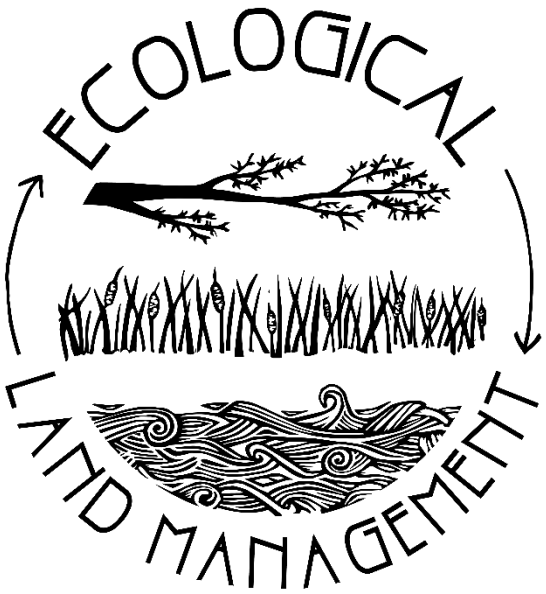

Explanation of Work Letter
Buzzy Park
Wilmington VT

8/17/2026

To Whom it May Concern,

The focus of this plan is Itadori knotweed (*Fallopia japonica*). For the duration of the work, the expected method of chemical treatment of *R. japonica* in the second half of the year is the use of a backpack sprayer, with a 3-5% concentration of glyphosate, and a 1-3% concentration of Agri-Dex surfactant. The same mixture is appropriate for many other woody species and shall be used for treating emergent seedlings and any resprouts, unless species specific considerations demand otherwise. A two-step treatment regime for the late summer/autumn paired with a growth inhibiting treatment in the spring shall be pursued, as outlined in the included "Plan of Work". Spring treatment shall be with glyphosate concentrations between .75 and 1 percent strength.

Spraying is the expected methodology for many reasons. It is the simplest and cheapest, and no effectiveness is lost, compared to other methods which reduce potential externalities. Additionally, other methods of chemical control introduce challenges. While injection for example keeps herbicide out of the air, knotweed patches are often large enough that risks to other flora are already minimal. It also only works once – once management begins, the canes never again reach a sufficient size. The tripling or quadrupling of the time involved therefore is only warranted when the externalities associated with spraying are significant enough to justify the costs. Being near plants that need to be protected, being along waterways (though AquaNeat is designed with such circumstances in mind), or any of the other myriad reasons folks wouldn't want herbicide in the air. Foaming is aa technique with a very similar suite of pros and cons to consider as injection. In contrast are the "clip and drip" / "cut and paint" techniques -these create a problem of waste management. Knotweed regrows from nodes. Nodes are on the aboveground stems and branches, as well as the belowground rhizomes. Cutting canes that grow over the water is often a useful and valuable idea. If a stand is going to be starved of resources via photosynthesis before treatment, this is the only way to do it. But the labor involved is significant, difficult, and lengthy. It is also difficult to predict the value of doing it. No relevant research exists that I have yet found.

For all of those reasons and more, spraying is the default. Conservation Commissions, homeowners, neighbors – they are all in a position to tweak the methodologies utilized. If I observe circumstances where I feel the externalities of spraying need to be re-assessed, or double checked, I certainly will. But those will be coming from the narrower range of my own professional experience with the work. However, as we all know, there are many concerns regarding the overuse of herbicides in our culture, most of which I agree with. I am perpetually surprised and intrigued when new concerns come to light that I had never considered. These concerns all come from the right places and are often worth tweaking the methodology for. But the reason for the change needs to be

978.358.1423
Brian@ecologicallandmanagement.com
300 Conway Road, Deerfield, MA 01373
www.ecologicallandmanagement.com

clear – otherwise, any effort to control the knotweed as well as address the concerns regarding chemicals will fall short.

To understand why the use of chemicals in this case is the preferred ecological option, let's work our way through the alternatives first.

Manual / Cultural Methods: The manual control of knotweed takes a long time and is very labor intensive. A group in Vermont's Mad River Valley is very dedicated to non-chemical control of knotweed, and their shorthand is that the number of years the plant has been there is the number of years they'll be dealing with it, by aggressively ripping it out of the ground. Wilmington doesn't have the bureaucratic infrastructure to manage that many hired hands, volunteer hands, and waste such an effort will create. The ground would be constantly trampled and upset if the plants are aggressively removed, and a common alternative, tarping, requires eliminating a huge amount of area for native flora and fauna. The area of the knotweed must be tarped, as well as a buffer of 15 feet beyond the knotweed, the "tarp" should be a non-woven geomembrane with a puncture resistance of 4000 of so Newton's (though 20-millimeter swimming pool liner may suffice) and then left in place for several years. The failure rate of tarping is high, unless work to prepare the ground with heavy machinery precedes any actual tarping. As one of the points of a knotweed control project is to bring back and support existing relationships between native flora, fauna, and the land, excluding the biodiversity that the project is trying to support, and impoverishing the soil biota in the meantime by cutting it off from light and air are significant downsides to any tarping effort. Whilst the means of covering the ground is a common point of debate in tarping efforts, both tarping and manual removal of plants creates harms to the species in the immediate area which are significant; unfortunately, the chances for these methods to fail are high as the length of time to reach success and the commitment to a strict calendar by many hands is unforgiving, and the outcome, unfortunately, is therefore uncertain. These methods are often best employed by homeowners or gardeners who are in the infested area several times a week and can carefully address any problems in a timely manner.

Excavation: This method offers a great likelihood of instant gratification, though it comes with waste disposal problems, and quite the bill. It is best utilized on sites where development requires that such activities are already part of the conversation, rather than natural areas such as the bank of a waterway. In this case, the level of engineering that would be required is likely to mean that the costs go far beyond what the town is able to afford and would require significant grant funds. Proper disposal of knotweed infested earth would be burial at an eight-foot depth (according to the State of New Hampshire), encapsulation with the aforementioned 4000 N puncture resistant geomembrane (according to the United Kingdom), or a six-foot burial depth with a clay cap (according to British Columbia), which is its own challenge. Once the problem of the scope and scale of the control effort was arranged, replacement soil would have to be brought in, which would likely require some very specific soil compositions at different soil depths. In addition to the cost

likely being prohibitive, such a project would require significant expertise to ensure that the project was done correctly.

Do Nothing: Before I speak to the chemical option for control, it's only fair to consider what doing nothing would accomplish. Obviously, no herbicides would be used, and preventing the introduction of such chemicals into the environment has upsides. But the knotweed would remain and continue spreading. The consequences of additional knotweed would be the continued loss of riparian habitat for a variety of flora, and a lack of habitat for fauna. While not obvious, the presence of a plant that contributes nothing to local biodiversity and degrades the environment by making the resources fauna do want further apart, whether in the vein of sustenance or shelter, makes the day-to-day lives harder of everything from soil microbiota, to invertebrates, right up to amphibians and waterfowl. As an allelopathic plant, knotweed degrades the soil for other floral species and pushes out the mycorrhizal network that native flora utilize. Doing nothing would allow this ecological wasteland to remain and presumably expand. Such an expansion would likely have consequences for town infrastructure as well. Knotweed destabilizes the banks of waterways; it only gives the illusion of creating structure for the bank. With a town sewer line and bridge just downstream of the patch being managed, any additional erosion of soil would increase the risk to these structures from the next flood event. The cost of emergency repairs to these must be taken into consideration, as well as any service interruption that such damage would entail. Managing this stand with the usual tools for landscape maintenance such as mowers and trimmers would actually create a risk of spread both on and off site. The nodes from which new plants can grow are very small and can stick to tools that move between sites. Knotweed behind guardrails is a good example of such a circumstance. The flair mower used to cut knotweed behind a guardrail is raised up, driven to the next guardrail, and the knotweed node spread to a new location. So doing nothing or just treating knotweed as a "normal" landscaping problem, allows for the expansion of the problems associated with this plant, both ecologically and infrastructurally.

Chemical Control: With those other options more fully considered, the pros and cons of chemical control can be better evaluated. It is relatively cheap, relatively fast, and allows the local environment to stay in place with the least impact, and to recover the quickest. The downsides to glyphosate in the environment are most pronounced in amphibians and pollinators. Not spraying during pollination and preventing flowers from providing resources to pollinators fits the treatment calendar. AquaNeat is formulated in such a way that has no surfactants, it is just glyphosate and a carrier. It is mostly the surfactants that create environmental harm – glyphosate in water binds quickly to soil and is no longer available for uptake by other organisms once this happens. By using a glyphosate product formulated specifically with harm reduction in mind, any harms caused through the introduction of this product to the environment is minimized to the greatest extent possible. The one added surfactant, Agri-Dex, was chosen after much research. It appears to be the least toxic option available for helping to ensure the AquaNeat stays on the knotweed, rather than dripping off. Also, any of the other herbicides that are known to be effective against glyphosate are

978.358.1423
Brian@ecologicallandmanagement.com
300 Conway Road, Deerfield, MA 01373
www.ecologicallandmanagement.com

more impactful to the environment. Glyphosate, for all the press related to it, is the least toxic herbicide option.

To summarize, knotweed control is a worthwhile endeavor to aid the environment and public infrastructure. Knotweed control is difficult, and no matter what management choice is made, there are significant costs. On balance, managing the negative externalities and fiscal considerations is done best with glyphosate.

Thank you,

Brian Colleran, MS, CERP, PWS
Principal, Ecological Land Management

978.358.1423
Brian@ecologicallandmanagement.com
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www.ecologicallandmanagement.com

Proposed Herbicide & Surfactant Materials and Usage

Product label including application methods and rates:

Please see below for expected herbicide and surfactant trade names, and the links to their product labels and safety data sheets.

Glyphosate:

An AquaNeat and Agri-Dex combination is the only glyphosate solution being proposed as it is currently the most water-safe option for chemical control of invasive species. The glyphosate formulation chosen was picked due to its lack of adjuvants, which are the source of many of the toxicity issues associated with herbicide application. By removing all other chemicals from the solution, the toxicity of the herbicide solution to non-target organisms can be more effectively reduced. Application rates for these products will be 3-5% concentrations of glyphosate, and a 1-3% concentration of Agri-Dex surfactant, except in the case of the Spring knotweed treatments, which will be a 2% concentrations of glyphosate.

Aquaneat Aquatic Herbicide (MDAR maintains this glyphosate formulation as approved for use in Sensitive Areas within Right of Ways):

Product Label & Safety Data Sheet

Agri-Dex Non Ionic Surfactant:

Product Label & Safety Data Sheet

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Proposed Plan of Work

While this plan outlines the agreed upon work at the project outset, the response of the plant to management actions may necessitate changes in future years. Such changes will be agreed upon by all parties in writing, with email or text agreements being agreed as sufficient for such plan of work changes, and such changes shall not invalidate other aspects of this plan.

Proposed Plan by Contractor: Accepted Plan by Client:

1. ☒Year One May/June – Weak/non-lethal Herbicide Spray
2. ☐ Year One Summer – Cut knotweed 1st window.
3. ☐ Year One Summer – Cut knotweed 2nd window.
4. ☐ Year One Summer – Cut knotweed 3rd window.
5. ☐ Year One Summer – Early 1st Herbicide: Spray
6. ☐ Year One Summer – Early 1st Herbicide: Injection
7. ☒ Year One Autumn –Late Herbicide Spray
8. ☐ Year One Autumn –Late Herbicide Injection
9. ☐ Year One Autumn –2nd Herbicide: Spray
10. ☒ Year Two May/June – Assessment of knotweed, and confirmation of management actions with Client
11. ☒ Year Two May/June – Weak/non-lethal Herbicide Spray
12. ☐ Year Two Summer – Cut knotweed 1st window.
13. ☐ Year Two Summer – Cut knotweed 2nd window.
14. ☐ Year Two Summer – Cut knotweed 3rd window.
15. ☒ Year Two Summer – Early 1st Herbicide: Spray
16. ☐ Year Two Autumn –Single Treatment Herbicide Spray
17. ☒ Year Two Autumn –2nd Herbicide: Spray
18. ☒ Year Three May/June – Assessment of knotweed, and confirmation of management actions with Client
19. ☒ Year Three May/June – Weak/non-lethal Herbicide Spray
20. ☐ Year Three Summer – Cut knotweed 1st window.
21. ☐ Year Three Summer – Cut knotweed 2nd window.
22. ☐ Year Three Summer – Cut knotweed 3rd window.
23. ☒ Year Three Summer – Early 1st Herbicide: Spray

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24. ☐ Year Three Autumn –Single Treatment Herbicide Spray
25. ☒ Year Three Autumn –2nd Herbicide: Spray

SUB-CONTRACTOR INFORMATION

Company & Staff: Ecological Land Management, LLC

Ecological Land Management, LLC (ELM), is an ecological restoration oriented company, with a focus on the management of *uaine dilathair* (from Irish; *uaine* – a non-natural green, and *dilathair* – the absence felt when a place is destroyed by people, which is the outcome of people moving damaging species to the place they cause damage) species, making transportation infrastructure more resilient to climate change, and restoring wetland and riparian areas. Specialties include research on and management of *uaine dilathair* knotweeds; interacting with the Massachusetts Wetlands Protection Act and related municipal wetland bylaws; and botanical education.

ELM's Principal, Brian Colleran graduated from Providence College with Bachelor's degrees in Biology and Sociology, and the University of Michigan's School for Environment and Sustainability with a Master's degree in Resource Ecology Management, concentrating in Conservation Biology and Ecosystem Management. He is a Professional Wetland Scientist (PWS) and Certified Ecological Restoration Practitioner (CERP), possesses both the basic and advanced Field Botany certificates awarded by the Native Plant Trust for whom he now serves as an educator, is a graduate of the Massachusetts Association of Conservation Commission's (MACC) Fundamentals program, has been trained as an A-level sawyer by the U.S. Forest Service, has a Commercial Pesticide License in the Commonwealth of Massachusetts in Category 40 (Rights-of-Way) and has been involved with four Conservation Commissions here in the Commonwealth, including as an Agent and a Chair. He has a long history in fluvial, riparian, and wetland projects; *uaine dilathair* species control work, and the regulation and management of natural areas. He has conducted a 100,000 dollar revegetation project along California's San Joaquin River on time and under budget, been involved with controlled burns and fen restoration in Michigan, fuels management and reforestation in Nevada's High Sierra, desert restoration in Arizona, and led statewide efforts to control the spread of *uaine dilathair* knotweed in the wake of Tropical Storm Irene in Vermont. He served as an outside advisor to a University of New Hampshire master's students whose thesis is titled: "Investigation into Itadori knotweed as a Control of Bank Erosion in New Hampshire Rivers". This project was prompted by a publication Mr. Colleran served as lead author on in 2020: Invasive Japanese knotweed (*Reynoutria japonica* Houtt.) and related knotweeds as catalysts for streambank erosion. River Research & Applications 36(9):1962-1969. He is the Founder of, and a Principal with, Ecological Land Management, where he continues to investigate the scope and scale of the impact to transportation and riparian systems inflicted by the swarm of *uaine dilathair* knotweed species and sub-species. He currently serves as a member of the Leadership Team for the Northeast Regional Invasive Species and Climate Change Network (RISCC).

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