

Module 4: Redesigning with Health in Mind

Estimated time: 1.75 hours

Environmental Health and Land Reuse Certificate
Module 4: Redesigning with Health in Mind

Agency for Toxic Substances and Disease Registry,
2019

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Guest Instructors:

Division of Community Health Investigations



**Redesigning with Health in Mind:
Objectives**

- ❑ **Basic Understanding of Site Cleanup Methods**
 - Describe 3 site cleanup methods.
- ❑ **Understand Community Needs and Vision**
 - Describe why health is important part of redevelopment plans.
 - Define Healthfields and give 3 examples
- ❑ **Demonstrate how to use the Action Model**

Division of Community Health Investigations

Objectives

- Have a basic understanding of typical site cleanup methods
 - Describe at least three site cleanup methods.
- Understand how to determine what the community needs and vision are
 - Describe why health is important to include in redevelopment plans.
 - Define Healthfields and describe at least three aspects or examples of health-focused redevelopment.
 - Explain the role, responsibilities, and scope of practice of a development community team member
- Demonstrate ability to use the Action Model to include community input in redevelopment plans.

Redesigning with Health in Mind: Test Details

- ❑ **Pre-test**
- ❑ **Post-test: 70% or higher to receive a certificate**
 - Identify your pre-test and post-test with a 4-digit number that you memorize
 - Use the same number on both the pre- and post-test



ATSDR Regional Representative taking a test. ATSDR, 2019.

Redesigning with Health in Mind: Pre-test Module 4

- ❑ **Pre-test Module 4**
- ❑ **Put your memorized 4-digit number on the top right-hand corner of your pre-test**

Basic Understanding of Site Cleanup Methods

Objective

DESCRIBE 3 SITE CLEANUP METHODS

Cleanup before Redevelopment

- ❑ **Identify and prioritize**
 - Contaminants
 - Exposure Pathways
- ❑ **Understand the future use**
 - Children
 - Elderly
 - Adults
- ❑ **Establish protective cleanup goals**
- ❑ **Implement the cleanup**



Now, you have a site in mind. It's time to plan how to design it with health in mind. Remember from Module 2, your first step to ensure that the site is clean before redevelopment. You have already hired an environmental consultant to conduct an environmental cleanup. During the environmental cleanup, you plan to:

- Identify and prioritize the key contaminants and exposure pathways to remediate. (Phase I and II ESA discussed in Module 2).
- Understand the future use of the site to ensure remediation does not impede new land use. Know your future users of the site (children, elderly, adults) and adjacent to the site.
- Establish cleanup goals that protect both workers, the environment, and future users.
- Implement cleanup measures that are consistent with goals and future use.

There are several ways to cleanup contaminants. The type of contaminant(s), site assessment, and exposure pathway(s) all inform the correct method to administer. The following treatment methods are defined by the EPA.

Common Site Cleanup Methods (1 of 2)

Site Cleanup Method	Key Points
Activated Carbon Treatment	Wastewater, activated carbon, buffer against toxins (fuel oil, PCBs, PFAS)
Air Stripping	Remove VOCs from water
Bioremediation	Uses microorganisms to transform toxins into nontoxic compounds (petroleum, solvents, pesticides)
Capping	Cover buried waste to prevent migration
Excavation	Physical removal of contaminated material
Soil Vapor Extraction (SVE)	Removes vapors from below ground for above-ground treatment

Here are some treatment methods used and defined by EPA.

- **Activated carbon treatment:** A wastewater technology, in which powdered activated carbon is added to an anaerobic or aerobic treatment system. The carbon in the biological treatment process acts as a “buffer” against the effects of toxic organics in the wastewater (absorbs natural and synthetic organic compounds). Compounds include vapors (radon), groundwater (fuel oil, solvents, polychlorinated biphenyls, dioxins, PFAS, radioactive materials, and low levels of metals).
- **Air stripping:** A process to remove volatile or certain semi-volatile organic compounds from contaminated groundwater or surface water. Part of pump and treat method.
- **Bioremediation:** A process that uses microorganisms to transform harmful substances into nontoxic compounds, a promising technology for treating chemical spills and hazardous waste. Contaminants treated using bioremediation include oil and other petroleum products, solvents, and pesticides. (Time: a few months to multiple years)
- **Capping:** A process to cover buried waste materials in order to prevent migration (movement) of the contaminants. Movement can be caused by rainwater, surface water, or wind moving through the site. Caps do not destroy or remove contaminants. Instead, they isolate them. They prevent people and animals from coming in contact with the contaminants. The caps must be maintained.
- **Excavation:** The removal of contaminated material from a hazardous waste site using heavy construction equipment. Excavation of contaminated soil from a site involves digging it up for “ex situ” (above-ground) treatment or for disposal in a landfill. Excavation also may involve removing old drums of chemicals and other buried debris that might be contaminated
- **Soil Vapor Extraction (SVE):** Soil vapor extraction removes vapors from below ground for above—ground treatment. The treatment involves using a vacuum to bring the vapors out from underground. SVE is frequently used with petroleum vapors.

Common Site Cleanup Methods (2 of 2)

Site Cleanup Method	Key Points
Immobilization	Treatment to prevent migration of toxins from soil slurries or waste sludge
Incineration	Burning, destroy organic compounds (e.g., dioxins, PCBs) in waste
Pump and Treat	Purify aquifers/groundwater. Remove dissolved contaminants in water, treat to remove contaminants, discharge treated water. (Solvents, PCBs, pesticides)
Soil Washing	Scrub soil ex situ: <ul style="list-style-type: none"> • Dissolve or suspend in wash solution • Concentrate into smaller volume
Thermal Desorption	Low temperature heat line separation process to remove organic compounds from soil and sludges

- **Immobilization:** A treatment process used to prevent migration of toxic chemicals from soil slurries and waste sludge, in order to keep them from spreading to the surrounding environment.
- **Incineration:** A method to destroy organic compounds in waste, particularly dioxins and polychlorinated biphenyls (PCBs). Incineration is the process of burning hazardous materials in soil, sludge, liquids, or gases at temperatures high enough to destroy contaminants. Used to destroy solvents, PCBs, and pesticides. Will not destroy metals, such as lead or chromium.
- **Pump and Treat:** A method to purify groundwater contaminated with industrial solvents, metals, and fuel oil. Time (Years to decades) Three basic steps:
 - The contaminated water is recovered from the aquifer or groundwater.
 - The recovered water is treated to remove contaminants.
 - The treated water is discharged,
- **Soil Washing:** Soil washing is a water-based process for scrubbing soils ex situ (away from the original site) to remove contaminants. The process removes contaminants from soils in one of two ways:
 - By dissolving or suspending them in the wash solution (which can be sustained by chemical manipulation of pH for a period of time); or
 - By concentrating them into a smaller volume of soil through particle size separation, gravity separation, and attrition scrubbing (similar to those techniques used in sand and gravel operations).
- **Thermal Desorption:** A low-temperature heat line separation process designed to remove/evaporate VOCs and some semi-VOCs contaminants from soils and sludges. Thermal desorption removes organic contaminants from soil, sludge or sediment by heating them in a

machine called a “thermal desorber” to evaporate the contaminants. Evaporation changes the contaminants into vapors (gases) and separates them from the solid material.

Knowledge Check #1

_____ is a process to cover buried waste materials in order to prevent migration (movement) of the contaminants.

- Incineration
- Immobilization
- Capping
- Excavation

KC#1 Answer: Capping

Knowledge Check #2

Bioremediation uses _____ to transform harmful substances into non-toxic compounds.

- Man-made chemicals
- Microorganisms
- Aeration
- Activated carbon

KC #2 Answer: Microorganisms

Knowledge Check #3 (1 of 2)

Soil washing is a surfactant-based process for scrubbing soil ex situ (away from the original site) to remove contaminants.

True or False?

KC Answer: True.

Knowledge Check #3 (2 of 2)

Two ways of soil washing are:

- By dissolving or suspending soils in a wash solution (which can be sustained by chemical manipulation of pH for a period of time).
- By removing contaminated soils from a hazardous waste site using heavy construction equipment.
- By incinerating soils to destroy organic compounds.
- By concentrating contaminants into a smaller volume of soil through particle size separation, gravity separation, and attrition scrubbing (similar to those techniques used in sand and gravel operations).

KC Answer: Bullets 1 and 4 are correct.

Community Needs and Visions

Focusing on Community Vision



Image of a community visioning session (ATSDR, 2016)

It is essential to maintain an inclusive and communicative process when working with community stakeholders. It is equally crucial to understand the community vision for the land reuse site and openly communicate with citizens to ensure that the redevelopment meets their unique needs. Translating complex environmental and health concepts into plain language may be the best way to ensure everyone is on the same contextual level. Establishing an open line of communication and displaying a level of understanding with the community builds trust with them and helps guarantee that the work will help address a pressing public health issue.



The land reuse site can be transformed into a site that benefits the health of its citizens. That is why it is important to establish a community vision at the start of the project in Step 1 (Engaging with Your Community). This vision may guide all the decisions for the future site. If the project lacks a vision for a healthier community, it may never happen. When developers and other groups pitch ideas to develop the land, it is crucial to understand the community's needs and integrate those into the central design of the site.



How would you evaluate how healthy your community is? What indicators or determinants of community health could you measure? Above is an image of Social Determinants of Health from Healthy People 2020 (<https://www.healthypeople.gov>). Determinants include Education, Economic Stability, Neighborhood and Built Environment, Health and Health Care, Social and Community Context.

Determinants of Community Health

- Income and social status
- Social support networks
- Education
- Employment/working conditions
- Social environments
- Physical environments

It is important to understand the basic health profile for your community.

- Income and social status
- Social support networks
- Education
- Employment/working conditions
- Social environments
- Physical environments

Other determinants of community health are:

Determinants of Community Health

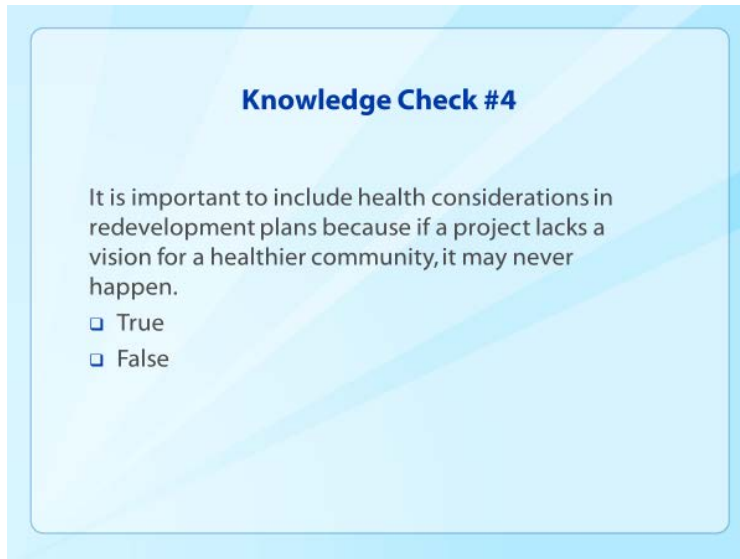
- Personal health practices
- Coping skills
- Healthy child development
- Gender
- Culture

Other Determinants of Community Health are:

- Personal health practices
- Coping skills
- Healthy child development

- Gender
- Culture

It is important to consider all of these factors when evaluating the health of your unique community and communicating with them.



Knowledge Check #4

It is important to include health considerations in redevelopment plans because if a project lacks a vision for a healthier community, it may never happen.

- True
- False

KC #4 Answer: True



Redesigning with Health in Mind:

ATSDR BROWNFIELD/LAND REUSE ACTION MODEL

Next, we will learn how to redesign with health in mind. The ATSDR Brownfields /Land Reuse Action Model helps the diverse members of the development community – officials, developers, community supporters, and residents, find ways to make health part of the renewal process. Communities can use the action model to identify common goals to incorporate these goals in strategic planning. First, we'll need to build our development community.

4 Step Action Model

1. What are the issues in the community?
2. How can development address these issues?
3. What are the corresponding community health benefits?
4. What data are needed to measure change?

It has 4 steps. They're questions that we'll ask ourselves today and answer together. You will work with this model throughout this course.

Building a Development Community

- ❑ Concerned citizens
- ❑ Business owners
- ❑ Developers/Planners
- ❑ Tribal leaders
- ❑ Government agencies
- ❑ Health agencies
- ❑ Nonprofits



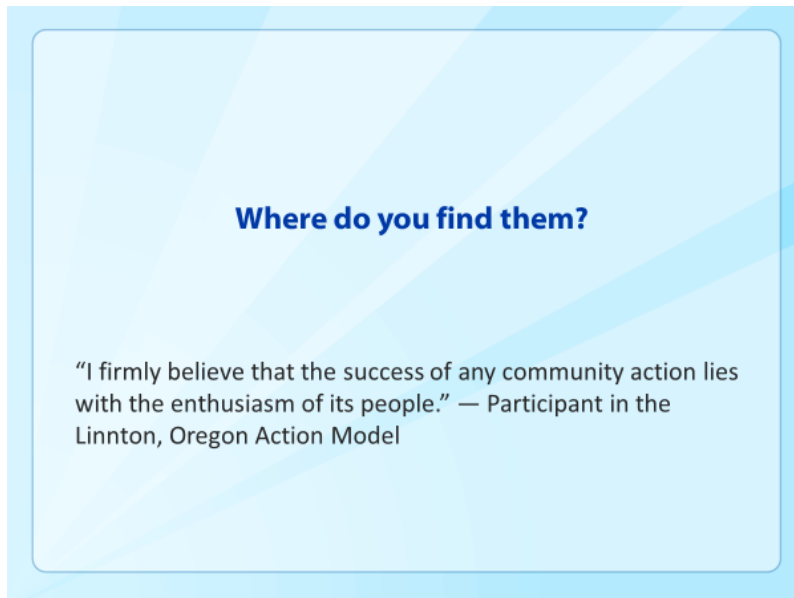
Image of a Development Community event. ATSDR, 2016.

The first step is to build a development community to get everyone at the table ready to redesign with health in mind.

A **development community** is a group of people who want to help with and have input on the land reuse site. This community might include:

- Concerned citizens
- Business owners
- Developers
- Planners
- Tribal leaders

- Government agencies
- Local, state, tribal health departments, Indian Health Service
- Nonprofit groups



Some good places to start identifying these people include local resources and organizations like:

- Chamber of Commerce
- Community centers
- Organizations (like the 4-H Club, Boys and Girls Clubs, and Salvation Army)
- Local hospitals and health clinics, IHS
- City Council, Tribal Council

Where do you think you can find tribal, state, and federal support?

State and Federal Support

- ❑ **ATSDR Land Reuse Team** (mailto: atsdr.landreuse@cdc.gov)
- ❑ **EPA Brownfields Program** (<https://www.epa.gov/brownfields>)
- ❑ **EPA Environmental Justice Program** (<https://www.epa.gov/environmentaljustice>)
- ❑ Health departments (state, local, tribal)
- ❑ State environmental protection agencies

Invite some experts to meet with the development team.

Start by emailing the [ATSDR Land Reuse Team](mailto:atsdr.landreuse@cdc.gov) to get in contact with a regional ATSDR office.

Other organizations could also be helpful including:

[EPA Brownfields Program](https://www.epa.gov/brownfields), which focuses on cleaning up old factories and industrial sites

[EPA Environmental Justice Program](https://www.epa.gov/environmentaljustice), which helps make sure all people – regardless of race, color, national origin, and income – live in a healthy environment

Health departments in the local area or state, which focus on keeping communities healthy

State environmental protection agencies, which focus on the environment and its effect on people's health

Ask Questions



Development Community meeting, ATSDR, 2017.

When you contact possible members of your Development Community, tell them about your ideas and ask a few questions.

- **What are the situations that *you* want to improve?** These may be the same or different from your own goals.
- **What would help solve them?** See what their ideas are for improvements.
- **Do you know anyone else who might be interested in our project?** This is key. You'll get more names of people who might want to join the Development Community.



There's no right number. Development Communities can range from 10 to 30 people.

How do you know you have your complete team? Whenever you talk to a new possible member, ask if they have recommendations for other potential members. When those recommendations tend to be people you've already contacted, that's a sign you have formed your Development Community.

Once some people sign on to work on the project, meet in person. These could be one-on-one meetings, or it could be a meeting of the larger group. Keep in mind that early meetings do not have to be formal. Nothing needs to be decided. The purpose of these meetings is relationship and trust building, providing an opportunity to get to know each other and understand each other's concerns and perspectives. The environmental or health professional must stay open to new ideas.

These meetings can be at the library, community center, senior center, or at a local health agency.

Action Model

1. What are the issues in the community?
2. How can development address these issues?
3. What are the corresponding community health benefits?
4. What data are needed to measure change?

By setting up the development community, you are ready to start on the first two steps of the action model. By now, you may even have heard about the issues in the community and some ideas of how redevelopment could address them.

Healthfields

Address many health-related issues:

- Contaminant and exposure reduction
- Environmental justice
- Fresh food availability
- Community recreation and green space
- Health care access
- Employment
- Crime

As you and your Development Community are starting to plan how redevelopment could address issues in the community, think about how redevelopment could improve the health of the community. How can you transform these brownfields to healthfields?

A Healthfield is a former land reuse site that has been transformed from an underused, potentially contaminated property into a vibrant area that serves a number of community health needs. Healthfields start with a vision to create a healthy community through land reuse and redevelopment. Healthfields is the broader strategy of improving access to health and healthcare through redevelopment. They simultaneously address health-related issues

Willa Carson Health and Wellness Center, Clearwater, FL



Clearwater Healthfield redevelopment. Source: Leading Change for Healthy Communities and Successful Land Reuse. Available at: https://www.atsdr.cdc.gov/sites/brownfields/docs/ATSDR_LandReuse.pdf

The healthfields movement owes a tremendous debt to Ms. Willa Carson. In 1998, Carson was a retired nurse in Clearwater, Florida. She ran a health clinic that provided basic medical assistance to friends and neighbors who lacked health insurance and the means to travel to the nearest hospital. When the City of Clearwater designated the Greenwood area of Clearwater as a Brownfields Redevelopment Site, Carson saw an opportunity. She had the pioneering vision to turn Greenwood, an abandoned gas station site, into a stand-alone health care facility.

Today, the Willa Carson Health and Wellness Center provides over 3,500 underserved residents with local access to preventive health and dental care, a pharmacy, and health education programs. Carson's work serves as the basis for community-driven Highways to Healthcare initiatives that turn abandoned properties with underground storage tanks across Florida into health centers and public service facilities.

Lynchburg Grows, Lynchburg, VA



Promotional image for Lynchburg Grows community supported agriculture. How to Get What We Grow. Retrieved from: <https://www.lynchburggrows.org/veggiebox2019>

In Lynchburg, Virginia, organizers turned to the owners of the derelict Schenkel Farm, a six-and-a-half acre rose growing facility with nine historic greenhouses, a farmhouse, a root cellar, and other farm

buildings. Inspired by the Lynchburg Grows mission, the family provided attractive terms for the organization to acquire the property, now known at the H.R. Schenkel Urban Farm and Environmental Center. Once transferred, the fledgling Lynchburg Grows appealed to community groups and local schools to clean the space and prepare for growing food. By 2013, more than 5,000 volunteers contributed over 70,000 hours working with Lynchburg Grows staff. They have produced over 100,000 roses and 80,000 pounds of food, donating almost 75% to Lynchburg-area food banks and soup kitchens.

(See Ch. 15)



The City of Baraboo is a river community of 12,000 people with the Baraboo River essentially bisecting the town. An active group of volunteers in Baraboo created redevelopment plans that not only improved the environment, but also the health of the community in the redevelopment area (e.). Several community organizations helped support the development of a 2.92-mile recreational trail along the riverfront. As a result, the area has seen increasing numbers of residents and visitors alike — walking, jogging, picnicking, and using several parks linked by the trail.

(See Ch. 15)

Knowledge Check #5

What is a "healthfield?"

- Working as a nurse is one example of a healthfield.
- A location where many healthy people gather together for like-minded activities is a healthfield.
- A former land reuse site that has been transformed from an underused, potentially contaminated property into a vibrant area that serves a number of community health needs is a healthfield.
- None of the above describe a healthfield.

KC #5 Answer: Bullet 3 is correct.

Knowledge Check #6

What would be considered an example of health-focused redevelopment? (Choose all that apply)

- Reusing existing underground storage tanks for a new gas station at the site of an old gas station.
- Increasing the availability of fresh food in a community through the creation of a community garden on an abandoned lot.
- Creating a senior center and health clinic inside an abandoned school.
- Demolishing an abandoned warehouse and fencing the property to protect the community from the danger of the debris left behind.
- Remediating asbestos contamination inside an old mill and redeveloping the building to be a cultural center.

KC #6 Answer: Bullets 2, 3, and 5: increasing availability of fresh food, creating a senior center, and redeveloping an old mill into a cultural center.

Action Model

Objective

DEMONSTRATE HOW TO USE THE ACTION MODEL

Next, we will continue to use the Action Model. The ATSDR Brownfields /Land Reuse Action Model helps the diverse members of the development community – officials, developers, community supporters, and residents, find ways to make health part of the renewal process. Communities can use the action model to identify common goals to incorporate these goals in strategic planning. First, our development community will address some community concerns and engage in healthfields redevelopment.

Practice: Redesign with Health in Mind



Old fuel tanks behind a gas station. Lloyd DeGrane, 2019.



Old school that needs cleanup. Lloyd DeGrane, 2018.

We will focus on a rural community with a gasoline leak that has migrated to an old school. The school is also contaminated with several chemicals of concern.

Practice

- **A rural community that has**
 - High number of land reuse sites
 - No grocery stores
 - No community gathering spaces that can also serve as storm shelters
 - A low median income
 - An aging population (median age 48)
 - No early childhood education programs
 - Closest primary health care or dental providers 25 miles away
 - Closest gas station 5 miles away
 - Closest grocery store 10 miles away
- **Some residents no longer drive**
 - have a hard time getting to doctor appointments and grocery stores.

You are working with a rural community that has high numbers of land reuse sites, no grocery stores, no community gathering spaces that can also serve as storm shelters, a low median income, no early childhood education, and no primary health care or dental providers. The town is 25 miles from the nearest hospital and healthcare providers, five miles from the nearest gas station, and 10 miles from the nearest grocery store. The population is aging (median age is 48). Some residents can no longer drive and have a hard time getting to doctor appointments and grocery stores.

Practice

The Development Community recently received a cleanup grant to clean up:

- Former school contaminated with
 - Lead
 - Mercury
 - PCBs (polychlorinated biphenyls)
 - Asbestos
- Former gas station
 - Tanks leaked gasoline in soil and groundwater
 - Groundwater VOC (volatile organic chemical) plume migrated from the gas station to the former school

Practice time. Pick a site in your community to redevelop. Assume that you have plans and funding for cleaning the site. How will you redevelop it? Who is on your development community?

Points to include:

The Development Community recently received a cleanup grant to clean up:

Former school contaminated with

Lead

Mercury

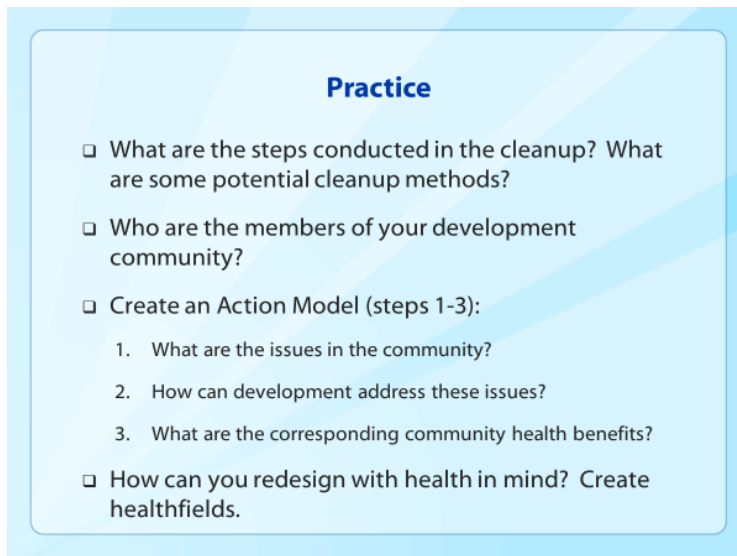
PCBs

Asbestos

Complicated by a former gas station

Tanks leaked gasoline in soil and groundwater

Groundwater VOC plume migrated from the gas station to the former school



Practice

- What are the steps conducted in the cleanup? What are some potential cleanup methods?
- Who are the members of your development community?
- Create an Action Model (steps 1-3):
 1. What are the issues in the community?
 2. How can development address these issues?
 3. What are the corresponding community health benefits?
- How can you redesign with health in mind? Create healthfields.

Use the blank Action Model Template and fill in steps 1-3 of the template.

1. What are the issues in the community?
2. How can development address these issues?
3. What are the corresponding community health benefits?

How can you redesign with health in mind? Create healthfields.

New Healthfields Example

- ❑ **Vendor Village – crafts village with community amenities in Chinle, AZ**



This proposed vendor crafts village will provide more visibility for vendors, generate tourism dollars, provide a central location for jeep tour access (of Canyon de Chelly), provide recreational trails for locals, a community center, an amphitheatre, showers, and basketball court. The natural wash through the area will be incorporate in the design. Ultimately, a formerly vacant parcel of land will be reused to improve overall community health.

Review

- ❑ **Review your slides and knowledge checks**
- ❑ **Post-test is next**
 - 70% pass rate
 - Can take it multiple times
 - Add your 4-digit number
 - Open book exam
 - We will grade these on the break.

Thank you!

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Division of Community Health Investigations

