Bradley, CSP

Certificate of Completion

This certifies that

Hans White

has successfully completed

8 Hour HAZWOPER Refresher Training

Refresher certification does NOT necessarily indicate initial 24 or 40 Hour HAZWOPER certification

In Accordance w/Federal OSHA Regulation 29 CFR 1910.120(e) & (p)

And all State OSHA/EPA Regulations as well including 29 CFR 1926.65 for Construction.

This course (Version 3) is approved for 8 Contact Hours (0.8 CEUs) of continuing education per the California Department of Public Health for Registered Environmental Health Specialist (REHS) (Accreditation # 044).

Safety Unlimited, Inc., Provider #5660170-2, is accredited by the International Association for Continuing Education and Training (IACET) and is accredited to issue the IACET CEU. As an IACET Accredited Provider, Safety Unlimited, Inc. offers CEUs for its programs that qualify under the ANSI/IACET Standard. Safety Unlimited, Inc. is authorized by IACET to offer 0.8 CEUs for this program.

Julius P. Griggs

Julius P. Griggs
Instructor #892

2305025162490

Certificate Number

5/2/2023

Issue Date

ACCREDITED IACET PROVIDER

Scan this code or visit safetyunlimited.com/v to verify certificate.

SAFETY UNLIMITED, Inc.
OSHA Compliant Safety Training Since 1993

2139 Tapo St., Suite 228 Simi Valley,CA 93063
(855) 784-2677 or 805 306-8027
https://www.safetyunlimited.com

Proof of initial certification and subsequent refresher training is NOT required to take refresher training

American Red Cross
Training Services

Certificate of Completion

Hans White

has successfully completed requirements for

Adult and Child First Aid/CPR/AED

Date Completed: 8/25/2022
Validity Period: 2 - Years

Conducted by: Capital City CPR

To verify certificate, scan code or visit redcross.org/digitalcertificate and enter ID.

Learn and be inspired at LifesavingAwards.org

010N3G1

American Red Cross
Training Services

CEU

Hans White

has succesfully completed requirements for

Adult and Child First Aid/CPR/AED-r.21

Date Completed: 8/25/2022

Contact Hours: 3.0
CEUs Awarded: 0.3

U.S. ARMY CORPS OF ENGINEERS

NAVFAC

CERTIFICATE

Hans White

SPK-USACE-02-22-00587

has completed the Corps of Engineers and Naval Facilities Engineering Command Training Course:

CONSTRUCTION QUALITY MANAGEMENT FOR CONTRACTORS

Virtual Instructor Led Training

AGC San Diego	August 25 & 26, 2022	SPK-USACE	Justin Puffer, PE, Chief QA Section
Location	Training Date(s)	Instructional District/ NAVFAC	District CQM Course Manager

Larry Smith, PE, CCM	agcsdeducation@agcsd.org	619-592-4533	Gary J Smith
Facilitator/Instructor	Email	Telephone	Facilitator/Instructor Signature

THIS CERTIFICATE EXPIRES FIVE YEARS FROM DATE OF ISSUE

TIDEWATER INC

This is to certify to all that

Hans White

has completed

Blood Borne Pathogen Training

Annual refresher course

Meeting all the requirements of 29 CFR 1910.1030

August 4, 2020
Date

Wayne Gaul
Signature

TIDEWATER INC

ENGINEERS / SCIENTISTS / PROGRAM MANAGERS

Certificate of Completion

This Certificate signifies completion of

Basic Radiation Awareness Training for

Hans White

Through completion of Classroom Training.

Awarded on May 24, 2021

Instructor James Reese, CHP, RRPT

NO. 571003076

Certificate of Training Completion

National Safety Coun

This is to certify t

Hans White (ISN-0749361

of Philotechnics, Ltd. (400-1713

has successfully completed all of t
requirements for the training progr

Construction Safety Orientation - National Safety Council

for L

90	October 06, 2022	October 06, 2023	
SCORE	TRAINING DATE	TRAINING EXPIRATION	EMPLOYEE SIGNATURE

ISN Collect. Verify. Connect.

NO. 57100307661
National Safety Council

Certificate of Training Completion

Hans White

(ISN-07493615)

Philotechnics, Ltd.

(400-171368)

Completed Training Program:

Construction Safety Orientation - National Safety Council
LMS

DATE: **October 06, 2022** EXP: **October 06, 2023**

SCORE: 90 SIGN:

NO. 571019476

United Acader

Certificate of Training Completion

This is to certify t

Hans White (ISN-0749361

of Philotechnics, Ltd. (400-1713

has successfully completed all of t
requirements for the training progr

DOT Transportation Requirements for Shipper - United Academy

for L

Complete	October 06, 2022	October 06, 2025	
SCORE	TRAINING DATE	TRAINING EXPIRATION	EMPLOYEE SIGNATURE

ISN. Collect. Verify. Connect.

NO. 57101947661
United Academy

Certificate of Training Completion

Hans White

(ISN-07493615)

Philotechnics, Ltd.

(400-171368)

Completed Training Program:

DOT Transportation Requirements for Shippers - United Academy

LMS

DATE: **October 06, 2022** EXP: **October 06, 2025**

SCORE: Complete SIGN:

Certificate of Completion

This certifies that

Hans White

has successfully completed

8 Hour HAZWOPER Supervisor Training

This certificate does not in itself indicate initial 24 or 40 Hour HAZWOPER Training

In Accordance With Federal OSHA Regulation 29 CFR 1910.120(e)(4)

And all State OSHA/EPA Regulations as well including 29 CFR 1926.65 for Construction.

This course is approved for 8 Contact Hours (0.8 CEUs) of continuing education per the California Department of Public Health for Registered Environmental Health Specialist (REHS) (Accreditation # 044)

Safety Unlimited, Inc., Provider #5660170-2, is accredited by the International Association for Continuing Education and Training (IACET) and is accredited to issue the IACET CEU. As an IACET Accredited Provider, Safety Unlimited, Inc. offers CEUs for its programs that qualify under the ANSI/IACET Standard. Safety Unlimited, Inc. is authorized by IACET to offer 0.8 CEUs for this program.

Julius P. Griggs

Julius P. Griggs
Instructor #892

2310264162490

Certificate Number

10/26/2023

Issue Date

ACCREDITED IACET PROVIDER

Scan this code or visit safetyunlimited.com/v to verify certificate.

SAFETY UNLIMITED, Inc.
OSHA Compliant Safety Training Since 1993

2139 Tapo St., Suite 228 Simi Valley,CA 93063
(855) 784-2677 or 805 306-8027
https://www.safetyunlimited.com

Annual Refresher Training NOT Required

Appendix 3. Labor Classification Personnel Resume Summary

Labor Classification Personnel Resume Summary

Instructions: Enter resume information in the fields below; do not submit other resume formats. Submit one resume for each proposed resource

Candidate Name:	**Udi Dias**
Contractor:	Tidewater, Inc.

Education / Training

Institution Name / City / State	Degree / Certification	Year Completed	Field Of Study
Patten University, Oakland, CA	AS	2006	Engineering Technology
The Art Institute of Washington, Arlington, VA	BFA	2010	Media Arts and Management
University of Maryland Global Campus, Adelphi, MD	MS (PSM)	2021	Environmental Science and Management
Compliance Solutions	Training	2019	OSHA 40 Hour HAWOPER
Safety Unlimited, Inc	Certification	2022	OSHA 8 Hour Refresher Training
Safety Unlimited, Inc	Certification	2020	DOT Hazmat Advanced General Awareness Training Per 49CFR§172
American Red Cross	Certification	2022	Adult First Aid/CPR/AED
OSHA	Training	2018	30-Hour Occupational Safety and Health Training
MD Department of the Environment	Accreditation	2022	AHERA Inspector and AHERA Supervisor
USACE and NAVFAC	Certification	2021	CQM for Contractors

Relevant Work Experience

Describe work experience relevant to the Duties / Responsibilities and Minimum Qualifications described in the RFP. Starts with the most recent experience first; do not include non-relevant experience.

Prince George's County Public Schools Environmental Scientist/Site Safety Health Officer 2019 to Present Prince George's Co. MD Alex Baylor 301-802-5112 Alex.Baylor@pgcps.org	Since 2020, PGCPS has awarded over 20 task orders to remove 20 USTs ranging in size from 5,000 gallons to 20,000 gallons. Duties and responsibilities include Site walk-throughs, collecting initial site information (location, measuring and gauging the tank), preparing figures for work plans, conducting pre-removal assessments with soil and groundwater sampling collecting, verification samples, and drafting closure reports based on the field data. Also, responsible for Site Safety Planning to identify potential risks. Safety training and ensuring that all personnel and contractors on the site adhere to safety regulations, standards, and company policies and regularly monitoring site conditions and operations to identify potential safety hazards and risks.
District of Columbia, Department of General Services, Environmental Scientist. 2020 to Present Kristen Audette 202-679-5872 Kristen.audette@dc.gov	Mr. Dias and Tidewater provide environmental stormwater programmatic support to the District of Columbia (DC), Department of General Services (DGS). Mr. Dias's responsibilities involve providing services included preparing Stormwater Pollution Prevention Plans (SWPPPs), quarterly and annual monitoring of stormwater discharges, and maintenance of stormwater grey water infrastructure (e.g., oil water separators, Baysavers, Stormceptors, and sandfilters, etc.) and green infrastructure best management practices (BMPs) (e.g., biorententions, tree silva cells, permeable pavers, and green roofs, etc.) under DC's Multi-Sector Permit (MSGP) and DC's Municipal Separate Storm Sewer System (MS4) Permit.
USACE, Remedial Investigation, Great Kills Landfill, Staten Island, NY. Environmental Scientist 2021 to Present	Mr. Dias served as an Environmental Scientist for the RI work being conducted at 265-acre National Park site formerly owned, operated, and developed by the City of New York. Responsible for Surface and Subsurface soil sampling (Soil Borings and Soil Cores).
USDA Beltsville, Agricultural Research Center,2021 to Present Beltsville, MD John Houston RPM CERCLA,240-204-3331 John.Houston@usda.gov	Mr. Dias provided services as an Environmental Scientist for provides CERCLA remedial investigation and response actions in support of the USDA BARC CERCLA Program. This includes performing the soil characterization investigation for three AOCs (involving a landfill and 2 pesticide/herbicide equipment wash areas) at the Glenn Dale Plant Introduction Facility The site is listed on USDA's Federal Facility.
National Institute of Health (NIH), Bethesda, Maryland, Division of Environmental Protection, 2011-2019 Chan-Nhu Nguyen 301-496-4983 chan-nhu.nguyen@nih.gov	Mr. Dias Served as the Remediation Program manager and the Site Safety Health Officer on remediation projects supporting the Division of Environmental Protection (DEP) and Division of Occupational Health and Safety (DOHS). Developed project specific Safety Plans, Accident Prevention Plans (APP), Activity Hazard Analysis (AHAs), Abatement plans, and Supportive Diagrams for all remediation (Mercury, Lead and Asbestos) projects. Also, produced satisfactory site-specific plans for the Fire department to acquire approvals for appropriate (Hospital environment) egress pass or maintaining the general functionality of the facility. Managed facility remediation, demolition, and general environmental related services (Asbestos, Mercury, Lead, Silver) for a total of 70 Task Orders at NIH. Responsibilities included on-site project management, oversight, and personnel management of field activities.

Employment History

List employment history, starting with the most recent employment first

Start and End Dates	Job Title or Position	Organization Name	Reason for Leaving
2019 to Present	Environmental Scientist	Tidewater, Inc	N/A
2017 to 2019	Environmental Remediation Program Manager	Polu Kai Services, LLC	Due to closure of the Environmental Department
2011 to 2017	Environmental Specialist/Project Manager	Global Consulting, Inc	Gain experience in Remediation work from performing site assessments.
2008 to 2011	Engineering Apprenticeship	Consolidated Construction and Engineering Co Inc	Career Advacement

References

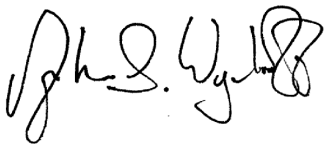
List persons the State may contact as employment references

Reference Name	Job Title or Position	Organization Name	Telephone / E-mail
John Wyckoff	Vice President	Tidewater, Inc	301-351-0756 john.wyckoff@tideh2o.net
Chan-Nhu Nguyen	Regional Environmental Manager Physical Scientist	NIH - Division of Environmental Protection	301-496-4983 chan-nhu.nguyen@nih.gov
CAPT Derek A. Newcomer, DrPH, CIH, CSP	Deputy Director	NIH- Division of Occupational Health and Safety	301-594-5879 newcomerd@nih.gov

Proposed Individual's Name/Company Name: Udi Dias/Tidewater, Inc.	How does the proposed individual meet each requirement?
LABOR CATEGORY TITLE:	*Level P3 Project Manager*
Requirement (See Section 3.10.4)	Candidate Relevant Experience *
Education: Ph.D. degree or equivalent, with four to ten (4-10) years' experience. M.S. degree or equivalent, with six to twelve (6-12) years' experience. B.S. degree with eight to fourteen (8-14) years' experience.	Education: BS Media Arts and Management, 2010, The Art Institute of Washington, Arlington, VA MS Environmental Science and Management, 2021, University of Maryland Global Campus, Adelphi, MD
Experience: Technical experience in chemical waste site investigations, or chemical cleanup activities, water pollution control, or other discipline directly related to the requirements of this Contract. Minimum of four (4) years or equivalent. Must have demonstrated ability to manage group of inter-disciplinary professionals.	Technical Experience: Mr. Dias, PSM, Tidewater Environmental Scientist has (2008 -Present) +15 years of experience providing environmental assessment, investigation, remedial action, compliance, and other multi-disciplinary environmental consulting services under major federal/state statutes/regulations (e., CERCLA, RCRA, CWA, and CAA). Other services provided during this period included limited lead-based paint and asbestos sampling, baseline soil and groundwater sampling, preparation of

	health and safety guidelines, management of geotechnical investigations, and natural resources consulting.
Duties: Level P3 – Under general supervision of a Level P4, plans, conducts and supervises assignments on a project-by-project basis. Estimates and schedules work to meet completion dates. Directs assistance, reviews progress and evaluates results; makes changes in methods, design or equipment where necessary. Responsible for safety and designing cost effective approaches to define the extent of contamination at various waste sites in an accurate manner, and to develop feasible remedial options.	Duties: Since 2008 Mr. Dias has been providing construction, environmental consulting/project management services on behalf of various commercial and governmental clients in the property management and construction industries. Mr. Dias also provides environmental program management services on behalf of multiple clients, including the International Monetary Fund, Prince Georges County Public Schools, and Federal Occupational Health. Specific project experience includes performing the soil characterization investigations, Remedial Investigations, providing UST compliance services including pre-closure, closure, and post closure activities for USTs located throughout Maryland., hazardous materials assessments, occupational health and safety services, Project management tasks completed by Mr. Dias's responsibilities include proposal preparation, scheduling/coordination of field personnel, client management, attending planning and project status meetings, report preparation, and project invoicing.

The information provided on this form for this labor category is true and correct to the best of my knowledge:

Contractor Representative:	Proposed Individual:
	
Signature	Signature
John Wyckoff	Udi Dias
Printed Name:	Printed Name
August 30, 2023	August 30, 2023
Date	Date

Sign each Form

Certificate of Completion

Udayanga Dias

has completed the requirements for

Adult First Aid/CPR/AED Online (Eligible for Skills Session within 90 days)

conducted by

American Red Cross

Date Completed: **05/24/2022**

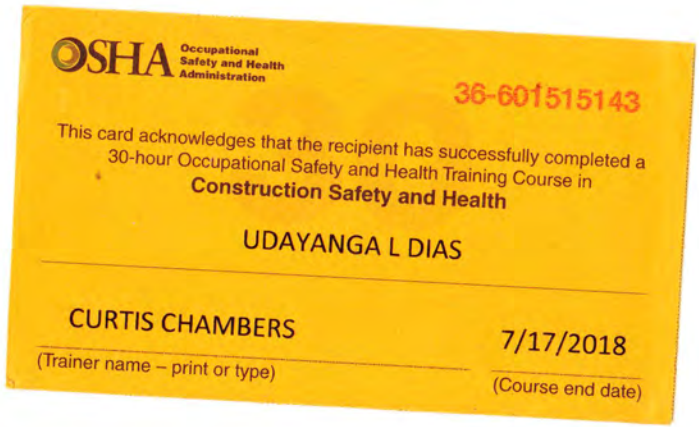
Valid Period: **2 Years**

Certificate ID: **00TT4JH**

American Red Cross

Scan code or visit:

https://www.redcross.org/take-a-class/qrcode?certnumber=00TT4JH



OSHA Occupational Safety and Health Administration

36-601515143

This card acknowledges that the recipient has successfully completed a 30-hour Occupational Safety and Health Training Course in **Construction Safety and Health**

UDAYANGA L DIAS

CURTIS CHAMBERS

(Trainer name – print or type)

7/17/2018

(Course end date)

Student Affiliation:
Tidewater,Inc
201900580

Compliance Solutions
"Today's Training...Tomorrow's Solution"

3980 Quebec St., 2nd Floor, Denver CO 80207-1633 800-711-2706

Certificate of Completion

Udayanga Dias

has been successfully completed training and passed all testing requirements for

40-Hour HAZWOPER Initial Training
as per 29 CFR 1910.120(e)

Presented
Friday, November 1, 2019

Compliance Solutions Occupational Trainers, Inc.

Certificate Number: 754980607

Jeffrey Kline
President/CEO

REHS, CIT
Eric Barker
Instructor

K&A CELEBRATING 15 YEARS PROVIDING QUALITY CONSTRUCTION TRAINING

kugan&associates,LLC
Training for Today and Tomorrow

CERTIFICATE OF COMPLETION

Udayanga Lakshitha Dias

KA-CQM-21-1230

has completed the Kugan & Associates, LLC, 16 Hour Online Training Course

CONSTRUCTION QUALITY MANAGEMENT FOR CONTRACTORS

Course Content Exceeds USACE / NAVFAC CQM-C #784 Training Content

THIS CERTIFICATE EXPIRES FIVE YEARS FROM DATE OF ISSUE

29 November 2021	27 December 2021	Roger Khavari CCM CQM Primary Training Coordinator Kugan & Associates, LLC
Course Start Date	Course Completion Date	

Kugan Panchadsaram PE, PMP	kugan@kugan.com	858-212-2941	Kugan Panchadsaram Digitally signed by Kugan Panchadsaram DN: C=US, E=kugan@kugan.com, O="Kugan & Associates, LLC", CN="Kugan Panchadsaram " Date: 2021.12.27 16:06:20-08'00'
CQM Facilitator / Instructor	Email	Telephone	Kugan Panchadsaram PE, PMP CQM Primary Facilitator Kugan & Associates, LLC

The U.S. Army Corps of Engineers (USACE) and NAVFAC Facilities Engineering Command (NAVFAC) are proponents of Construction Quality Management (CQM) training and inspection of construction.

NAVFAC

Certificate of Completion

This certifies that

Udayanga Dias

has successfully completed

8 Hour HAZWOPER Refresher Training

Refresher certification does NOT necessarily indicate initial 24 or 40 Hour HAZWOPER certification

In Accordance w/Federal OSHA Regulation 29 CFR 1910.120(e) & (p)

And all State OSHA/EPA Regulations as well including 29 CFR 1926.65 for Construction.

This course (Version 3) is approved for 8 Contact Hours (0.8 CEUs) of continuing education per the California Department of Public Health for Registered Environmental Health Specialist (REHS) (Accreditation # 044).

Safety Unlimited, Inc., Provider #5660170-2, is accredited by the International Association for Continuing Education and Training (IACET) and is accredited to issue the IACET CEU. As an IACET Accredited Provider, Safety Unlimited, Inc. offers CEUs for its programs that qualify under the ANSI/IACET Standard. Safety Unlimited, Inc. is authorized by IACET to offer 0.8 CEUs for this program.

Julius P. Griggs

Julius P. Griggs
Instructor #892

2211295348398

Certificate Number

11/29/2022

Issue Date

ACCREDITED IACET PROVIDER

Scan this code or visit safetyunlimited.com/v to verify certificate.

SAFETY UNLIMITED, Inc.
OSHA Compliant Safety Training Since 1993

2139 Tapo St., Suite 228 Simi Valley,CA 93063
(855) 784-2677 or 805 306-8027
https://www.safetyunlimited.com

Proof of initial certification and subsequent refresher training is NOT required to take refresher training

Certificate of Completion

This certifies that

Udayanga Dias

has successfully completed

8 Hour HAZWOPER Supervisor Training

This certificate does not in itself indicate initial 24 or 40 Hour HAZWOPER Training

In Accordance With Federal OSHA Regulation 29 CFR 1910.120(e)(4)

And all State OSHA/EPA Regulations as well including 29 CFR 1926.65 for Construction.

This course is approved for 8 Contact Hours (0.8 CEUs) of continuing education per the California Department of Public Health for Registered Environmental Health Specialist (REHS) (Accreditation # 044)

Safety Unlimited, Inc., Provider #5660170-2, is accredited by the International Association for Continuing Education and Training (IACET) and is accredited to issue the IACET CEU. As an IACET Accredited Provider, Safety Unlimited, Inc. offers CEUs for its programs that qualify under the ANSI/IACET Standard. Safety Unlimited, Inc. is authorized by IACET to offer 0.8 CEUs for this program.

Julius P. Griggs

Julius P. Griggs
Instructor #892

2311014348398

Certificate Number

11/1/2023

Issue Date

ACCREDITED IACET PROVIDER

Scan this code or visit safetyunlimited.com/v to verify certificate.

Annual Refresher Training NOT Required

SAFETY UNLIMITED, Inc.
OSHA Compliant Safety Training Since 1993

2139 Tapo St., Suite 228 Simi Valley,CA 93063
(855) 784-2677 or 805 306-8027
https://www.safetyunlimited.com

Timothy M. Walsh-CTSP

SUMMARY Extensive experience in production tree work, including residential, commercial, municipal and utility arboriculture. Extensive education and training in arboriculture, safety, health, ergonomics and compliance. Proven operational management success with experience in strategy, marketing, sales, customer service, and consulting. Accomplished educator, trainer, technical writer, and speaker.

EMPLOYMENT

The Davey Tree Expert Co. December 2022-Present

Kent, Ohio

Vice President – Health & Safety

The Davey Tree Expert Co. November 2018-Present

Kent, Ohio

Director, Corporate Safety Department

The Davey Tree Expert Co. September 2015-November 2018

Kent, Ohio

Safety Manager, Corporate Safety Department

Arborist Enterprises, Inc. October 2014-August 2015

Manheim, Pennsylvania

Production Operations Director

The Asplundh Tree Expert Co July 2011- October 2014

Willow Grove, Pennsylvania

Director, Safety Operations

The Asplundh Tree Expert Co January 2010-July 2011

Willow Grove, Pennsylvania

Corporate Safety Compliance & Training Manager

Self Employed December 2008-January 2010

Manchester, New Hampshire

Production Climber; Safety, Health and Compliance Trainer

The Lucas Tree Expert Co. Inc. September 2006-December 2008

Portland, Maine

Safety, Health and Compliance Trainer
(Including serving as Interim Safety Director)

Broad Oak Tree and Shrub Care, Inc. July 2003-August 2006

Milford, New Hampshire

Crew Leader/Production Climber

Tree Care Industry Association June 2001-July 2003

Manchester, New Hampshire

Staff Arborist

Student Society of Arboriculture September 1999-2004

Manchester, New Hampshire

Director (volunteer position)

The Davey Tree Expert Co., Inc. February 2001-May 2001

Plymouth, Minnesota

Crew Leader/Production Climber

First Choice Tree Care, Inc. January 1997-April 2000

Stevens Point, Wisconsin

President

The University of Wisconsin-Stevens Point September 1994-May 2001

Stevens Point, Wisconsin

Forestry Associate Lecturer

- Classes Taught (labs): Introduction to Forest Science, Forest Entomology, Forest Pathology, Forest Protection, Advanced Climbing and Rigging Techniques.

The Bartlett Tree Expert Company May-August 1994

San Rafael, California

Sales Trainee

Petersen Tree Service, Inc. August 1988-May 1994

Minocqua, Wisconsin

Crew Leader/Production Climber /Sales Rep. /State Certified Pesticide Applicator & Equipment Operator.

EDUCATION

Doctor of Science in Ergonomics and Safety (pending)

- Minor: **Arboriculture**
- Minor: **Safety Policy**

Master of Science in Ergonomics 2006

University of Massachusetts, Lowell

Master of Science in Natural Resources- Urban Forestry 2001

University of Wisconsin - Stevens Point

Bachelor of Science- 1994

- Major: **Urban Forestry**
- Major: **Forest Management**
- Minor: **Biology**
- Minor: **Resource Management**

University of Wisconsin - Stevens Point

CERTIFICATIONS

- ISA Certified Arborist #WI-0214
- ISA Certified Tree Worker Climber Specialist #WI-0214AT
- Certified Treecare Safety Professional #00001

TRAINING EXPERIENCE (HIGHLIGHTS)

- Climbing/rigging training around US and world since 1997, highlights below:
- ANSI Z133 presentations-2015-present
- Climbing/rigging Demonstration with Robert Phillips, Los Angeles, CA 9/2002
- Rigging Demonstration with Mark Chisholm, Wisconsin Rapids, WI September 2002
- Rigging Demonstration, MAC-ISA, Hagerstown MD, October 2001
- Speaker at Shade Tree Short Course, St. Paul, MN March 2001
- Trainer Kentucky Chapter Tree Climbing Workshop, March 2000
- Assistant to Robert Phillips, Tree Climbing Workshop Western Chapter Meeting 1999
- Assistant for ArborMaster Training, Inc. Illinois Regional's 1997
- Electrical Hazards Awareness Program trainer since 2001
- Chain saw use and safety training for regional fire departments and school districts

PUBLIC SPEAKING (HIGHLIGHTS)

- Speaker-Initial Arborist Safety Training Institute Chipper and Chain Saw Safety in conjunction with the 39th ITCC, Tampa, FL. March, 2015, and: 40th ITCC San Antonio, TX
- Speaker/Facilitator-Aerial Lift Operator Train-The-Trainer Program, March, 2015
- Speaker-Certified Treecare Safety Professional Workshops, January 2009-present
- Speaker/Facilitator-Electrical Hazards Awareness Train-The-Trainer Program, July 30, 2008
- Speaker/Organizer-Crane and Chipper Safety for Arborists (and OSHA), May 23, 2008
- Speaker at TCI Expo 2007, Hartford, CT
- Speaker at Tree Care Industry Expo-Baltimore, MD November 2009 (scheduled),Speaker at Connecticut Tree Proective Association Summer meeting, June 2009, Maine Arborist

Association 2008, Association of Montana Turf, Ornamental and Pest Professionals 2008, Southern Maine Community Collge 2008, Speaker at Tree Care Industry Expo Hartford, CT November 2007, Speaker at Rocky Mountain Chapter-ISA Annual meeting 2006, Western Chapter ISA Meeting, 1999; Spanish Chapter ISA Meeting, 1999; Australian Chapter ISA Meeting, 1999, 2000; Indiana Arborist Association, 2000; Midwest ISA, 2000; Michigan Forestry and Parks Association, 2000, New Zealand Arborist Association 2000, Mid Atlantic Chapter (MAC) ISA Meeting 2001, Michigan Forestry and Parks Association 2002, New Hampshire Arborist Association 2002, Florida ISA Chapter 2002, Wisconsin Arborist Association 2005, 2007

- Speaker at ISA Annual Conference and Trade Show: Hilton Head, SC 1995; Salt Lake City, UT 1997; Birmingham, UK 1998
- Exhibitor, Tree Care Industry Exposition, Charlotte, NC '96, Columbus, OH '97, Baltimore, MD ’98, Indianapolis, IN ‘99

JUDGING

- Aerial Rescue Head Judge ‘98-00
- WI Chapter Tree Climbing Championship (TCC)
- Spain Aerial Rescue Judge TCC ’99
- Judge ’99 Australia TCC
- European Student TCC 2000
- Master’s Challenge Judge’00 Minnesota TCC
- Head Judge Australia 2000
- New Zealand 2000, Technician
- Southern Chapter TCC, 2002
- Aerial rescue/ Master’s Challenge-Florida ISA Chapter 2002
- Footlock New England Chapter 2007

PROGRAM DEVELOPMENT

- Curriculum Developer for ANSI Z133 Workshop based on a grant from USFS in conjunction with the ISA and SCA
- Contract Creator TCIA Tree Care Academy Chain Saw Program
- Consultant/advisor to TCIA new Aerial Rescue and Electrical Hazards Programs
- Conference Chair, SSA North American Conferences, 1997-2004
- International Conference Chair, European SSA Conference.
- Co-creator “The Tree System” Sessions with Dr. Alex Shigo at the Sugar Shack.
- Creator/organizer for 1st Tree Educator Summit.
- Co-creator Collegiate ArborMaster Training Program.
- Author TCIA Tailgate Safety Program (2007 update)

OTHER

- Member of the National Occupational Research Agenda Safety Workgroup
- Stakeholder/representative for the Ohio Bureau of Workers Compensation group interested in reducing potential injury/death of tree service workers in Ohio
- Tree Care Industry (TCI) Magazine Editorial Advisory Committee
- Individual Voting Member of the Accredited Standards Committee Z133, 2006, 2012 revisions
    - Chair of Aerial Lift and Definitions Task Groups 2017 Revision
    - Member of Chain Saw, Climbing and Cordage, Crane, Electrical Hazards, Hand Tools and Ladders, Removals and Rigging, Saddle Construction and Lanyards,

Training, and Chipper Task Forces of the Accredited Standards Committee (ASC) Z133.

- President, Utility Arborist Association
- Member Utility Arborist Association (UAA) Strategic Planning Team
- Urban Forest Strike Team training participant, September 2009
- FEMA/NIMS Courses completed: ICS-100, ICS-200, ICS-700a
- Author of numerous training and educational articles in Arborist News, TCI Magazine and The Tree Worker
- Founding member of the Tree Function and Education Group
- Contributor to CALOSHA Tree Climbing and Access Advisory Committee
- Contributor to Oregon OSHA Forest Activities Standards Advisory Committee
- Chair ISA International Safety Committee
- Proctor Certified Treecare Safety Professional Exam, January 2009-present
- Assistant Proctor ISA Certification Exam 1997.
- Member, ISA Strategic Planning Team.

AWARDS

- UAA Will Nutter Silver Shield 2022
- American Society of Safety Engineers Winter Scholarship 2005 and 2006
- New England Chapter ISA Graduate Student Award 2004
- National Arborist Association (NAA) Chair's Award 2002
- International Society of Arboriculture (ISA) Award of Achievement, 2001,
- Wisconsin Arborist Association (WAA) Outstanding Graduate Student Award 1995, Outstanding Student Award 1994.
- UWSP Chancellors Leadership Award 1994.

References available upon request

Davey First Aid Course Attendance/Progress Report

Page 1 of 3 Date Completed: 2/15/23 Location/Territory #: 130531

Instructor's Name/Employee #: 20051665 Start Time 8 Finish Time 3 Duration 7

The Instructor(s) confirm participation during educational core parts, completion of the required practical skills as well as a passing (80%) grade on both written tests. Two-Year certification card will be issued to the following employees.

Employee Number	20076883	20040134	20004899	20079496	20045760	30033344	30005079	20066759	20074450	20074479	20c70746	20063086
Name of Participant	Josh Kung	Tony T-X	Brett Bowers	Brad Colwell	CJ Nichols	Chris Kinne	Ryan Frazier	George Fitzgerald	Michael Williams	Ed Boyczuk	Matt Brennan	Tyler Martin
Reviewed Emergency Response Procedures	X	X	X	X	X	X	X	X	X	X	X	X
Introduction – EMS, Good Sam Law, Law of Consent	X	X	X	X	X	X	X	X	X	X	X	X
Training Guidelines – Safety and Health	X	X	X	X	X	X	X	X	X	X	X	X
Blood Borne Pathogens – Prevention, Precautions, Hepatitis B	X	X	X	X	X	X	X	X	X	X	X	X
Examination of a Sick or Injured Person – Conscious and Unconscious	X	X	X	X	X	X	X	X	X	X	X	X
Shock – Treatment	X	X	X	X	X	X	X	X	X	X	X	X
ABCs of Life Saving – Breathing, Choking, and CPR	X	X	X	X	X	X	X	X	X	X	X	X
Bleeding – External and Internal	X	X	X	X	X	X	X	X	X	X	X	X
Head and Neck Injuries – Moving accident victim	X	X	X	X	X	X	X	X	X	X	X	X
Burns and Electrical Shock Emergencies	X	X	X	X	X	X	X	X	X	X	X	X
Fractures, Sprains, and Dislocations – Splints and	X	X	X	X	X	X	X	X	X	X	X	X
Chest and Abdominal Injuries – Blunt and Penetrating	X	X	X	X	X	X	X	X	X	X	X	X
Eyes, Ears, and Nose Injuries	X	X	X	X	X	X	X	X	X	X	X	X
Insect and Snake Bites	X	X	X	X	X	X	X	X	X	X	X	X
Poisonings and Poisonous Plants	X	X	X	X	X	X	X	X	X	X	X	X
Extremes of Temperature	X	X	X	X	X	X	X	X	X	X	X	X
Written Tests – First Aid/CPR (score)	100	100	100	100	100	100	100	100	100	100	100	100

E-mail to **SafetyTrainingRecords@davey.com** or Fax # **330-676-6725**

Davey First Aid Course Attendance/Progress Report

Page 2 of 3 Date Completed: 2/15/23 Location/Territory #: 130531

Instructor's Name/Employee #: 20051665 Start Time 8 Finish Time 3 Duration 7

The Instructor(s) confirm participation during educational core parts, completion of the required practical skills as well as a passing (80%) grade on both written tests. Two-Year certification card will be issued to the following employees.

Employee Number	20081052	20037255	30055431	20075958	20055770	20063055	30033814	20063086				
Name of Participant	Michael Hunt	Gerald Klubek	Sara Pigatz	Eric Johnson	Adam Martin	Dave Pinkney	Chris Kinney	Tyler Martin				
Reviewed Emergency Response Procedures	X	X	X	X	X	X	X	X				
Introduction – EMS, Good Sam Law, Law of Consent	X	X	X	X	X	X	X	X				
Training Guidelines – Safety and Health	X	X	X	X	X	X	X	X				
Blood Borne Pathogens – Prevention, Precautions, Hepatitis B Vaccination	X	X	X	X	X	X	X	X				
Examination of a Sick or Injured Person – Conscious and Unconscious	X	X	X	X	X	X	X	X				
Shock – Treatment	X	X	X	X	X	X	X	X				
ABCs of Life Saving – Breathing, Choking, and CPR Emergencies	X	X	X	X	X	X	X	X				
Bleeding – External and Internal	X	X	X	X	X	X	X	X				
Head and Neck Injuries – Moving accident victim	X	X	X	X	X	X	X	X				
Burns and Electrical Shock Emergencies	X	X	X	X	X	X	X	X				
Fractures, Sprains, and Dislocations – Splints and Slings	X	X	X	X	X	X	X	X				
Chest and Abdominal Injuries – Blunt and Penetrating	X	X	X	X	X	X	X	X				
Eyes, Ears, and Nose Injuries	X	X	X	X	X	X	X	X				
Insect and Snake Bites	X	X	X	X	X	X	X	X				
Poisonings and Poisonous Plants	X	X	X	X	X	X	X	X				
Extremes of Temperature	X	X	X	X	X	X	X	X				
Written Tests – First Aid/CPR (score)	100	100	100	100	100	100	100	100				

E-mail to **SafetyTrainingRecords@davey.com** or Fax # **330-676-6725**

DAVEY
FIRST AID COURSE

Certification Card

Brett Powenski

has successfully completed the Davey First Aid Program

Ross Behringer

INSTRUCTOR

2/15/2025

COUNTERSIGNATURE

DAVEY
FIRST AID COURSE

Certification Card

Adam Martin

has successfully completed the Davey First Aid Program

Ross Behringer

INSTRUCTOR

2/15/2025

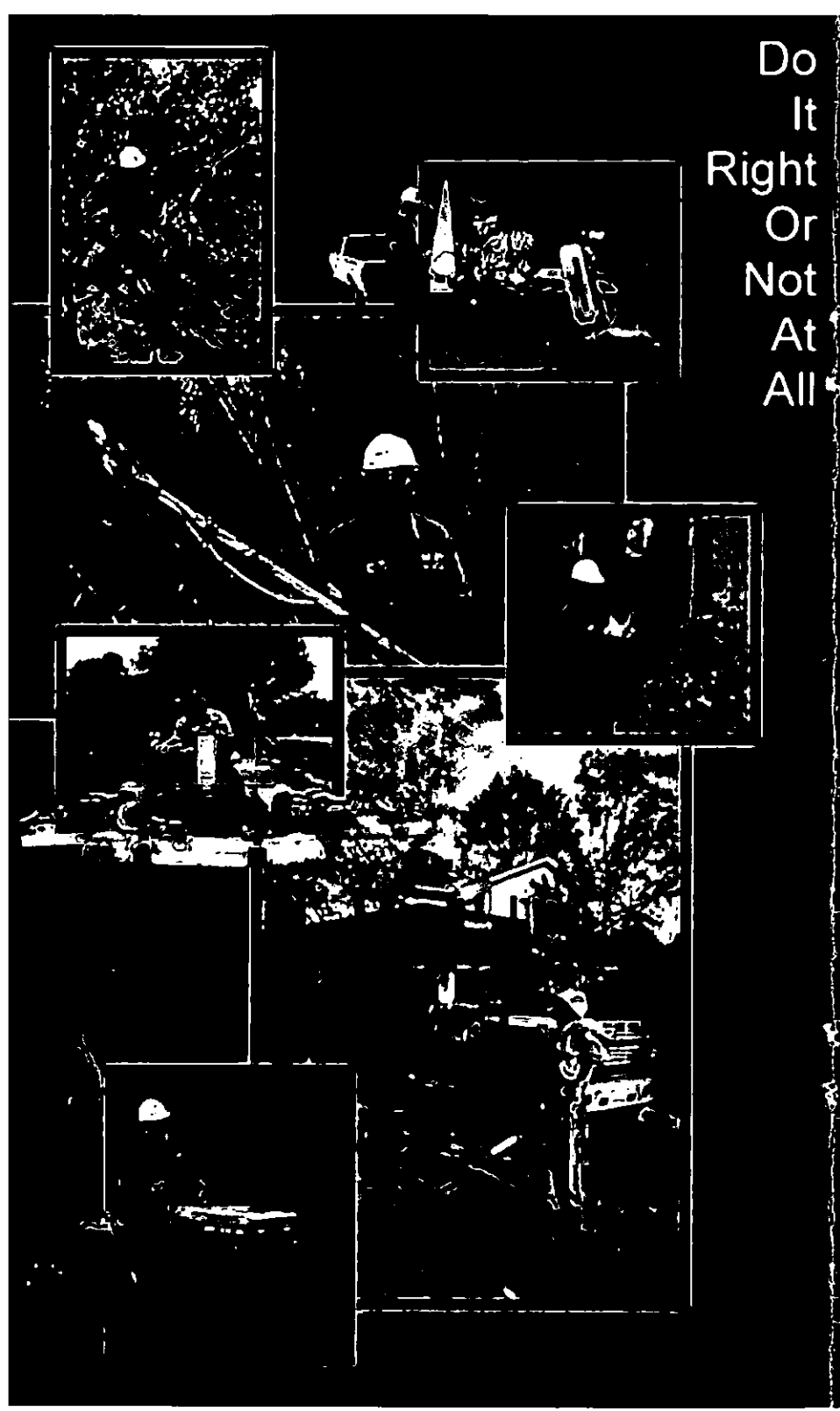
COUNTERSIGNATURE

Color legend:	Compliant	Expiring	Missing/Expired	Uploaded, Needs Verification	cted by Document Quality Co	Document Requested

Name: **Report Date: 10/16/2023**
Position: All **Company: [The Davey Tree Expert Company]**
Report Type: Driver Document Matrix **Location: Buffalo (130531)**

									Custom Documents (DQF)	
EmpNo	Employee Name	Company	Position	DL State of Issue	Location	Hire Date	Qualified Date	Document Status	Medical Certification Card	Self - Certification Verification
20081052	Alvut, Michael	The Davey Tree Expert Company	CDL Class A	New York	Buffalo (130531)	10/4/2021	9/19/2022	Complete	2/10/2024	2/10/2024
20051665	Behringer, Ross	The Davey Tree Expert Company	NON CDL	New York	Buffalo (130531)	4/7/2015	11/19/2015	Complete	4/5/2025	N/A
30010993	Bockhahn, Chad	The Davey Tree Expert Company	CDL Class B	New York	Buffalo (130531)	9/11/2023	9/27/2023	Complete	6/30/2025	6/30/2025
20074479	Boyczuk, Edward	The Davey Tree Expert Company	CDL Class A Permit	New York	Buffalo (130531)	6/3/2020	2/14/2022	Complete	2/10/2024	2/10/2024
20070746	Brennan, Matthew	The Davey Tree Expert Company	CDL Class A	New York	Buffalo (130531)	8/8/2019	8/2/2021	Expiring	10/27/2023	10/27/2023
20079696	Colwell, Bradley	The Davey Tree Expert Company	NON CDL	Pennsylvania	Buffalo (130531)	7/9/2021	7/26/2021	Complete	9/25/2025	N/A
30005079	Frazier, Ryan	The Davey Tree Expert Company	NON CDL	New York	Buffalo (130531)	9/12/2022	9/13/2023	Complete	1/9/2025	N/A
1062827	Hill, Randall	The Davey Tree Expert Company	CDL Class B	New York	Buffalo (130531)	11/26/1998	4/9/1999	Complete	6/23/2024	6/23/2024
20075958	Johnson, Eric	The Davey Tree Expert Company	CDL Class A	New York	Buffalo (130531)	10/5/2020	8/25/2021	Complete	10/5/2024	10/5/2024
30003344	Kinney, Christopher	The Davey Tree Expert Company	NON CDL	New York	Buffalo (130531)	5/31/2022	6/16/2022	Complete	8/6/2025	N/A
30003255	Klubek, Gerald	The Davey Tree Expert Company	CDL Class A Permit	New York	Buffalo (130531)	5/23/2022		Complete	9/29/2025	9/29/2025
20076100	Lazzaro, Daniel	The Davey Tree Expert Company	NON CDL	New York	Buffalo (130531)	10/14/2020	4/19/2022	Complete	6/13/2024	N/A
20055770	Martin, Adam	The Davey Tree Expert Company	CDL Class A	New York	Buffalo (130531)	4/21/2016	10/3/2016	Complete	12/23/2023	12/23/2023
20063086	Martin, Tyler	The Davey Tree Expert Company	CDL Class A	New York	Buffalo (130531)	5/4/2018	1/15/2019	Complete	9/27/2024	9/27/2024
20070450	O'Sullivan, Michael	The Davey Tree Expert Company	CDL Class B	New York	Buffalo (130531)	6/24/2019	1/27/2020	Complete	5/25/2024	5/25/2024
705178	Papadinoff, Michael	The Davey Tree Expert Company	CDL Class B	New York	Buffalo (130531)	8/1/1980	11/9/1998	Complete	10/9/2024	10/9/2024
30010120	Phillips, Celia	The Davey Tree Expert Company	NON CDL	New York	Buffalo (130531)	7/17/2023	8/10/2023	Complete	8/8/2025	N/A
20063055	Piatkowski, David	The Davey Tree Expert Company	CDL Class A	New York	Buffalo (130531)	3/19/2018	2/1/2023	Complete	4/14/2024	4/14/2024
20066759	Pitarresi, George	The Davey Tree Expert Company	NON CDL	New York	Buffalo (130531)	10/30/2018	11/28/2018	Complete	10/5/2024	N/A
20056228	Plarr, George	The Davey Tree Expert Company	CDL Class B	New York	Buffalo (130531)	5/23/2016	12/13/2017	Complete	6/6/2024	6/6/2024
30005439	Ploetz, Sara	The Davey Tree Expert Company	NON CDL	New York	Buffalo (130531)	9/28/2022	1/6/2023	Complete	12/20/2024	N/A
737742	Potzler, David	The Davey Tree Expert Company	CDL Class B	New York	Buffalo (130531)	10/11/1988	9/15/1998	Complete	7/12/2024	7/12/2024
20004899	Powenski, Brett	The Davey Tree Expert Company	CDL Class A	New York	Buffalo (130531)	6/5/2000	3/4/2002	Complete	11/29/2023	11/29/2023
20076883	Rung, Joshua	The Davey Tree Expert Company	NON CDL	New York	Buffalo (130531)	4/30/2021	9/17/2021	Complete	9/22/2025	N/A
20047641	Suzano, Lukas	The Davey Tree Expert Company	CDL Class A	New York	Buffalo (130531)	4/2/2014	9/29/2016	Complete	2/28/2024	2/28/2024
20060134	Tyx, Jonathan	The Davey Tree Expert Company	CDL Class A	New York	Buffalo (130531)	6/13/2017	10/7/2019	Complete	6/23/2024	6/23/2024

Back to Summary



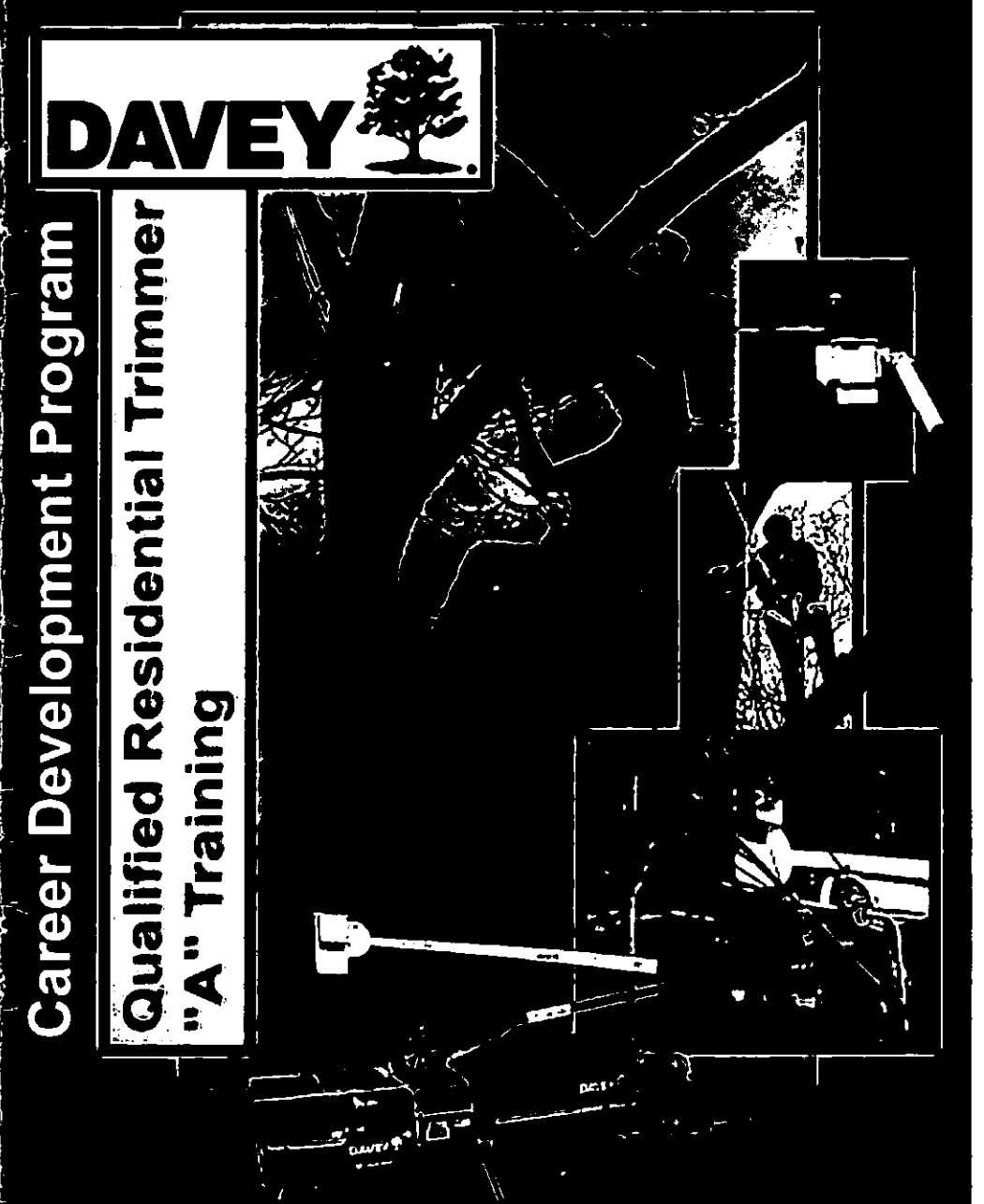
Do
It
Right
Or
Not
At
All

This belongs to: 20004894
Brett Powenski

DAVEY

Career Development Program

Qualified Residential Trimmer "A" Training



THE DAVEY TREE EXPERT COMPANY

Congratulations on completing the second phase of your tree surgery training program with the Davey Tree Expert Company.

You have completed a significant part of a great tradition in education and training which has been the hallmark of our company since it began in 1880. As you complete the following sections of this training manual, you'll take another step toward owning the knowledge of your chosen profession. Your supervisors and foremen are here to teach you and direct you in your training – training that will be ongoing throughout your career with Davey.

Give this training your full commitment, and you will continue on your way to a successful career with the Davey Tree Expert Company.

Sincerely,

Ken Celmer
Sr. Vice President and General Manager

Qualified Residential Tree Trimmer "A"
Certification of Training & Demonstrated Proficiency

To: All Foremen

Re: Employee Brett Powenski Employee #2004899

Successful completion of this Training Program is a prerequisite to promotion to Trimmer "A".

This employee has satisfied Trimmer "B" requirements and is expected to complete all routine tree surgery assignments with minimal guidance. The work skill requirement for satisfactory completion and promotion to Trimmer "A" is the proficiency to handle all tree surgery assignments.

In addition to the work skill requirements, these individuals must:

- Show leadership by helping teach newer trimmers and trainees.
- Learn Davey and client (if applicable) reporting procedures necessary for foremanship.
- Be able to communicate with the crew, client and public.
- Know, follow and promote Davey work procedures & safety rules.
- Be willing and able to be a probationary Foreman.
- The extension course should be finished at completion of this level.

When the employee has satisfactorily demonstrated proficiency in the above requirements, sign this certification.

Brett Powenski — Employee
[signature] — Foreman
2-26-04 — Date

[signature] — District Manager
2-26-04 — Date

ATTENTION DISTRICT MANAGER:

Send Training Certification to the Safety Department when completed.

Do
It
Right
Or
Not
At
All

This belongs to:
Brett Powenski

DAVEY

Career Development Program

Qualified Residential Trimmer "B" Training

THE DAVEY TREE EXPERT COMPANY

Congratulations on completing the first phase of your tree surgery training program with the Davey Tree Expert Company.

You have completed a significant part of a great tradition in education and training which has been the hallmark of our company since it began in 1880. As you complete the following sections of this training manual, you'll take another step toward owning the knowledge of your chosen profession. Your supervisors and foremen are here to teach you and direct you in your training – training that will be ongoing throughout your career with Davey.

Give this training your full commitment, and you will continue on your way to a successful career with the Davey Tree Expert Company.

Sincerely,

Ken Celmer
Sr. Vice President and General Manager

Qualified Residential Tree Trimmer "B"
Certification of Training & Demonstrated Proficiency

To: All Foremen

Re: Employee Brett Powers Employee # 20004899

Successful completion of this Training Program is a prerequisite to promotion to Trimmer "B".

This employee has successfully completed the Trimmer "C" requirements and is expected to improve upon the skills acquired. Trimmer "B" training will concentrate on tree surgery techniques used to accomplish assignments normally encountered in your territory.

The guidance required of the Foreman should decrease as the Trimmer "C"s proficiency increases. When this training level is complete, the new Trimmer "B" must be capable of handling all routine assignments with the minimum of guidance.

As in the Trainee level, the Foreman will initial the items satisfactorily completed, sign and date the appropriate certification, then notify the District Manager. After observation, if the District Manager is satisfied, the certification will be approved or training redirected as warranted by unsatisfactory performance.

ATTENTION DISTRICT MANAGER!

Send Trimmer "B" Training Certification to the Safety Department when completed.

Fertilization, if applicable N/A

	Approved
• Knows Principles of Fertilization	❑
• Knows Qualities and Use of Arborgreen	❑
• Knows Qualities and Use of Other Materials	❑
• Proper Use/Care of Fertilization Tools	❑
• Proper Load and Mix of Tanker	❑
• Secures Materials On Truck/Trailer While In Transit	❑
• Understands different driving characteristics of Tanker vs. Surgery Truck	❑
• Identify Underground Utilities & Installations (Sprinklers, Lamp Post Wire, K-9 Electric Fence)	❑
• Can Demonstrate Spill Response	❑
• Hazcom/Hazmat Training	❑
• Can Repair Leaks	❑
• Fertilization Completed Properly	❑

Employee _____ Foreman _____ Date _____

District Manager _____ Date _____

Tree Planting and Moving

	Approved
• Knows Principles of Planting and Moving	☑
• Proper Use/Care of Installation Tools	☑
• Proper Storage of Tools/Hardware	☑
• Secures Tree On Truck/Trailer While In Transit	☑
• Identify Underground Utilities & Maintains Clearance	☑
• Can Estimate Approximate Weight of Tree Ball	☑
• Safe Use of Moving Equipment, Ball cart	☑
• Can Safely Operate Machinery, Skid Steer, Tractor	☑
• Identify Cut & Puncture Hazards, Basket, Nails	☑
• Installation Completed Properly	☑

Employee _____ Foreman _____ Date 8/26/03

District Manager _____ Date 8/26/03

Employee Development Program

Instructions for Continued Training

Manager's Responsibilities

1. Re-issue the Employee Development Manual to the employee
2. Explain your expectations and job responsibilities of job title employee is training for
3. Verify employee proficiency progress during the training process
4. Collect manual from employee when foreman and employee state that the training is complete, review for accuracy and sign certifications.
5. Keep a copy of the certifications in the employee's file and send the original to the Safety Department in Kent.

Employee's Responsibilities

1. Understand the training requirements issued to you, and take possession of your training and development
2. Learn the required proficiencies required by the job descriptions
3. You are responsible for maintaining the Employee Development Manual and for completing the requisite training documentation with your foremen
4. This manual is to remain with you on the crew to which you are assigned, and must be delivered to your manager upon completion
5. Several foremen may have a part of your training responsibility, this manual is designed to let each foreman know where you are in your skills development, and what you still need to learn
6. This manual may be completed in any order you demonstrate proficiencies. It is a cumulative rather than sequential process.
7. Take pride in your development as an employee. You are expanding your role in a noble trade and furthering a great career

Foreman's / Trainer's Responsibilities

1. Teach and train the employee in the required proficiencies outlined in the Employee Development Manual.
2. Initial and sign off on the checklists in any order as the new employee demonstrates skills and proficiencies in the various categories.
3. This manual is designed to help foremen further the training of employees by establishing a guide that allows you to cover all of the skills required
4. Several foremen may have a part in each employee's training, and this manual will tell each foreman at a glance how far along an employee is in their training. As well as what they still need to learn.
5. Take great pride in each trainee's development and your training responsibility. Pass along you knowledge and skills as they were passed along to you.

Lightning Protection, if applicable

	Approved
• Knows Principles of Protection System	☑
• Proper Use/Care of Installation Tools	☑
• Proper Storage of Tools/Hardware In Gear Bag	☑
• Secures Conductor Aloft While Installing	☑
• Understands Proper Number and Placement of Conductors and Air Terminals	☑
• Installs Bolt/Clamp Connector to any Cabling System Present In Tree	☑
• Understands Appropriate Use Of Grounding	☑
• Installs System Properly	☑

Employee _____ Foreman _____ Date 5/26/03

District Manager _____ Date 5/26/03

DAVEY © 12/01

Bracing

	Approved
• Knows Principles of Bracing	☑
• Knows Principles of Cavity Work, if applicable	☑
• Proper Use/Care of Drills, Bits, Wrenches	☑
• Proper Storage of Tools/Hardware In Gear Bag	☑
• Selects Proper Rod, Washers & Nuts	☑
• Understands Proper Number and Placement of Through Rod Bracing System	☑
• Drills Proper Size Hole	☑
• Installs Wood Rod Properly	☑
• Understands Appropriate Use Of Screws(Dead End Bracing)	☑
• Installs Wood Screws	☑

Employee _____ Foreman _____ Date 8/24/03

District Manager _____ Date 8/24/03

Climbing

	Approved
• Can Demonstrate Climber Rescue	☑
• Proficient at Climbing Without Spikes	☑
• Proficient at Climbing With Spikes	☑
• Sharpens Spikes Properly	☑
• Safely Produces Quality Work	☑
• Overall Ability and Technique Good	☑
• Maintains Electrical Minimum Approach Distances	☑

Employee _____ Foreman _____ Date 8/24/03

District Manager _____ Date 8/24/03

Aerial Lift Operation

	Approved
• Can Demonstrate Aerial Lift Rescue	☑
• Can Identify Components and Perform Daily and Weekly Inspection	☑
• Can Perform All Required Maintenance	☑
• Selects Most Efficient Set Up Site	☑
• Operates Smoothly and Efficiently	☑
• Safely Produces Quality Work	☑
• Maintains Electrical Minimum Approach Distances	☑
• Does Not Drop Limb In a Manner To Cause Property Damage	☑

Employee _____ Foreman _____ Date 8/26/03

District Manager _____ Date 8/26/03

Cabling

	Approved
• Understands Principles of Cabling	☑
• Chooses Proper Placement for Cables	☑
• Identifies Proper Hardware (cables, thimbles, lags, bits)	☑
• Understands Limitations of Materials	☑
• Knows Difference Between Repair & Support Installation	☑
• Proper Use/Care of Drills & Bits	☑
• Proper Storage of Tools/Hardware	☑
• Knows When To Use Screw Rod w/ Amon Eye vs. Lag	☑
• Installs Lags and Rods Properly	☑
• Attaches Cables Properly	☑
• Pre-formed Tree Grips	☑
• Hand-wrapped	☑
• Tree To Ground Guying	☑
• Tree To Tree Guying	☑
• Installing Ground Anchors	☑
• Removal of Old/Defective System	☑

Employee _____ Foreman _____ Date 8/26/03

District Manager _____ Date 8/26/03

Tree Removal

The removal of large limbs and trees can be challenging to the most experienced trimmer depending upon the tree and circumstances. Therefore, proficiency should be based upon the routine size and complexity of removals, regularly assigned to your crew.

	Approved
• Review S&T Manual Tree Removal Section	☑
• Inspect the Tree Condition, Conductors and Surroundings	☑
• Determine If It Will Require Topping	☑
• Job Briefing Covering: Removal of Sound, Straight Trees Removal of Leaning Trees Removal of Lodged Trees Removal of Cracked/Split Tree Removal of Multiple Lead Trees Removal of Trees Larger in Diameter Than Bar Length Special Techniques for Storm Damaged Trees and Limbs	☑
• Install Rigging, and Removing Limbs	☑
• Notches and Back Cuts (Standard, Open Face & Humboldt)	☑
• Ground Felling of Entire Tree	☑
• Ground Felling of Topped Tree	☑
• Limbing and Bucking	☑
• Handling Large Wood Safely (Reduce Size, Rolling, Mechanical Advantage)	☑
• Cutting Stump to Grade	☑

Employee _____ Foreman _____ Date 8/26/03

District Manager _____ Date 8/26/03

Pruning

	Approved
• Evaluates Tree and Hazards	☑
• Selects Proper Work Position	☑
• Brings Appropriate Tools Aloft	☑
• Makes Initial Cuts to Clear Communication Lines with a Non-Conductive Pole Tool	☑
• Does Not Drop Limbs on Communication Lines	☑
• Communicates Warning Before Cutting	☑
• Re-checks Surroundings For:	
Distance/Location of Conductors	☑
Pedestrians/Children	☑
Location of Ground Personnel	☑
High Hangers	☑
Traffic	☑
Other Hazards	☑
• Clears Vines Before Cutting Entangled Limbs	☑
• Immediately Removes Stubs, Unless Needed for Rigging	☑
• Makes Efficient Cuts	☑
• Careful Around Private Property	☑
• Evaluates Next Tree While Aloft	☑
• Rechecks Tree for Proper Completion and Hangers Before Coming Down	☑
• Maintains Productivity	☑

(Continued on Page 8)

Pruning continued

Approved

- Methods of Pruning:
  - Trees Under the Line ☑
  - Side Clearance ☑
  - Directional Trimming ☑
  - Drop Crotching/Crown Reduction ☑
  - Remove Overhang/Building Clearance ☑
  - Deadwooding (Crown Cleaning) ☑
  - Thinning (Crown Thinning) ☑
- Select Tools Applicable To Your Crew For Pruning:
  - Speed Saw, Pole Pruner and Saw ☑
  - Gasoline Chain Saw ☑
  - Hydraulic Chain Saw ☑
  - Hydraulic Pole Chain Saw ☑
  - Hydraulic Pole Circular Saw ☑
  - Hydraulic Pole Pruner ☑
  - Hand Loppers/Shears ☑
  - Gas Shears ☑
- Girdling roots/root pruning ☑
- Installation of Root Barrier ☑

Employee _____ Foreman _____ Date 8/26/03

District Manager _____ Date 8/26/03

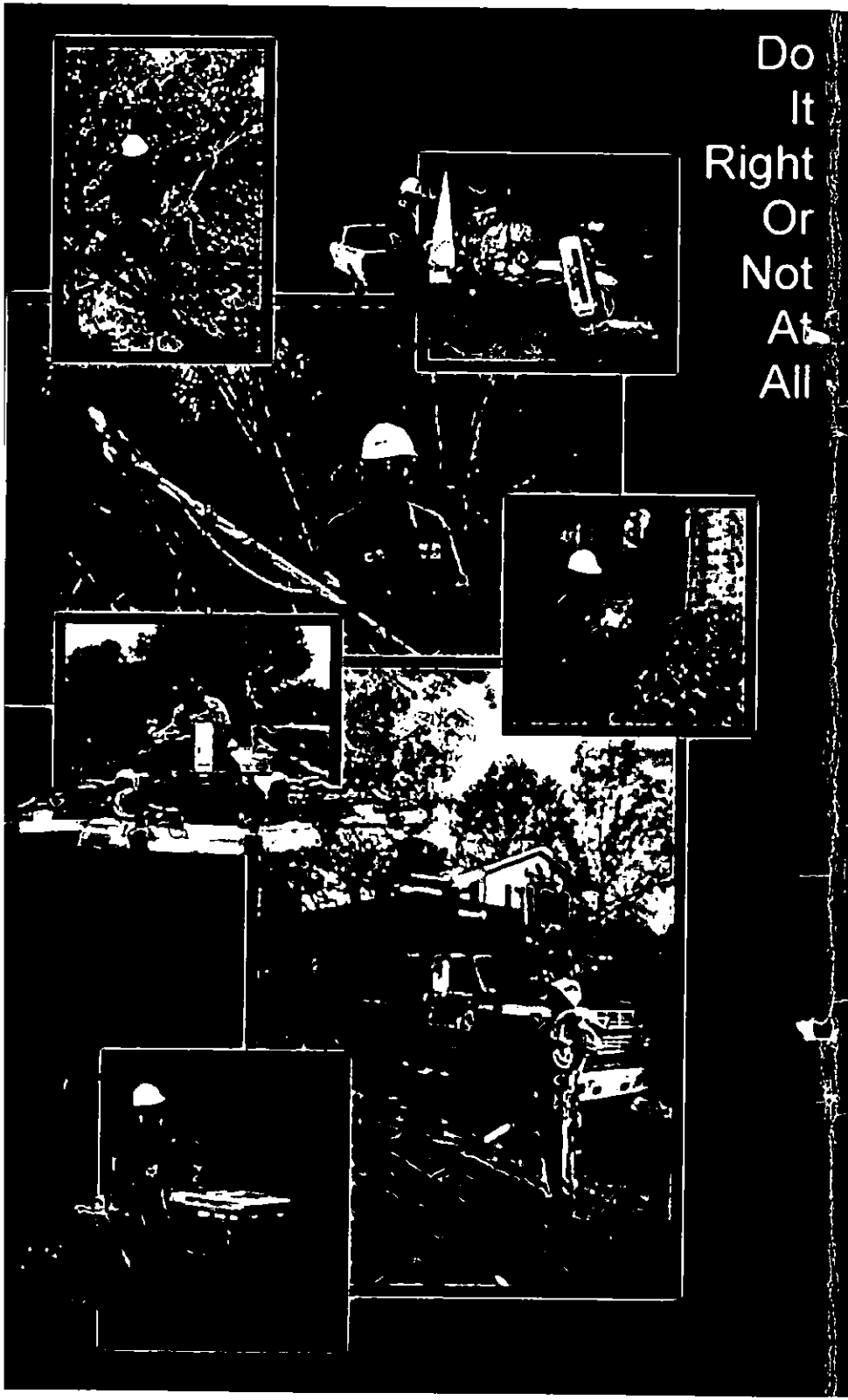
Rigging Limbs

Approved

- Understands Working Versus Breaking Rope Strengths ☑
- Selects Proper Crotch ☑
- Selects Proper Rope For Task ☑
- Pull Rope (Guide Rope) ☑
- Tip Rope for Raising Brush End ☑
- Butt Rope for Controlling Butt End ☑
- Butt Hitch ☑
- False Crotch ☑
- Use of Arborist Grade Block(s), if equipped ☑
- Use of Come-Alongs, if equipped ☑
- Hinge Cut ☑
- Jump Cut ☑
- Under Cut ☑
- Top Cut ☑
- Finish Cut ☑
- Combination of Above ☑

Employee _____ Foreman _____ Date 8/26/03

District Manager _____ Date 8/26/03



Do It Right Or Not At All

This belongs to:
Brett Powenski

DAVEY

Career Development Program

Qualified Residential Trimmer "C" Training

THE DAVEY TREE EXPERT COMPANY

48. Which method is <u>not</u> for rescuing an injured person from a bucket on which the controls are not operating:
    A. Climb tree if adjacent
    (B) Experiment with the lift if you are not familiar with it
    C. Lower the boom by the factory recommendations on emergency procedures

49. When a worker has made contact with an energized electrical conductor, which should be done first?
    A. Call the Power Company
    B. Call an ambulance
    (C) Assess the situation

50. In an aerial rescue emergency, all work shall be performed in a manner to avoid unnecessary risk to the rescuer.
    (True) False

ATTENTION: DISTRICT MANAGER

The completed original Training Materials and Tests are to be submitted to the Safety Department in Kent, retain a territory copy.

Welcome to the Davey Tree Expert Company.

You are now part of a great tradition in education and training which has been the hallmark of our company since it began in 1880. As you complete each section of this training manual, you'll take another step toward owning the knowledge of your chosen profession. Your supervisors and foremen are here to teach you and direct you in your training – training that will be ongoing throughout your career with Davey.

Give this training your full commitment, and you will be well on your way to a successful career with the Davey Tree Expert Company.

Sincerely,

Ken Celmer
Sr. Vice President and General Manager

Qualified Residential Trimmer
Introductory Training Program Employee Profile

Employee Name Brett Powenski

Employee # 20004899 Hire Date 6/4/00

Territory # 135531 Location Atlanta R/C

District Manager Chris Heim

Foreman Zac Perry

Davey First Aid/CPR & Aerial Rescue Course Date 3/20/01
(Mandatory within 90 Days of hire)

Complete these items if applicable:

Length of Prior Tree Experience _____ (Years) _____ (Months)

Employed by _____ Company,

From _____ (Date) to _____ (Date), work classification _____

and by _____ Company,

From _____ (Date) to _____ (Date), work classification _____

I recognize that my Foreman and/or Supervisor will be evaluating my performance during my 90 Day Introductory Period and that as a condition of employment, I must perform satisfactorily, pass proficiency tests and complete Davey training programs, including First Aid/CPR and Aerial Rescue, failure to comply will affect my continued employment.

Brett Powenski
Employee Signature

5/24/03
Date

39. Operators should always face the direction of travel of the lift while moving, and check the location of upper knuckle frequently.
(True) False

40. You may use the aerial lift for a crane as long as the load limit does not exceed manufacturer's recommended load limit.
True (False)

41. The aerial lift should be cleaned with steel wool pads.
True (False)

42. Aerial lifts should only be operated where outriggers:
A. Are in soft ground
(B.) On good solid footing
C. On blacktop

43. Aerial lifts are to be inspected according to the daily and weekly form.
(True) False

44. Holes may be drilled in the bottom of aerial lift buckets for drainage.
True (False)

45. While working on a two-man crew, your partner becomes injured in a tree while you are on the ground. The first thing you should do is:
A. Get to a phone and call an ambulance
(B.) Assess the situation
C. Climb the tree and untie climbers friction hitch

46. Upon reaching the injured person in the tree, you would first check for:
A. Broken bones
(B.) Breathing
C. Bleeding

47. Under which condition would you not lower the injured person from the tree and seek help:
A. Possibility of arterial bleeding
B. Unconscious and not breathing
(C.) Possibility of broken back or neck

28. Use a long forked push stick to feed small material into the chipper.
True False

29. Never reach into the feed table beyond the rubber flaps when chipping.
True False

30. Power saw operations require no planning ahead of time.
True False

31. You may smoke while refueling a saw if you are careful.
True False

32. Any container marked gasoline may be used to carry gasoline for the saw.
True False

33. It is permissible to use one hand to operate a chain saw when safely secured in a tree.
True False

34. It is not necessary to have an escape route when felling a tree.
True False

35. Chain brakes installed by the manufacturer shall be kept in operating condition.
True False

36. Be certain that no persons will be in striking range before making the backcut of a tree being felled.
True False

37. Rules for electrical hazards and safe work procedures do not apply to aerial lifts.
True False

38. The operator shall always wear fall protection when operating an aerial lift.
True False

New Hire Orientation and Employee Development Program

Instructions for Introductory Training

Manager's Responsibilities

1. Review the employee welcome information with the new employee
2. (Part 1 of the Employee Development Manual)
3. Show the new employee the required videos within 2 days of hiring
4. Sign off on the General Orientation Checklist. Keep a copy in the employee's file and send the original to Personnel in Kent
5. Issue the Employee Development Manual to the new employee
6. Verify employee proficiency progress during the training process
7. Collect manual from employee after 90 days, review for accuracy and sign certifications. Give the written examination, correct it upon completion, 80% grade required.
8. Keep a copy of the certifications and exam in the employee's file and send the original to the Safety Department in Kent.
9. At this point the Initial Performance Review is to be conducted by the District Manager with the Trainee.

Employee's Responsibilities

Successful completion of this Introductory Training is a prerequisite for promotion to Trimmer "C" at the 90 Day Initial Performance Review.

1. Understand the orientation and training requirements issued to you, and take possession of your training and development
2. Learn the required proficiencies required by the job descriptions
3. You are responsible for maintaining the Employee Development Manual and for completing the requisite training documentation with your foremen
4. This manual is to remain with you on the crew to which you are assigned, and must be delivered to your manager upon completion after 90 days

5. Several foremen may have a part of your training responsibility, this manual is designed to let each foreman know where you are in your skills development, and what you still need to learn
6. This manual may be completed in any order you demonstrate proficiencies. It is a cumulative rather than sequential process.
7. Take pride in your development as an employee. You are learning a noble trade and laying the foundation of a great career

Foreman's / Trainer's Responsibilities

Upon becoming a Davey foreman, you assumed the responsibility of training, as did the foreman who trained you. This format should aid you in organization and will formally document your efforts and trainee's learning.

1. Teach and train the new employee in the required proficiencies outlined in the Employee Development Manual.
2. Initial and sign off on the checklists in the order that the new employee demonstrates skills and proficiencies in the various categories.
3. This manual is designed to help foremen train new employees by establishing a guide that allows you to cover all of the skills required from a new employee within 90 days
4. Several foremen may have a part in each employee's training, and this manual will tell each foreman at a glance how far along an employee is in their training. As well as what they still need to learn.
5. Take great pride in each trainee's development and your training responsibility. Pass along your knowledge and skills as they were passed along to you.

17. After you have crotched your climbing rope and tied a friction hitch, keep your rope slack.
    True (False)

18. When using insulated aerial lifts, the operator may disregard minimum working distance shown in the Safety and Training Manual.
    True (False)

19. A foreman should go on to other work and notify his supervisor if he feels the work cannot be accomplished safely.
    (True) False

20. You may hang your pruner on utility lines and cables when convenient.
    True (False)

21. Climbers must be tied-in with a rope and saddle whenever working in a tree or from a ladder or roof.
    (True) False

22. Storm damage work requires extra caution due to the possibility of downed energized conductors and the condition of trees.
    (True) False

23. Chipper blades should be sharp and have right adjustment.
    (True) False

24. Chipper key may be left in ignition when left unattended.
    True (False)

25. Safest way to feed brush into a chipper is from the street side.
    True (False)

26. Loose-ragged or unbuttoned clothes can be a hazard while feeding chipper.
    (True) False

27. Eye and ear protection are not necessary if only a small amount of brush is to be chipped.
    (False)

7. A job briefing is required at the first work location and if new hazards are encountered during work:
   (True) False

8. It is permissible to use your climbing rope when lowering limbs:
   A. If it is easier
   B. If the limb is small
   (C) Never

9. Hangers may be left overnight in a tree:
   (A) Never - it is a potential hazard
   B. When you are going back the next morning
   C. Because we have insurance

10. Safe practice violation notices should only be issued:
   A. When you are mad
   (B) To any employee violating safe work procedures
   C. Because you don't like someone

11. All overhead electrical and communication lines shall be considered energized and never touched either directly or indirectly.
   (True) False

12. Electrical shock or burn will occur when a worker comes in direct or indirect contact with energized conductors and a path to the ground.
   (True) False

13. A person who has received an electrical shock is subject to heart fibrillation or stoppage plus respiratory failure.
   (True) False

14. Trees shall be inspected for the presence of energized electrical conductors prior to commencing any climbing or are work.
   (True) False

15. Trimmers must avoid turning their backs to conductors.
   (True) False

16. The safest, highest crotch that positions you at an angle to swing away from energized electrical conductors shall always be used.
   (True) False

General, Personal Safety and On the Job Orientation

	Approved
• Read Safety and Training (S&T) Manual Sections	
Job Observation and Electric Hazards	☑
Personal Protective Equipment	☑
Driving	☑
Work Site Set Up	☑
Hazcom / Hazmat Program	☑
• View Orientation Video	☑
• Read Tree Care Introduction to Training Booklet	☑
• Inspection, Care and Use of Personal Protective Equipment	☑
• Warm-up Stretching Exercises/View Davey Video	☑
• Safe Lifting Procedures	☑
• Carries Out Instructions from Job Briefing	☑
• Emergency Response Telephone Numbers and Hospital Location	☑
• Poison Plant/Animal Identification, Avoidance and First Aid	☑
• Fire Extinguisher Inspection and Use	☑
• Review of Aerial Rescue Procedures and Training	☑
• Participates in Tailgate Meetings	☑

Employee _____ Foreman _____ Date 8/26/03

District Manager _____ Date 8/26/03

Work Site Set Up

	Approved
• Maintains 2 Signs at Proper Distance	☑
• 6 Cones Identify Work Site	☑
• 2 Wheel Chocks in Place	☑
• Flagging Procedures in accord with State Regulations	☑
• Watches for Overhead Hazards When Guiding Driver	☑
• Placement of Rescue Equipment	☑

Brett Powenski
Employee

Foreman

8/26/03
Date

District Manager

8/26/03
Date

Qualified Residential Tree Trimmer Safety Test

TESTING TO BE CONDUCTED UPON COMPLETION OF DEMONSTRATED PROFICIENCY. PASSING GRADE IS 80%.

Employee Name & Number Brett Powenski 20004899

Date 8/26/03 Grade 100 %

District Manager Signature

Circle the correct answer.

1. All field employees shall participate in a safety (tailgate) meetings:
   (A) Weekly
   B. Yearly
   C. Monthly

2. Hearing protection shall be worn:
   A. While operating chain saw
   B. When supervisor is on job
   (C) While operating chain saw, chipper or loud machinery
   D. Only when you have a lot of work

3. Non-approved glasses may be worn in place of approved safety glasses:
   A. While using chain saw
   (B) Never - use only approved safety glasses
   C. While chipping small branches

4. Warning signs and cones are only necessary:
   A. When there is heavy traffic
   (B) On every job site
   C. When working on state highways

5. You are not required to use climbing rope unless going above:
   A. 15 feet
   (B) Always required when leaving ground
   C. 10 feet

6. First aid kits should be checked often, making sure they:
   A. Are completely stocked
   (B) Both A and C
   C. In proper location

Stump Grinders, if applicable N/A

	Approved
• Review Manufacturer's Information, Warning Decals, Controls and Inspection Procedures	☐
• Proper Attachment to Truck	☐
• Personal Protective Equipment Requirements	☐
• Work Site Set Up and Positioning of Machine	☐
• Protection of Public and Property	☐
• Engage, Grind and Disengage	☐
• Work Site Clean Up	☐
• Maintenance	☐

Employee _____ Foreman _____ Date _____

District Manager _____ Date _____

ATTENTION: DISTRICT MANAGER

The completed original Training Materials and Tests are to be submitted to the Safety Department in Kent, retain a territory copy.

Brush Disposal

	Approved
• Review Brush Chipper (S&T) Manual Section	☑
• Viewed Davey Chipper Safety Video	☑
• Discussed Characteristics of Rotary Drum & Self-Feed Chippers	☑
• Never wear gauntlet gloves, body belt or saddle while chipping	☑
• Review Manufacturer's Instructions, Warning Decals and Safety Features	☑
• Identify Hazard and Pinch Points	☑
• Proper Attachment to Truck	☑
• Lubrication and Maintenance	☑
• Guiding Driver in Reverse	☑
• Efficiently Stack and Drag Brush	☑
• Start, Engage and Accelerate	☑
• Safe Operation from Curb Side	☑
• Uses Push Stick on Small Material	☑
• Decelerate, Disengage and Shut Down	☑
• Stack/Load Wood Efficiently	☑
• Work Site Clean up	☑
• Proper Dumping Procedure	☑

Brett Edwards _____ 8/26/03

Employee Foreman Date

Chris Klein 8/26/03

District Manager Date

Electric Hazards

	Approved
• Viewed Davey Electric Hazards (Telecommunications) Video	☑
• Viewed Aerial Rescue Video	☑
• **Can Identify:**	
Primaries	☑
Secondary	☑
Transmission	☑
Cable Television	☑
Telephone Company	☑
Guy Wires	☑
House Drops and Meters	☑
Risers (For Underground House Drop)	☑
Apparatus – Transformers, Cut-outs, Insulators	☑
Fire Alarm/ Street Light Wire (if present)	☑
• **Can Describe:**	
Direct Contact	☑
Indirect Contact	☑
Effects of Electricity on the Human Body	☑
Down Wire Hazards	☑
• Maintains 2-3ft. Approach Distance from Communications Lines & House Drops	☑
• Maintains 10 foot Minimum Approach Distance From Electric Supply Lines	☑
• Performs work proficiently and safely	☑

Employee _____ Foreman _____ Date 8/26/03

District Manager _____ Date 8/26/03

Aerial Lifts, if applicable

	Approved
• Review Aerial Lift (S&T) Manual Section	☑
• Practice Aerial Lift Rescue Procedures	☑
• Review Manufacturer's Instructions and Warning Decals	☑
• Identify Major Components	☑
• Knows All Grease Points and Hydraulic Level	☑
• Operation of Outriggers/Pad Placement	☑
• Participates in Daily/Weekly Aerial Inspection	☑
• Operation from Lower Controls/Deadman	☑
• Operation from Bucket/Minimum Approach Distance	☑
• Watches Path of Booms/Obstructions/Road	☑
• Use and Care of Hydraulic Tools	☑
• Secures Unit for Travel, Including Sweep Down and Check for Low Limbs	☑
• Checks for Overhead Obstructions and Conductors when Pinning Truck for Overnight Storage	☑

Employee _____ Foreman _____ Date 8/26/03

District Manager _____ Date 8/26/03

Power Hand Tools (Drills, Hedger, Trimmer, etc.)

	Approved
• Read and Understands Operator Instructions Found in Safety Manuals for all Power Tools	☑
• Proper Storage of Tools	☑
• Proper Gas Oil Mix	☑
• Identifies Ground Hazards, i.e., Debris	☑
• Can Identify Hazard Points	☑
• Maintains Proper Hand Grip	☑
• Checks Safety Devices on Tool	☑
• Proper Starting Procedure	☑
• Maintains Proper Stance for Ground Use of Power Tool	☑
• Maintains 10 foot Clearance Rule	☑
• Wears Gloves When Sharpening and Adjusting Blades or Chain	☑
• Can Perform non-mechanical Maintenance on Power Tools	☑

Brett Howard — Employee

_____ — Foreman

8/26/03 — Date

Chris Hein — District Manager

8/26/03 — Date

Hand Tools

	Approved
• Review Hand Tool (S&T) Manual Section	☑
• Inspection of Poles and Connectors	☑
• Pruner Sharpening and Maintenance	☑
• Care, Use and Storage of Hand Saw	☑
• Care, Use and Storage of Pole Pruner/Saw	☑
• Identify and Remove All Hangers	☑
• Care, Use and Storage of, If Applicable:	
Come-alongs	☑
Axes	☑
Sledge/Wedge	☑
Cant Hooks	☑
• Identify, Prepare, Secure and Send Aloft Cabling, Bracing, Lightning Protection Tools and Materials	☑

Brett Howard — Employee

_____ — Foreman

8/26/03 — Date

Chris Hein — District Manager

8/26/03 — Date

Chain Saws

	Approved
• Review Chain Saw (S&T) Manual Section	☑
• View Davey Chainsaw Safety Video	☑
• Review Tree Removal (S&T) Manual Section	☑
• Can Sharpen and Adjust Chain	☑
• Carries Saw Properly	☑
• Can Identify/Avoid Kick Back Zone	☑
• Proper Maintenance	☑
• Checks Chain Brake for Proper Function	☑
• Identify Ground Hazards, i.e., Debris	☑
• Proper Starting Procedure	☑
• Proper Stance for Cutting	☑
• Maintains 10 Foot Clearance From Other Personnel	☑
• Maintains Proper Two Handed Grip	☑
• Limbs Brush Efficiently	☑
• Bucks Logs Efficiently	☑
• Felling Trees	
Establish Felling Safety Plan	☑
Knows When to Secure With Pull Rope	☑
Establish Escape Route	☑
Proper Notch, Back & Groundline Cuts	☑
• Proper Refueling	☑
• Proper Storage	☑

Employee _____ Foreman _____ Date 8/26/03

District Manager _____ Date 8/26/03

Ladders

	Approved
• Review Ladder (S&T) Manual Section	☑
• Inspection and Care	☑
• Carrying	☑
• Placement for Use	☑
• Tied-In When Working From the Ladder	☑
• Storage	☑

Employee _____ Foreman _____ Date 8/26/03

District Manager _____ Date 8/26/03

Climbing

	Approved
• Review Climbing (S&T) Manual Section	☑
• Practice Climber Rescue	☑
• Positions Rescue Gear	☑
• Inspection of Climbing Gear and Tree	☑
• Understands Davey Tie-In Policy	☑
• Selects and Places Rope in Crotch, High and Away from Electric Conductors	☑
• Knots Tied Properly	☑
• Ascends Tree Safely and Efficiently	☑
• Proper Re-crotch Method	☑
• Proper Use and Securing of Tools	☑
• Proficient in Work Methods	☑
• Checks Friction Hitch Periodically	☑
• Descends Tree Safely	☑

Employee _____ Foreman _____ Date 8/26/03

District Manager _____ Date 8/26/03

Mobile Equipment

	Approved
• Review Equipment (S&T) Manual Section	☑
• Review Pre/Post-trip Inspection	☑
• Review All Controls and Warning Decals	☑
• Review Storage and Security	☑
• Understands Lockout/Tagout Procedure	☑
• Has & Carries Proper Credentials to Drive	☑
• Drives Defensively	☑
• Operates Equipment Safely, Initial Those That Apply :	
Trucks	☑
Tractors	☑
Skid Steer Loaders	☑
Knuckle Boom/Crane Under Direct Supervision of Certified Crane Operator	☑

Employee _____ Foreman _____ Date 8/26/03

District Manager _____ Date 8/26/03

Tree Identification and Hazard Trees

	Approved
• Review Hazard Tree Information, In (S&T) Manual Climbing Section	☑
• Identify Hazard Trees on Site	☑
• Identify Dominant Trees in Area and Pertinent Characteristics	
Growth Habits	☑
Wood Strength	☑
Wood Weight	☑
Thorns	☑
Allergic Reaction - Man and Animal	☑

Employee _____ Foreman _____ Date 8/26/03

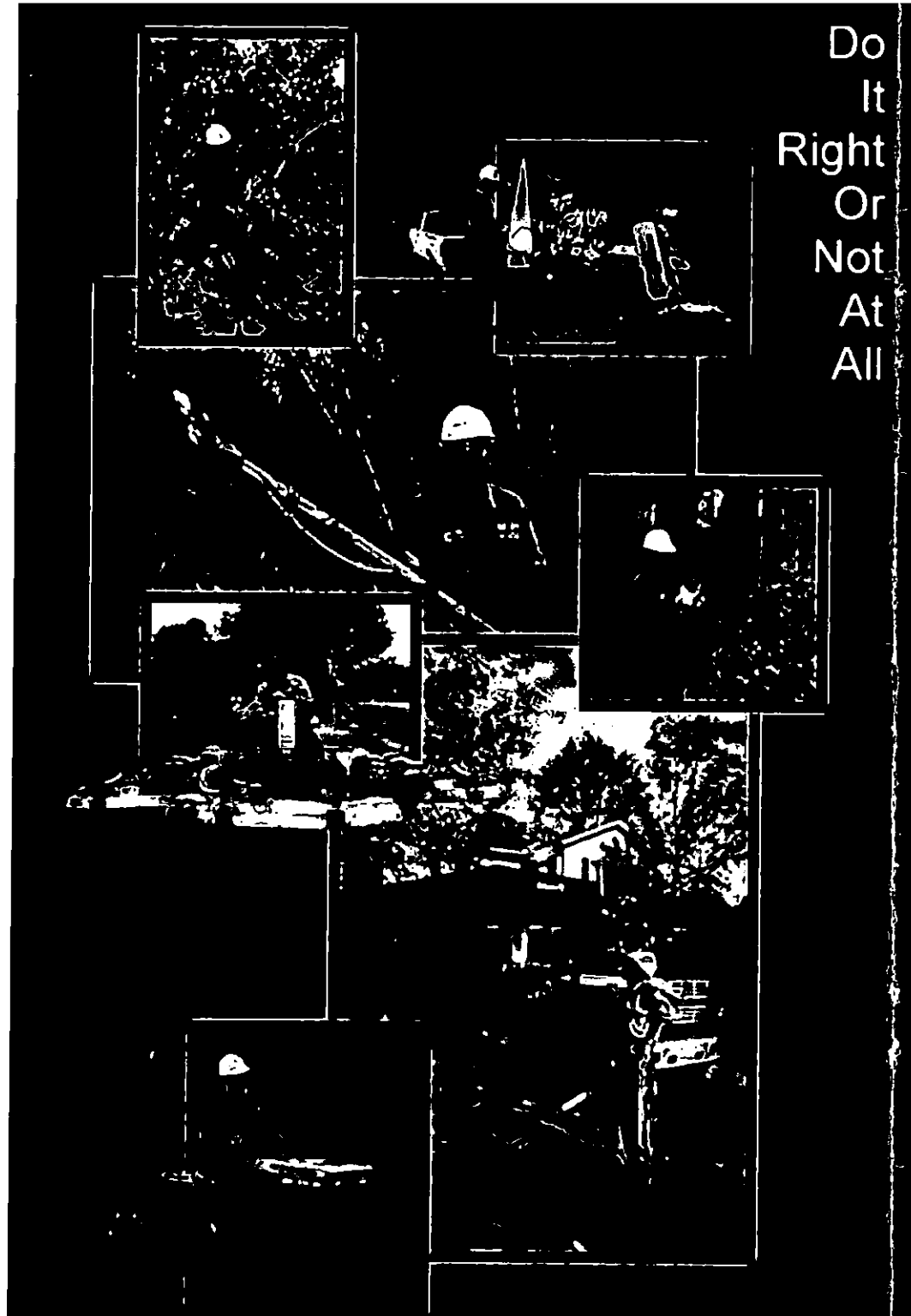
District Manager _____ Date 8/26/03

Ropes, Knots and Rigging

	Approved
• Review Ropes and Knots (S&T) Manual Section	☑
• Rope Inspection and Identification	☑
• Rope Storage	☑
• Ability to Tie and Apply:	
Taut Line Hitch	☑
Blake Hitch	☑
Figure 8 Knot	☑
Girth Hitch	☑
Prussic Loop to Lanyard	☑
Throwing Fist and/or Throw Bag	☑
Bowline	☑
Clove Hitch	☑
Running Bowline	☑
Weavers Knot	☑
Wrap for Storage	☑
• Keeps Climbers Rope Clear	☑
• Has Understanding of Crotch Selection	☑
• Stands in Proper Position When Handling Rigged Limbs	☑
• Can Set and Run Ropes Efficiently	☑

Employee _____ Foreman _____ Date 8/26/03

District Manager _____ Date 8/26/03



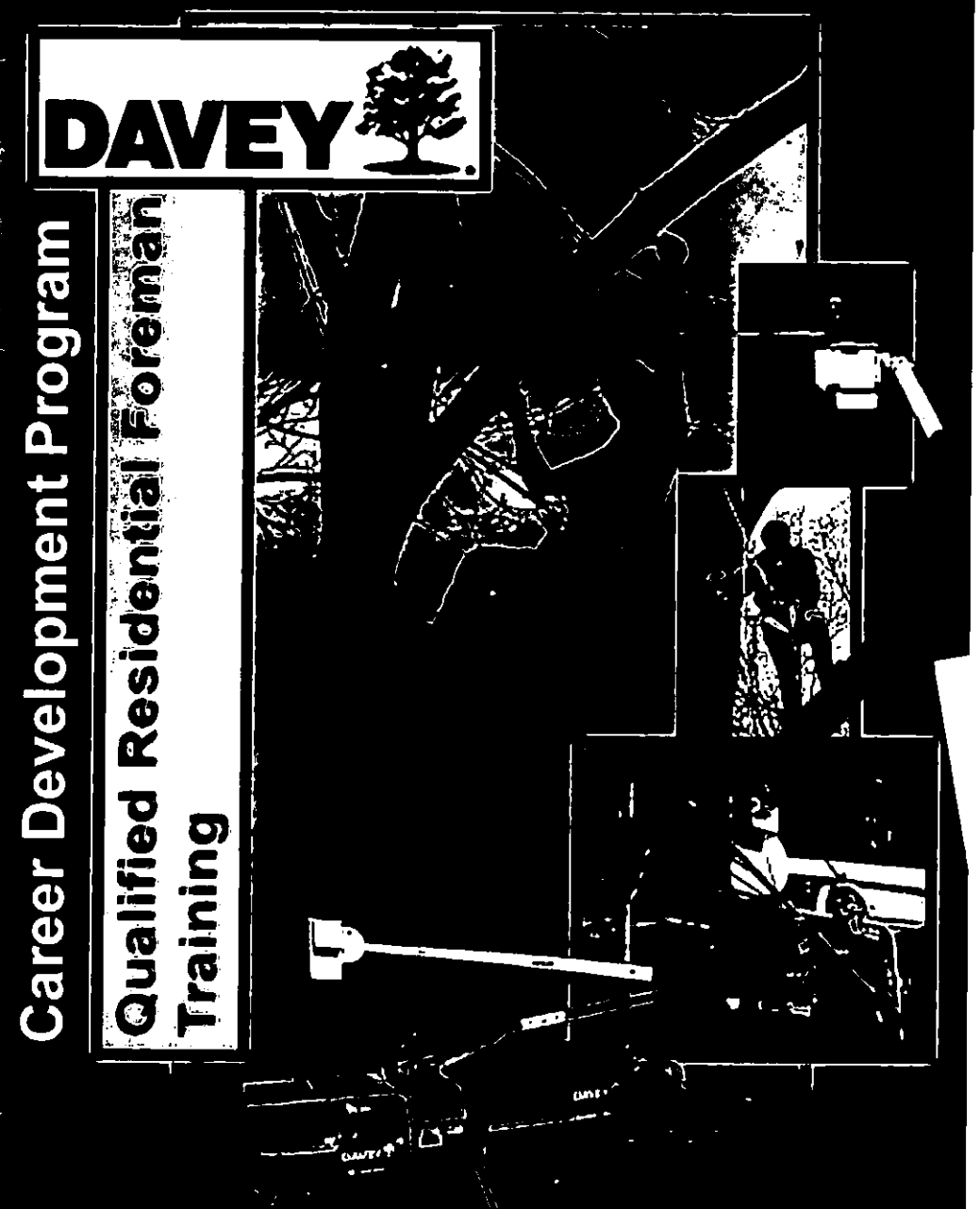
Do
It
Right
Or
Not
At
All

This belongs to:
Brett Powenski

DAVEY

Career Development Program

Qualified Residential Foreman Training



THE DAVEY TREE EXPERT COMPANY

Congratulations as you enter the foremanship training phase of tree surgery training program with the Davey Tree Expert Company.

As a Davey Foreman you will have the added responsibility of teaching, training and monitoring the progress of trainees and climbers assigned to your crew. It is up to you to share your knowledge and skill to develop your fellow Davey employees just as your foreman trained you. While continuing to grow your own skills as a tree care professional, communicate your progress and the progress of your crew to your supervisor.

Give your development and the training of others your full commitment, and you will continue your success with the Davey Tree Expert Company.

Sincerely,

Ken Celmer
Sr. Vice President and General Manager

Qualified Tree Care Foreman
Certification of Training & Demonstrated Proficiency

Re: Employee Brett Pawenski Employee # 20004899

Completion of this certification is a requisite to promotion to Foreman

This employee has satisfied Trimmer "A" requirements and is expected to complete all routine tree surgery assignments and in addition:

- Shows leadership by helping teach newer trimmers and trainees.
- Knows Davey and client (if applicable) reporting procedures necessary for foremanship.
- Is able to communicate with the crew, client and public.
- Knows, follows and promotes Davey work procedures & safety rules.
- Has successfully performed as a probationary foreman.

When the employee has satisfactorily demonstrated proficiency in the above requirements, sign this certification.

Employee	District Manager	Date
		10/1/04

ATTENTION DISTRICT MANAGER:

Send this Training Certification to the Safety Department when completed.

APPENDIX F
Tailgate Form

TAILGATE SAFETY MEETING FORM

Date:_____ Time:_____Job Number: W912DR-20-D-0012

Site Location: Niagara Falls Air Reserve Station Site 3 Landfill

Scope of Work: Site Visit/Reconnaissance; Vegetation Removal; Tree Removal; CAMP Air Monitoring; Stump Removal; Landfill Cap Repair; Site Maintenance.

SAFETY TOPICS PRESENTED

Protective Clothing/Equipment: Level D: hard hat (if applicable), standard work clothing, safety glasses, safety-toed boots, work gloves, traffic vest, etc.

Chemical Hazards: None anticipated.

Physical Hazards: Slips, trips, falls; heavy equipment; uneven/marshy conditions. Review AHAs

Equipment Used: stake body truck; wood chipper; chainsaws; hand/power tools

Emergency Procedures: 911, First Aid

Hospital:

Mount St. Mary's Hospital
5300 Military Road
Lewiston, NY 14092

Phone: **845-561-4400**Ambulance Phone: 911

Hospital Address and Route: • Head South on Kinross Street toward Langley Street (0.4 miles), Turn left on Hulby Street (194 ft), Turn right on Hulby Street (0.2 miles), Turn right onto Kirkbridge Drive (144ft), Turn left onto Wagner Drive (0.4 miles), Turn left onto Blewett Drive (0.4 miles), Turn right onto Tuscarora Road (0.4 miles), Turn left onto Lockport Rd (0.4 miles), Turn right onto Joris Ct/Lockport Rd (1.8 Miles), Turn right onto NY-265 N/Military Rd (3.0 miles), Turn left (0.1 mile), arrive at hospital.

Noise Impacts and Mitigation: Ear plugs/muffs during wood chipping, tree removal, and stump grinding, Noise Monitoring.

Odor Impacts and Mitigation:

Permits Required:

ATTENDEES

NAME PRINTED	SIGNATURE

Meeting Conducted by: _____ Signed by: _____
Site Safety Officer: _____ Quality Manager: _____

Daily Issues and Lessons Learned:_____

Daily Site Closure Actions:_____

APPENDIX G
Accident Investigation and Reporting Form

U.S. Army Corps of Engineers (USACE)

MISHAP NOTIFICATION AND INVESTIGATION

For use of this form, see instructions in the attachments and USACE ER 385-1-99; the proponent agency is CESO.

Requirement Control Symbol

RCS-CESO-21-0001

DATA REQUIRED BY THE PRIVACY ACT OF 1974

Authority 10 U.S.C. 7013, Secretary of the Army; 5 U.S.C. 7902, Safety Programs; Public Law 91-596, Occupational Safety and Health Act of 1970; DoD Instruction 6055.1, DoD Safety and Occupational Health Program; Army Regulations 385-10, Army Safety Program; DoD Instruction 6055 .07, Mishap Notification, Investigation, Reporting, and Record Keeping; and E.O. 9397 (SSN), as amended.

Principal Purpose Information collected is to provide the USACE leaders, soldiers, families and civilians in injury, illness, and loss data to effectively manage its safety and occupational health program.

Routine Uses In addition to those disclosures generally permitted under 5 U.S.C. 552a(b) of the Privacy Act of 1974, these records or information contained therein may specifically be disclosed outside the DoD as a routine use pursuant to 5 U.S.C. 552a(b) as follows: To the Department of Labor, the Federal Aviation Agency, the National Transportation Safety Board, and to Federal, State, and local agencies and applicable civilian organizations, such as the National Safety Council, for use in a combined effort of accident prevention. In some cases, data must also be disclosed to an employee's representative under the provisions of 29 CFR 1960.29. Records will be made available consistent with applicable laws and regulations. Information will be withheld from the public only if authorized by 5 U.S.C. Section 552 (Freedom of Information Act (FOIA), 5 U.S.C. 552a (Privacy Act)), or other statutory or regulatory authority.

Disclosure Failure to provide all the required information on the report may result in the rejection of report submission.

1. WHO IS REPORTING MISHAP

a. Name:		b. Phone number:
c. Email address:	d. Signature:	
e. Report type:	☐ 1. Near Miss Report. *(No injury/illness, or property damage. Complete all fields with underlined text.)*	Date:
	☐ 2. Initial Accident Report. (*For accident notification within 24 hrs, Complete all fields with underlined text.*)	Date:
	☐ 3. Final Accident Report. *(For reporting findings from accident investigation, complete full form.)*	Date:

f. Mishap Type. *(Check all that apply)*

☐ Fatality	☐ Injury/Illness	☐ Property Damage	☐ Near Miss

g. Were any of the following items associated with the mishap ? ☐ Yes ☐ No *(If yes, check all that apply)*

☐ Electrical and/or Hazardous Energy	☐ Working at Heights	☐ Diving	☐ Load Handling Equipment or Rigging	☐ Occupational Health Exposure

2. WHO WAS INVOLVED IN THIS MISHAP?

a. Name:		
b. Personnel Classification:	c. Time employee began work:	
d. Gender:	e. Date of birth (for Government personnel only):	f. Age:
g. Date hired:	h. Primary language:	
i. Is individual a supervisor? ☐ Yes ☐ No	j. Duty status at time of mishap:	k. Years experience in job:

l. What was individual doing when mishap occurred? (*Select activity from the drop downs below.*)

1. General activities:	2. Vehicle/Equipment/Vessel:
3. Sports/Recreation:	4. Other not listed:

m. Did individual utilize all OSHA/EM 385-1-1 required Personal Protective Equipment (PPE) for activity? ☐ Yes ☐ No ☐ N/A

If no, identify missing PPE:

n. Was a Personal Flotation Device used? ☐ Yes ☐ No ☐ N/A	o. Was a seat belt used? ☐ Yes ☐ No ☐ N/A

p. **Government personnel only:**		
1. Job series:	2. Rank:	3. Grade:
4. Center/Division/Lab:		5. District:
q. **Contractor personnel only:**		
1. Employer/Contractor name:		
2. Individual's occupation/trade:		Other not listed:
r. If mishap occurred on a contractor site, provide the following:		
1. Prime Contractor name:		
2. Contract number:	3. Contract type:	4. Funding type:

3. WHAT TYPE OF INJURY/ILLNESS OCCURRED?

a. Severity of injury/illness?	b. Type of Injury/Illness:
c. Identify body part(s) affected by injury/illness:	
Primary body part affected:	Secondary body part affected:
d. Identify cause and source of injury/illness:	
Cause of injury/illness:	Source of injury/illness:
e. Was employee treated by a physician or health care professional provider? ☐ Yes ☐ No	
If yes, provide name of physician or health care professional provider?	
f. Was treatment given away from work site? ☐ Yes ☐ No	g. Was employee treated in an emergency room ? ☐ Yes ☐ No ☐ N/A
h. If treatment was given away from the work-site, where was it given? (For Government Personnel Only)	
Treatment facility name: Address: City: State: Zip: Country:	
i. Was employee hospitalized as an in-patient? ☐ Yes ☐ No	If yes, how many nights? / Was OSHA notified? ☐ Yes ☐ No
Note: OSHA requires reporting all work-related fatalities within 8 hours and in-patient hospitalizations, amputations and loss of an eye within 24 hours to OSHA.	
j. Estimated days away from work:	k. Estimated days of restricted/transferred duty:

4. WHAT HAPPENED?

a. What was the primary activity occurring at the time of the mishap?
Other, not listed:
b. What happened? Provide a detailed description of the mishap. (Do not include any personally identifiable information (name, etc.).)
Note: Provide supporting photos, charts, diagrams, etc. with this report.
c. What other organizations or agencies have been notified about this mishap?

5. WHAT TYPE OF PROPERTY/MATERIAL WAS INVOLVED?			
a. List all property/material involved in the mishap. (Include damaged and undamaged property.)			
	Item A	*Item B*	*Item C*
i. Type of item:			
Other not listed:			
ii. Name of item(s):			
iii. Collision type:			
Other not listed:			
iv. Ownership of item:			
v. Dollar cost of damage:			

6. WHEN DID THE MISHAP OCCUR?	
a. Date the mishap occurred:	b. Time mishap occurred:
c. What day did mishap occur on?	d. What period of day did mishap occur?

7. WHERE DID THE MISHAP OCCUR?			
a. Did the mishap occur on a military Base/Post? ☐ Yes ☐ No			
b. USACE Office/Program/Project name:			
c. Select the location type most closely associated with the mishap:			
d. Identify exact location where mishap occurred:			
Address:			
City:	State:	Zip:	Country:
e. Latitude:	f. Longitude:		

8. WHY DID THE MISHAP OCCUR? (*Recommend completing this section for Near Misses.*)
A. Performance Causal Factors
1. Did a problem with performance contribute to this mishap occurring? ☐ Yes ☐ No
If yes, select the error that contributed most to the mishap:
2. Describe action(s) taken, anticipated or recommended to eliminate cause(s):
B. Support Causal Factors
1. Did a problem with resources contribute to this mishap occurring? ☐ Yes ☐ No
If yes, select the error that contributed most to the mishap:
2. Describe action(s) taken, anticipated or recommended to eliminate cause(s):
C. Standards/Policy/Planning Causal Factors
1. Did an organizational standard/policy/or plan contribute to this mishap occurring? ☐ Yes ☐ No
If yes, select the error that contributed most to the mishap:
2. Was a written Activity Hazard Analysis (AHA) or equivalent completed and accepted by Government Designated Authority (GDA) for task(s) being performed at time of mishap? (If yes, attach a copy to this report) ☐ Yes ☐ No
If yes, was the AHA available and used by worker? ☐ Yes ☐ No
3. Was a written work plan (critical lift plan, fall protection plan, etc.) required, completed and accepted by the GDA for task(s) being performed at time of mishap? ☐ Yes ☐ No
If yes, was the plan available and used by worker? ☐ Yes ☐ No

4. Describe action(s) taken, anticipated or recommended to eliminate cause(s):

D. Training Causal Factors

1. Did a problem with training contribute to this mishap occurring? ☐ Yes ☐ No

If yes, select the error that contributed most to the mishap:

2. Was individual trained to perform the activity/task? ☐ Yes ☐ No

If yes, select type of training: ☐ Classroom ☐ Certification/License ☐ On the job

☐ Other, describe:

What was date of most recent training?

3. Describe action(s) taken, anticipated or recommended to eliminate cause(s):

E. Leader/Supervisor Causal Factors

1. Did any leader/supervisory mistake/task error contribute to this mishap occurring? ☐ Yes ☐ No

If yes, select the error that contributed most to the mishap:

2. Did the safety climate/culture contribute to the mishap? ☐ Yes ☐ No

3. Did challenges with teamwork contribute to the mishap? ☐ Yes ☐ No

4. Describe action(s) taken, anticipated or recommended to eliminate cause(s):

F. Individual Causal Factors

1. Did any individual mistakes/task errors contribute to this mishap occurring? ☐ Yes ☐ No

If yes, select the error that contributed most to the mishap:

2. Describe action(s) taken, anticipated or recommended to eliminate cause(s):

G. Physical Environment Causal Factors

1. Did any physical environment contribute to this mishap occurring? ☐ Yes ☐ No

If yes, select the error that contributed most to the mishap:

2. Describe action(s) taken, anticipated or recommended to eliminate cause(s):

H. Material Causal Factors

1. Did any material failure contribute to this mishap occurring? ☐ Yes ☐ No

If yes, select the error that contributed most to the mishap:

2. Which failure is most closely associated with the material failure/malfunction?

3. Describe action(s) taken, anticipated or recommended to eliminate cause(s):

I. Environmental Causal Factors

1. Did any environmental condition contribute to this mishap occurring? ☐ Yes ☐ No

If yes, select the factor that contributed most to the mishap:

2. Describe action(s) taken, anticipated or recommended to eliminate cause(s):

J. Facility/Building Design
1. Did the design of the facility/building contribute to the mishap? ☐ Yes ☐ No
If yes, describe:
2. Describe action(s) taken, anticipated or recommended to eliminate hazard:
K. Existing Hazard
1. Did a hazard(s) contribute to the mishap? ☐ Yes ☐ No
If yes, describe the hazard(s):
2. Describe action(s) taken, anticipated or recommended to eliminate hazard(s):
9. Corrective Action plan
a. Have all corrective action(s) to prevent mishap recurrence been completed? ☐ Yes ☐ No
b. Who is responsible for the corrective action plan?
c. What date will/have all corrective action(s) be/been completed by:
d. Additional information:
10. Additional Information

APPENDIX H
Blood-Borne Pathogen Program

TIDEWATER INC
ENGINEERS / SCIENTISTS / PROGRAM MANAGERS

Health, Safety and Environment Program

Bloodborne Pathogens Program
Exposure Control Plan

July 2019

Approved by:

Bernard F. Umiejewski

Corporate Health, Safety and Environment

Introduction

Tidewater recognizes the potential danger to its employees resulting from occupational exposure to bloodborne pathogens. OSHA addresses these hazards in their standard, Occupational Exposure to Bloodborne Pathogens Rule (29 CFR 1910.1030). Bloodborne pathogens are infectious microorganisms in human blood that can cause disease in humans. These pathogens include, but are not limited to, hepatitis B (HBV), hepatitis C (HCV) and human immunodeficiency virus (HIV).

Purpose

This program addresses the methods of compliance with the OSHA standard and focuses on reducing the risk of contracting a bloodborne pathogen related disease while conducting work for Tidewater. Tidewater's Bloodborne Pathogens Program Exposure Control Plan is essential for developing, implementing, and monitoring information specifically directed at reducing the risk of exposure and the risk of infection.

Scope and Applicability

OSHA standards for bloodborne pathogens (BBPs) and personal protective equipment (PPE) require employers to protect workers from occupational exposure to infectious agents. The BBP standard applies when workers have occupational exposure to human blood or other potentially infectious materials (OPIMs). At Tidewater, those who have been assigned duties as First Aid/Cardiopulmonary Resuscitation/Automated External Defibrillator (FA/CPR/AED) responders and trained in FA/CPR/AED are covered by the standard and this Exposure Control Plan.

Regulatory/Voluntary Standard References

Tidewater's Bloodborne Pathogens Program Exposure Control Plan (ECP) has been developed to comply with the following applicable standard(s):

- 29 CFR 1910.1030 - OSHA Occupational Exposure to Bloodborne Pathogens
- 29 CFR 1910.1020 – OSHA Access to Employee Exposure and Medical Records
- EM 385-1-1 Section 03.A.05 – Bloodborne Pathogen Program

Responsibilities

Corporate Health, Safety and Environment (Corporate HSE)

- Develop a BBP Program, implementing it, and monitor overall compliance with the OSHA BBP Standard;
- Review the BBP Program annually;
- Consider commercially available medical devices designed to eliminate or minimize occupational exposure applicable to first aid response. Annually discuss with Corporate Health and Safety Committee and document in meeting minutes;

- Maintain a record of first aid response incidents where blood or other potentially infectious materials were present; and
- Maintain the employee's right to confidentiality.

Managers

- Ensure employees receive BBP training and are offered vaccinations.
- Contact the Corporate HSE following a first aid or exposure incident;
- Ensure that an incident report is sent to the Corporate HSE for first aid response or exposure incidents involving blood or other potentially infectious materials (OPIMs); and
- Refer the employee for prompt medical evaluation and follow-up as discussed below.

Employees

- Comply with the provisions of this program, as applicable;
- Immediately report any first aid or exposure incident to their supervisor.

Procedures

Exposure Determination and Task Identification

The BBP standard applies when workers have occupational exposure to human blood or other potentially infectious materials (OPIMs), and requires the use of universal precautions to prevent contact with these materials.

As defined in the OSHA BBP standard, “blood” means human blood, human blood components, and products made from human blood. “Other Potentially Infectious Materials" means:

1. The following human body fluids: semen, vaginal secretions, cerebrospinal fluid, synovial fluid, pleural fluid, pericardial fluid, peritoneal fluid, amniotic fluid, saliva in dental procedures, body fluid that is visibly contaminated with blood, and all body fluids in situations where it is difficult or impossible to differentiate between body fluids;
2. Any unfixed tissue or organ (other than intact skin) from a human (living or dead); and
3. HIV-containing cell or tissue cultures, organ cultures, and HIV- or HBV-containing culture medium or other solutions; and blood, organs, or other tissues from experimental animals infected with HIV or HBV.

Although not specifically covered by the BBP standard, other body fluids, such as, urine, feces, nasal secretions, sputum, vomit, breast milk, and saliva (from other than dental procedures)., have been identified as potential sources of worker exposures and infections.

At Tidewater, those who have been assigned duties as First Aid/Cardiopulmonary Resuscitation (FA/CPR) responders and trained in FA/CPR are covered by the standard and

this Exposure Control Plan. In most cases, those who provide coverage as Site-Safety and Health Officers (SSHO) are also those trained in FA/CPR.

In some instances, projects may require employees to have direct contact with wastes from municipal sites, hospitals, medical laboratories, or medical facilities through sampling or other responsibilities. Although much of this waste may not meet the definition of blood or OPIMs, the hazard evaluation may result in requirements for PPE to prevent exposures to infectious materials and the consideration of offering vaccinations for tetanus, tuberculosis, etc.

Universal Precautions

Universal Precautions is an approach to infection control in which all human blood and certain human body fluids are treated as if they are known to be infectious. Universal Precautions provide the first line of defense and shall be practiced at all times when there is a potential for exposure. Universal precautions are a combination of Engineering Controls and Work Practices, and PPE.

Engineering and Work Practice Controls

Engineering and work practice controls shall be used to eliminate or minimize employee exposure and include Work Area Restrictions, Needles and other Sharps, Housekeeping, Laundry Procedures, Decontamination, and Regulated Waste Disposal.

Work Area Restrictions

- In work areas where there is a foreseeable exposure to blood or other potentially infectious material, employees are not to eat, drink, apply cosmetics or lip balm, smoke or handle contact lenses.
- Food and beverages are not to be kept in refrigerators, freezers, shelve, cabinets, on counter tops or bench tops where blood or other potentially infectious material are present.
- Mouth pipetting/suctioning of blood or other potentially infectious material is prohibited.
- All procedures will be conducted in a manner which will minimize splashing, spraying, splattering & generation of droplets of blood or other potentially infectious material.

Needles and other Sharps

- Tidewater does not expect FA/CPR responders to encounter or use syringes, needles or other sharps (e.g., glass capillary tubes) in the course of providing assistance to those who are injured. However, if sharps are encountered, contaminated needles and other contaminated sharps will not be bent, recapped, removed, sheared or purposely broken. Handle sharp objects to prevent potential for cuts and puncture.
- Contaminated sharps that are not reusable are to be placed immediately, or as soon as possible, after use into appropriate sharps containers.

- Sharps containers are puncture resistant, labeled with a biohazard label, and are leak proof.

Housekeeping

- All biological waste, including all disposable medical products, will be discarded into color coded containers labeled BIOHAZARD before being secured and transported for disposal.
- All first aid kits will contain biohazard bags to contain waste created in first aid/emergency situations.
- When working with waste resulting from an accident, Universal Precautions shall be the first line of defense against exposure to bloodborne pathogens. All biological waste and any potentially infectious material shall be handled according to the information presented below in **Regulated Waste Disposal.**

Laundry Procedures

- Laundry contaminated with blood or other potentially infectious material will be handled as little as possible.
- Contaminated laundry will be bagged and containerized at the location where it was used and it will not be sorted or rinsed in the location of use.
- All employees who handle contaminated laundry will use personal protective equipment to prevent contact with blood or other potentially infectious material.
- Contaminated laundry that is cleaned by an outside source which does not utilize Universal Precautions in the handling of all laundry, the contaminated laundry must place such laundry in bags or containers which are labeled with the BIOHAZARD label or color-coded.

Decontamination

- All employees shall wash their hands and any other affected skin with soap and water, and flush exposed mucous membranes with water immediately or as soon as feasible following contact with blood or OPIMs.
- Where access to hand washing facilities is not possible, appropriate antiseptic hand cleansers and towelettes will be provided as part of a first aid kit. However, all employees are required to wash hands as soon as feasible after using antiseptic cleanser and towel alternatives.
- Clean spilled blood from the floor and around the equipment immediately.
- Employees engaged in cleaning shall use PPE (e.g., gloves) so that there is no contact of potentially contaminated material with skin or personal clothing.
- Clean floors, surrounding items, and equipment with a germicidal detergent or household bleach (1 part to 10 parts water), avoiding splatter or dripping. If dripping is reasonably anticipated, place a drop cloth or absorbent towel under the equipment being cleaned.
- All cleaning materials and personal protective equipment shall be disposed of as infectious waste or properly prepared as potentially infectious laundry for transport to a laundry facility.

- Contaminated equipment that is to be serviced shall be examined and decontaminated by someone trained in first aid, or an equipment maintenance specialist under the supervision of someone trained in first aid.
- If decontamination of the equipment is not feasible:
    - A BIOHAZARD label shall be attached to the equipment stating which portions remain contaminated. If large, it shall be roped off until it is made safe or properly removed.
    - Information that the piece of equipment may present a risk of occupational exposure to bloodborne pathogens must be conveyed to all affected employees or the servicing or moving representatives prior to handling, servicing, or shipping.

Regulated Waste Disposal

- Regulated Waste means:
    - liquid or semi-liquid blood or other potentially infectious materials;
    - contaminated items that would release blood or other potentially infectious materials in a liquid or semi-liquid state if compressed;
    - items that are caked with dried blood or other potentially infectious materials and are capable of releasing these materials during handling;
    - contaminated sharps; and
    - pathological and microbiological wastes containing blood or other potentially infectious materials.
- Regulated waste must be placed in containers which are closable, constructed to contain all contents and prevent leakage, appropriately labeled or color-coded, and closed prior to removal to prevent spillage or protrusion of contents during handling.
- All contaminated sharps are discarded immediately or as soon as feasible in sharps containers that are closable, puncture-resistant, leak-proof on sides and bottoms, and labeled or color-coded appropriately.
- When moving containers of contaminated sharps from the area of use, the containers shall be closed immediately prior to removal or replacement to prevent spillage or protrusion of contents during handling, storage, transport or shipping.
- The container shall be placed in a secondary container if leakage or the primary container is compromised. The second container shall be closable, constructed to contain all contents and prevent leakage during handling, storage and transport, or shipping. The second container shall be labeled or color-coded to identify its contents.
- Reusable containers shall not be opened, emptied, or cleaned manually or in any other manner which would expose employees to risk of percutaneous injury.
- Disposal of all regulated waste shall be in accordance with applicable regulations of the United States, States and Territories, and local regulations.

Personal Protective Equipment (PPE)

- Tidewater will provide appropriate PPE. This includes first aid kits with gloves, flexible airways, and biohazard disposal bags.
- PPE will be considered appropriate only if it does not permit blood or OPIMs to pass through to or reach the employee's work clothes, street clothes, undergarments, skin, eyes, or mouth or other mucous membranes under normal conditions of use and for the duration of time the protective equipment will be used.
- Training is provided by Safety or the SSHO in the appropriate use of the PPE for tasks or procedures employees will perform.
- If PPE or clothing becomes contaminated, it shall be removed or as soon as possible.
- All PPE shall be removed prior to leaving the work area and placed in a marked container or plastic bag for storage, washing, decontamination, or disposal.
- Gloves shall be worn when providing first aid to injured employee and where it is reasonably anticipated employees will have hand contact with blood or other potentially infectious material, non-intact skin, and/or mucous membranes.
- Disposable gloves are not to be washed or decontaminated for re-use and are to be replaced as soon as possible when they become contaminated; if gloves are torn or punctured; or when their ability to function as a barrier is compromised.
- Utility gloves may be decontaminated for re-use provided the integrity of the glove is not compromised.
- Utility gloves will be discarded if they are cracked, peeling, torn, punctured, or exhibit other signs of deterioration; or when their ability to function as a barrier is comprised.
- Masks in combination with eye protection devices, such as, goggles or glasses with solid side shield, or chin length face shields, are required to be worn whenever splashes, spray, splatter, or droplets of blood or other potentially infectious material may be generated and eye, nose, or mouth contamination can reasonably be anticipated.

Post-Exposure Evaluation and Follow-Up

All employees who have been in an exposure incident (see Abbreviations and Definitions) will be immediately referred for a confidential post-exposure evaluation and follow-up.

Medical Evaluation

The medical evaluation will include the following components:

- Evaluating the route of exposure and circumstances in which the incident occurred.
- Identification and documentation of the source individual;
    - After obtaining consent, the source individual's blood shall be tested as soon as possible to determine HBV and HIV status. If consent cannot be obtained, Tidewater shall document that legally required consent cannot be obtained. When consent is not required by law, the source individual's blood, if available, shall be tested and the results documented.

  - When the source individual is already confirmed to be infected with HBV or HIV, testing need not be repeated.
  - Results of the source individual's testing shall be made available to the exposed employee, and the employee shall be informed of the laws and regulations concerning disclosure of data related to the source individual.
- The exposed employee's blood shall be collected and tested as soon as possible.
- If the employee consents to a baseline blood collection, but does not give consent at that time for HIV testing, the sample shall be preserved for at least 90 days. If, within 90 days of the incident, the employees elects to have the sample tested, the testing will be done as soon as possible.
- If a Hepatitis B vaccination is recommended, the employee may choose to waive the vaccination by signing the declination form. (If the employee initially declines hepatitis B vaccination but at a later date decides to accept the vaccination, it will be made available at that time.)
- Counseling.
- Evaluation of reported illnesses.

Information Provided to the Healthcare Professional

The Supervisor, Project Manager or SSHO will provide the healthcare professional who is conducting the post-exposure evaluation:

- A copy of 29 CFR Part 1910.1030;
- A description of the exposed employee's duties related to the exposure incident;
- Documentation of the route of exposure and circumstances under which the exposure occurred;
- Results of the source individual's blood testing if available; and
- The employee's vaccination status.

Healthcare Professional's Written Opinion

Tidewater's provide the employee with a copy of the evaluating healthcare professional's written opinion within 15 days after completing of the evaluation. This written opinion shall be limited to whether Hepatitis B vaccination is indicated for the employee and whether the employee has received it. The written opinion shall be limited to discussions regarding the fact that the employee has been informed of any medical conditions resulting from their exposure and the results of the evaluation. The health care provider shall communicate all other findings or diagnoses directly to the employee and shall not include them in this written report.

Procedures for Evaluating an Exposure Incident

Supervisor, Project Manager or SSHO complete Bloodborne Pathogens Incident Evaluation Report **(**Appendix B) and will include a review the circumstances of all exposure incidents to determine:

- Engineering controls in use at the time;
- Work practices followed;
- Description of the device being used (including type and brand);
- Personal protective equipment or clothing that was used at the time of the exposure incident (gloves, eye shields, etc.);
- Location of the incident;
- Procedure being performed when the incident occurred; and
- Employee's training.

Project Manager or the SSHO will record all percutaneous injuries from contaminated sharps in the Sharps Injury Log.

If it is determined that revisions need to be made, Safety will ensure that appropriate changes are made to this ECP.

Training and Qualifications

All employees will participate in a training program for bloodborne pathogens. Training shall be provided at the time of initial assignment to tasks where occupational exposure may occur and at least annually thereafter. Refresher training may be provided as part of an 8-hour HAZWOPER Refresher course. It must be conducted by an individual who is knowledgeable in the subject matter covered.

Initial training will include the following elements:

- A copy of the OSHA BBP Standard and an explanation of its contents;
- A general explanation of the epidemiology and symptoms of bloodborne diseases;
- An explanation of the modes of transmission of bloodborne pathogens;
- A copy of the Tidewater ECP;
- Appropriate methods for recognizing tasks that may involve exposure to bloodborne pathogens;
- Use and limitations of methods that will prevent or reduce exposure, including engineering controls, work practices, and personal protective equipment;
- Information on the types, proper use, location, handling, and decontamination and/or disposal of personal protective equipment;
- An explanation of the basis for selecting personal protective equipment;
- Information on the Hepatitis B vaccination, including information on its efficacy, safety, method of administration, the benefits of being vaccinated, and that the vaccine and vaccination will be offered at no cost to the employee;
    - Note: The employee may choose to decline the vaccination series by signing the declination form in Appendix A. If the employee initially declines hepatitis B vaccination but at a later date decides to accept the vaccination, it will be made available at that time.
- Information on appropriate actions to take and persons to contact in an emergency involving an exposure incident;

- Procedures to follow if an exposure or first aid incident occurs, including reporting methods and medical follow-up that will be made available;
- An explanation of the signs, labels, and color coding on containers required by the OSHA BBP Standard; and
- An opportunity for interactive questions and answers with the person conducting the training session.

Records

Medical Records

The Employee Certification Manager (ECM) database will be used to maintain records for each employee with occupational exposure to bloodborne pathogens. These records will be maintained according to OSHA requirements in 29 CFR 1910.1030 and 29 CFR 1910.1020. The records will include, as appropriate:

- The name and social security number of the employee;
- Hepatitis B vaccination status;
- Results of any post-exposure examination(s) and follow-up;
- The health care professional's written opinion based upon the post-exposure evaluation, and
- A copy of the information provided to the healthcare professional.

The records must be kept for a period of the employee's duration of employment plus 30 years. These records will not be released to anyone without the employee's written consent except as required by the OSHA Standard or as required by law.

Sharps Injury Log

In addition to the 1904 Recordkeeping Requirements, all percutaneous injuries from contaminated sharps are also recorded in the Sharps Injury Log. All incidences must include at least:

- Date of the injury
- Type and brand of the device involved
- Department or work area where the incident occurred
- Explanation of how the incident occurred.

The log is reviewed at least annually as part of the annual evaluation of the program and is maintained for at least five years following the end of the calendar year that they cover. If a copy is requested by anyone, it must have any personal identifiers removed from the report.

Training Records

Records for Bloodborne Pathogens training will be maintained by the ECM. Records will include:

- The dates of training sessions,
- Contents and summary of the training sessions,

- Names and qualifications of the trainers, and
- Names and job titles of course attendees.
- Training records will be maintained for a period of at least 3 years.

Abbreviations and Definitions

Bloodborne pathogens (BBP)	Pathogenic microorganisms that are present in human blood and that can infect and cause disease in persons who are exposed to blood containing these pathogens.
Infection Control Kit	Materials used to implement the provisions of this SOP. Contents include flexible airways, disposable gloves, and biohazard bags.
ECM	Employee Certification Manager Database – Contact Cathy Moore or Sara Brocki
Exposure Incident	A specific exposure to the eye, mouth, other mucous membrane or non-intact skin, or parenteral exposure to blood or other potentially infectious materials, that results from the performance of an employee's duties.
First Aid Incident	An event where a first aid provider rendered first aid or CPR and blood or body fluids were present, but where specific exposure is not known to have occurred.
Hand washing facilities	A facility providing an adequate supply of running water, soap, and single-use towels.
Parenteral	Piercing the skin barrier (including mucous membranes).
Regulated waste	Any one of these: • Liquid or semi-liquid blood or other potentially infectious materials; • Contaminated items that would release with blood or other potentially infectious materials in a liquid or semi-liquid state if compressed; • Objects caked with dried blood or other potentially infectious materials which are capable of releasing these materials during handling; • Contaminated sharps; and • Pathological and microbiological wastes containing blood or other potentially infectious materials.
Sharps	Any objects contaminated with blood or other potentially infectious material that are capable of penetrating the skin.
Sterilize	The use of a physical or chemical procedure to destroy microbial life.
Universal precautions	A method of infection control in which all human blood and certain body fluids are treated as if known to be infectious for HIV, HBV, and other bloodborne pathogens.

Appendix A

Tidewater Exposure Control Plan

Declination of Hepatitis B Vaccine

I understand that due to my occupational exposure to blood or other potentially infectious materials, I may be at risk of acquiring hepatitis B virus (HBV) infection. Tidewater has given me the opportunity to be vaccinated with hepatitis B vaccine, at no charge. However, I decline hepatitis B vaccination at this time.

I understand that by declining this vaccine, I continue to be at risk of acquiring hepatitis B, a serious disease. If in the future I continue to have occupational exposure to blood or other potentially infectious materials while employed by Tidewater and I want to be vaccinated with hepatitis B vaccine, I can receive the vaccination series at no charge.

_____ _____

Date *Signature*

_____ _____

Date *Signature of Witness*

Routing Requirements: Employee Certification Manager Database
Human Resources

Appendix B

Tidewater Exposure Control Plan

Bloodborne Pathogens Incident Evaluation Report

Employee Name:		Incident Date:	_____/ _____/_____
Location:		Incident Time:	AM/PM
Did the employee render First Aid or CPR with blood or other potentially infectious materials present? ____ Yes ____ No			
Did an exposure incident occur? ____ Yes ____ No If yes, describe here and complete the following sections.			
Manager's assessment of the following control measures used at the time of the exposure:			
Route of Exposure:			
Engineering:			
Work Practice:			
Personal Protective Equipment:			
Manager's signature:			

Appendix I
Hearing Conservation Program

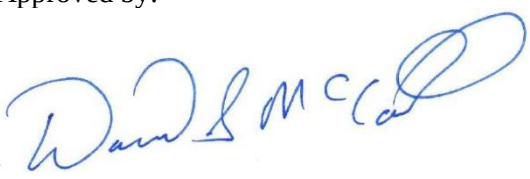
TIDEWATER INC
ENGINEERS / SCIENTISTS / PROGRAM MANAGERS

Health, Safety and Environment Program

HEARING CONSERVATION PROGRAM

November 2021

Approved by:



Corporate Health, Safety and Environment

Introduction and Purpose

Tidewater employees may perform tasks that expose them to high noise levels for extended periods of time. The Hearing Conservation Program (HCP), developed in accordance with both the OSHA General Industry and Construction requirements, is designed to help prevent hearing loss due to high noise levels while performing tasks where high noise levels have been identified.

Scope and Applicability

When employee noise exposures exceed Tidewater acceptable noise exposure limits, employees will be included in the hearing conservation program and the requirements of this program will be implemented including training and audiograms.

Regulatory/Voluntary Standard References

Tidewater's Hearing Conservation Program has been developed to comply with the following applicable standards:

- 29 CFR 1926.52 and 101- Occupational Noise Exposure; Hearing Protection
- 29 CFR 1910.95 – Occupational Noise Exposure
- USACE EM-385-1-1 2014

Responsibilities

Corporate Health, Safety and Environment (HSE) Manager

- Ensure that noise monitoring is conducted according to the requirements in the OSHA Occupational Noise Standard Exposure, 29 CFR 1910.95.
- Work with employees to identify contract clinics or audiometric testing facilities available to service these locations, and assist in clinic or facility selection when requested.
- Ensure that the supervisor and employees are notified of the noise monitoring results within 15 work days, in writing, if exposed at or above 85 dBA.
- Ensure that all occupational exposures with permanent threshold shifts of 10 dBA or greater averaged over 2000, 3000, and 4000 Hz are recorded in the OSHA 300 Log of recordable illnesses.
- Work with Supervisors, Project Managers and employees to determine if there are feasible engineering and/or administrative controls which may be implemented to reduce noise exposure levels in high noise areas to below 85 dBA.
- Ensure that hearing protection is adequate to attenuate the noise for the affected employee(s).
- Coordinate and assist any employees and field operations to set up, implement, and maintain the HCP.
- Periodically evaluate program implementation.

Project Manager/Supervisor

- Notify the Corporate HSE Manager of the addition of new equipment, changes in process, or controls which may affect the HCP, and participate in evaluations or implementation of HCP requirements.
- Ensure that all affected employees are included in the HCP.
- Ensure that all employees are aware of the locations where hearing protection is required and that buildings, areas, or specific equipment are posted with adequate notification signs.
- Ensure that employees wear hearing protection in designated areas.

Employee Responsibilities

- Assist management and the Corporate HSE Manager in identifying or evaluating high noise areas or HCP requirements.
- Complete training as required.
- Use hearing protection in designated or posted areas.
- Participate in annual audiogram in a timely manner.

Procedures

When it is suspected that noise exposure may equal or exceed Tidewater acceptable noise exposure limits, noise will be assessed in accordance with the OSHA Occupational Noise Exposure Standard and without regard to any attenuation provided by the use of personal protective equipment (PPE). Supervisors and/or Project Managers will work with the Corporate HSE Manager to properly assess potential noise exposures. A table of acceptable noise exposure limits is in Appendix A. These limits are based on ACGIH TLVs® and are the same limits mandated by USACE EM-385-1-1.

When noise exposure exceeds the Tidewater acceptable noise exposure limits (Appendix A), employees will require training and audiograms. When there are indicators that noise levels are above 85 dBA (without regard to time), it is recommended that hearing protection be worn.

Some indicators of high noise include:

- When standing 2-3 feet (arm's length) from another person and you have to raise your voice to have a conversation, the surrounding noise may be too loud.
- When equipment manuals identify the noise levels produced exceed the acceptable noise exposure limit.
- When working at a project location and others are observed using hearing protection.
- When employees experience ringing in their ears or temporary hearing loss after a day's work.
- When employees express concern about the noise levels in the workplace.
- When noise is generated by the examples of typical sound levels (>80 dBA) as shown in Appendix B.

If employees suspect high noise level, contact the Project Manager or the Supervisor. Initial screening of noise levels may be accomplished using the NIOSH Sound Level Meter mobile app for Apple products and following the guidelines in Appendix C – Obtaining Noise Levels Using NIOSH SLM Mobile app.

If noise levels cannot be reduced to acceptable levels with engineering controls, all employees potentially exposed will require annual audiograms and training, and will be provided hearing protection. Employees will be given a choice of hearing protection from a minimum of 2 options. The hearing protection offered will attenuate noise to safe levels. See NRR in the Definitions and Abbreviations table.

In rare situations where noise cannot be reduced to safe levels with engineering controls and/or hearing protection, exposure may be controlled by the time employees work in the high noise level area(s) (i.e., administrative controls).

Signs identifying high noise levels and the requirement for hearing protection will be posted in areas where high noise levels have been identified.

Training and Qualifications

All employees expected to be exposed above acceptable limits will be included in the HCP which requires that employees receive initial training and baseline audiograms. The training will include the following:

- The effects of noise on hearing.
- The purpose of hearing protection, advantages and disadvantages, attenuation of various types, and instructions on selection, fitting, use, and care of all hearing protection provided to them.
- Identification of sources of high noise levels in the workplace.
- The purpose of audiometric testing and an explanation of the test procedures.
- The contents of the OSHA Standard.

Employees that remain in the HCP will require annual training and an annual audiogram.

OSHA in the Noise Standard (29 CFR 1910.95) Appendices states the requirements for those conducting audiograms. Appendix D – Audiogram Specification summarizes those requirements and may be used to provide that information to those conducting the exams.

Records

Training records will be kept until replaced by a new training record.

Audiometric test records will be maintained for the duration of employment.

Noise exposure measurement records will be maintained for a minimum of 2 years.

Definitions and Abbreviations

ACGIH	American Conference of Governmental Industrial Hygienists
Attenuate	To reduce in strength or force. In sound, to reduce intensity as expressed in decibels.
dBA	A weighted network filter employed in making sound pressure measurements, indicated by a suffix added to the unit symbol of dbA
HCP	Hearing Conservation Program
HSE	Health, Safety and Environment
Impact Noise	The noise resulting from the collision of two masses.
Impulse Noise	Usually considered to be singular noise pulses, each less than 1 second in duration, or repetitive noise pulses occurring at greater than 1 second intervals. Also defined as a change of sound pressure of 40 dB or more within 0.5 second.
NIOSH	National Institute for Occupational Safety and Health
NRR	Noise Reduction Rating stated by the manufacturer usually found on the package. In order to calculate the adequacy of hearing protection, OSHA requires subtracting 7 from the NRR; incorporating a safety factor by dividing that number by 2; and then subtracting the remainder from the noise level readings (in dBA) to estimate the noise levels under the hearing protection. As an example: dBA reading of 110. NRR of 30. 30 minus 7 = 23. 23 divided by 2 = 11.5. 110 dBA minus 11.5 = 98.5 dBA. 98.5 dBA is the estimated level under the hearing protection.
SLM	Sound Level Meter
TLVs	Threshold Limit Values published by ACGIH. Exposure limits for various chemical substances and other occupational limits.

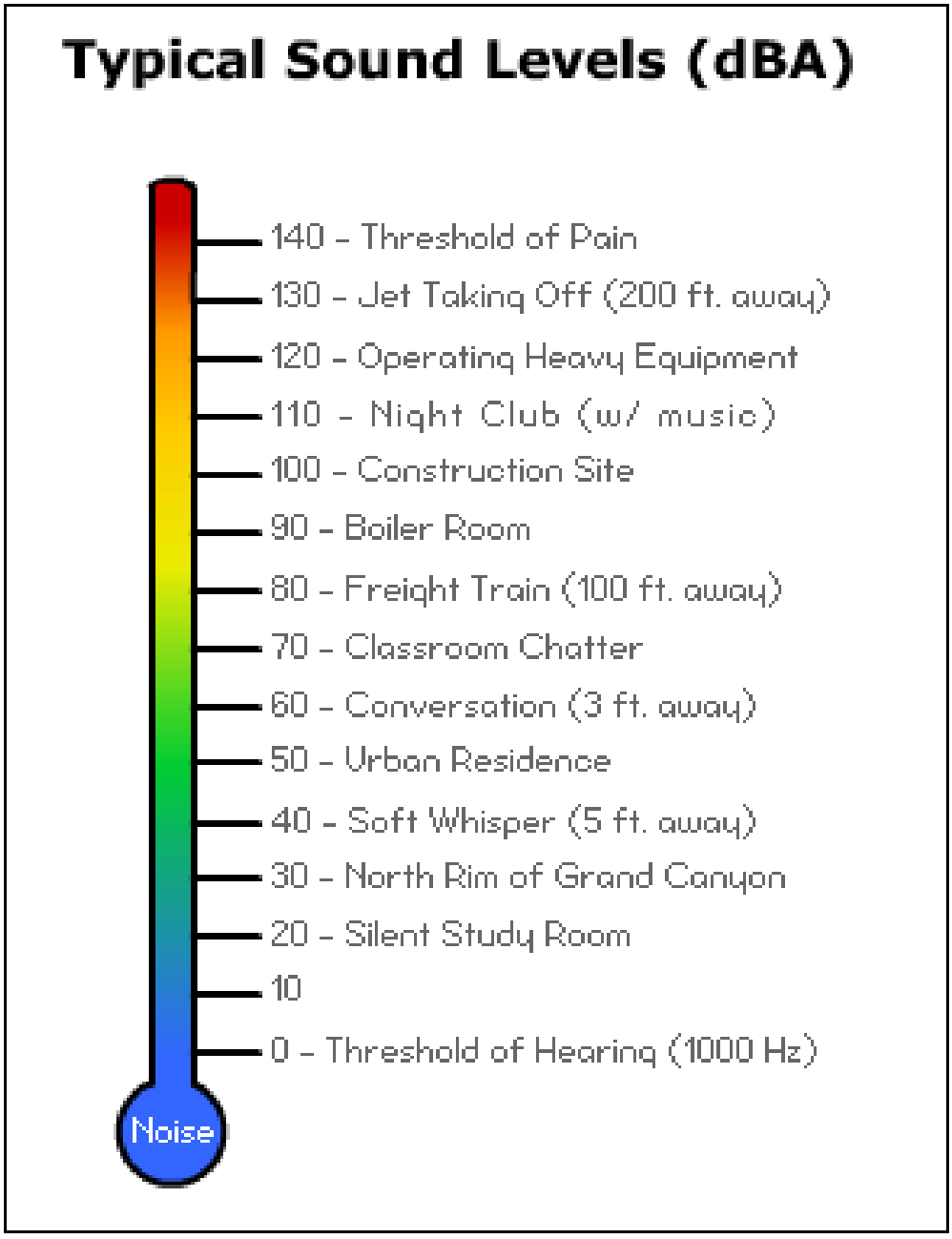
Appendix A – Tidewater Acceptable Noise Limits*

Duration Per Day, Hours	Sound Level dBA, Slow Response
8	85
6	86
4	88
3	89
2	91
1-1/2	92
1	94
1/2	97
1/4 or less	100

The noise limit for impulse or impact noise cannot exceed 140 dB peak sound pressure level.

*Based on the ACGIH TLVs® values. ACGIH TLVs® are also mandated by USACE EM-385-1-1.

Appendix B – Typical Sound Levels



Appendix C – Obtaining Noise Levels Using the NIOSH SLM Mobile app

The purpose of this Appendix is to provide guidance on obtaining noise levels using the National Institute of Occupational Safety and Health (NIOSH) Sound Level Meter mobile app when noise in excess of the Tidewater acceptable noise exposure levels is suspected. The OSHA Occupational Noise Exposure Standard has very specific requirements for documenting high noise levels in the workplace. Supervisors and/or Project Managers will work with the Corporate Health, Safety and Environmental Manager to properly assess potential noise exposures. The information included in this Appendix is used to determine if noise measurements according to OSHA requirements are necessary.

The Tidewater Hearing Conservation Program provides several indicators and examples of potential high noise levels. When these are present, it may be necessary to further quantify noise levels. An initial screen of noise levels can be conducted using the NIOSH Sound Level Meter (SLM) mobile app (see app information below).

- If sound levels are 85 dBA or above, use of hearing protection is suggested.
- Using the screening limit table below, if sound levels exceed the dBA level for the expected time you will be in the area, document the dBA level and the time spent in the area, and contact your supervisor or Project Manager. The table below represents ½ of the acceptable limits. You may work in the area using hearing protection.

Noise Level Screening Limits
(Approximately ½ of the acceptable limits)

Duration Per Day, Hours	Sound Level dBA, Slow Response
8	83
4	85
2	88
1	91
1/2	94
1/4 or less	97

When noise levels on the app indicate potential exposure above those in the screening limit table above, Project Managers or supervisors should contact the Corporate HSE Manager to determine next steps.

NIOSH SLM Mobile app: The app can be found in the app store for Apple devices by searching "NIOSH SLM". This is a free app but only available for Apple devices. Detailed information on the app can be found on the NIOSH website: https://www.cdc.gov/niosh/topics/noise/app.html (NOTE: There are several mobile apps. Tidewater has specifically selected the NIOSH app.) The NIOSH app recommends the use of an external microphone and acoustical calibrator for better accuracy. If these items are not available, it does not prevent use of the app and still provides a good screening measurement. It is important to note that no app provides monitoring that is compliant with the OSHA standard. The apps are to be used ONLY as screening tools.

Appendix D – Audiogram Specifications

The purpose of this Appendix is to provide information on audiograms. The audiograms will be conducted by a contract clinic near employee work locations and must be conducted according to the requirements of the OSHA Occupational Noise Exposure Standard (26 CFR 1910.95 Appendices C, D, E). The information included in this Appendix can be provided to the clinic to ensure compliance. However, the contract clinic should be familiar with OSHA Occupational Noise Exposure Standard (29 CFR 1910.95), especially the applicable Appendices.

Employee Audiometric Testing

- Baseline should be performed prior to exposure, but shall be performed within 6 months of an employee's exposure at or above the action level of an 8-hour TWA of 85 dBA.
- The baseline audiogram should be conducted after a 14 hour period where the employee is not exposed to high noise levels.
- At least annually after obtaining the baseline audiogram, each affected employee shall receive a new audiogram.
- All employees who have experienced a standard threshold shift (STS) shall be retested within 30 days, and the results of this test shall be used as the annual audiogram
- Each employee who has had a persistent standard threshold shift (PSTS) due to an occupational exposure requires notification in writing within 21 days of this determination. A copy of this notification will also be maintained by the employee's supervisor and the Corporate HSE Manager.
- All confirmed PSTS that are considered to be related to occupational exposure shall be recorded in the OSHA 300 Log of recordable illnesses.
- The Supervisor, Project Manager and Corporate HSE Manager should assess each job where a PSTS has occurred and identify controls to prevent future STS.
- An employee experiencing an STS shall be referred for a clinical audiological evaluation if additional testing is necessary or if a medical pathology of the ear is suspected to be caused by the wearing of hearing protection. In addition, these employees shall be refit and retrained in the use of hearing protection.

Audiometric Test Facility and Equipment Requirements

- Audiometric tests shall be performed by a licensed or certified audiologist, otolaryngologist, or other physician, or by a technician who is certified by the Council of Accreditation in Occupational Hearing Conservation, or who has satisfactorily demonstrated competence in administering audiometric examinations, obtaining valid audiograms, and properly using, maintaining and checking calibration and proper functioning of the audiometers being used. A technician who operates microprocessor audiometers does not need to be certified. A technician who performs audiometric tests must be responsible to an audiologist, otolaryngologist or physician.
- Audiometric tests shall be pure tone, air conduction, hearing threshold examinations, with test frequencies including as a minimum 500, 1000, 2000, 3000, 4000, and 6000 Hz. Tests at each frequency shall be taken separately for each ear.
- Audiometric tests shall be conducted with audiometers (including microprocessor

audiometers) that meet the specifications of, and are maintained and used in accordance with, American National Standard Specification for Audiometers, S3.6-1969.

- Pulsed-tone and self-recording audiometers, if used, shall meet the requirements specified in Appendix C of the OSHA Occupational Noise Exposure Standard, 29 CFR 190.95: "Audiometric Measuring Instruments".
- Rooms used for audiometric testing shall not have background sound pressure levels exceeding those in the table below when measured by equipment conforming at least to the Type 2 requirements of American National Standard Specification for Sound Level Meters, S1.4-1971 (R1976), and to the Class II requirements of American National Standard Specification for Octave, Half-Octave, and Third-Octave Band Filter Sets, S1.11-1971 (R1976).

MAXIMUM ALLOWABLE OCTAVE-BAND SOUND PRESSURE LEVELS
FOR AUDIOMETRIC TEST ROOMS

Octave-band center frequency (Hz)	500	1000	2000	4000	8000
Sound pressure level (dB)	40	40	47	57	62

"Audiometer calibration."

- The functional operation of the audiometer shall be checked before each day's use by testing a person with known, stable hearing thresholds, and by listening to the audiometer's output to make sure that the output is free from distorted or unwanted sounds. Deviations of 10 decibels or greater require an acoustic calibration.
- Audiometer calibration shall be checked acoustically at least annually in accordance with Appendix E: "Acoustic Calibration of Audiometers." Test frequencies below 500 Hz and above 6000 Hz may be omitted from this check. Deviations of 15 decibels or greater require an exhaustive calibration.
- An exhaustive calibration shall be performed at least every two years in accordance with sections 4.1.2; 4.1.3.; 4.1.4.3; 4.2; 4.4.1; 4.4.2; 4.4.3; and 4.5 of the American National Standard Specification for Audiometers, S3.6-1969. Test frequencies below 500 Hz and above 6000 Hz may be omitted from this calibration.