Complex Solid Waste Facilities

PLANNING AND DESIGN OF ~~TRANSFER STATIONS~~ TO SUPPORT ZERO WASTE INITIATIVES

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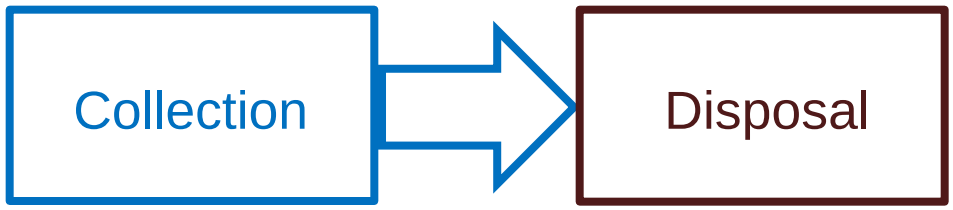
Trash Collection and Disposal I

Historic concept: Garbage is garbage is garbage – just get rid of it

Typical Solid Waste System:

- Collection
- Transportation to landfill
- Disposal

Flow Diagram



Solid Waste Systems I

As municipalities grew, landfills closed and new ones were located farther from population centers, prompting the need for transfer stations.

Solid waste systems were transformed.

Flow Diagram

Trash Collection and Disposal II

In the 1960's and 1970's the simple concept of "garbage is garbage…" changed.

One factor was the birth and growth of the "environmental movement".

Another factor: this came at a time of phenomenal population growth.

Trash Collection and Disposal II

The environmental movement contributed to the enactment of the Clean Air Act and subsequently the Resource Conservation and Recovery Act - legislation that greatly impacted solid waste collection and disposal.

- Subtitle D of RCRA led to the closure of hundreds of landfills.

Trash Collection and Disposal II

The combination of these factors led to the perception that the U.S. was facing a landfill capacity shortage “crisis”.

This perceived crisis, combined with the other factors, led to significant macro-scale increases in recycling over the next few years.

As a result, solid waste systems needed to be transformed again.

Trash Collection and Disposal II

To Facilitate Recycling:

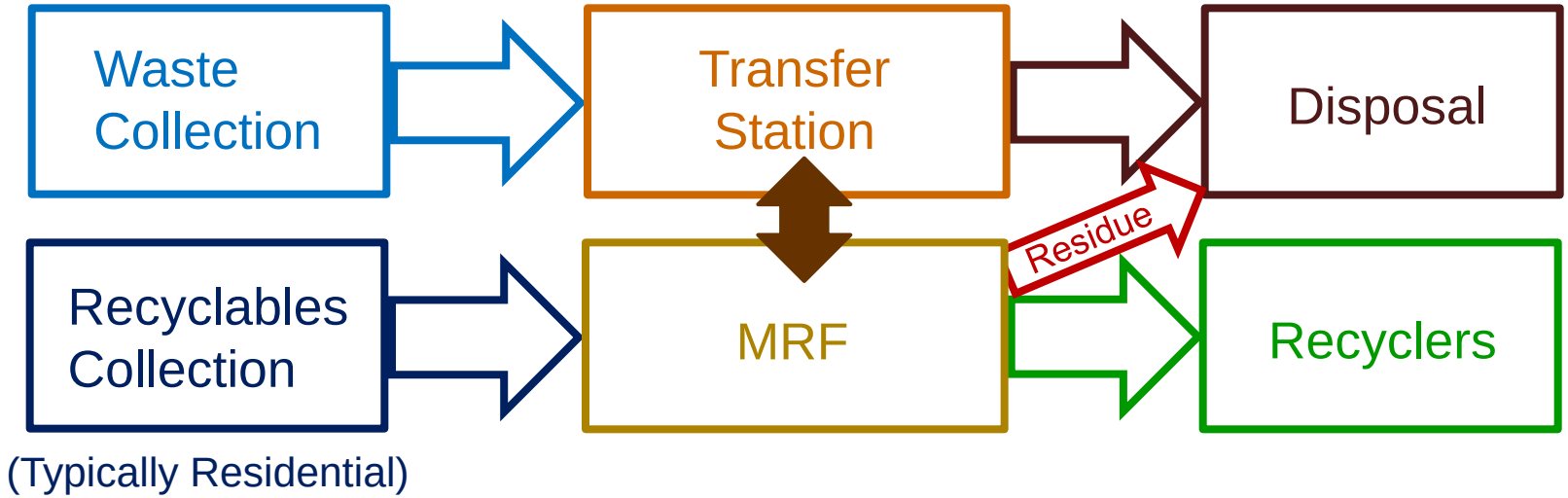
- In some municipalities, changes were made in collection services in order to segregate the waste stream into MSW (non-recyclable) and recyclable collection streams.
- In many cases existing municipal facilities experienced significant increases in public participation.

Solid Waste Systems II

New/revised facilities were needed for recycling operations and to accommodate the increase in public participation.

Solid waste systems needed to be transformed again.

Flow Diagram



Trash Collection and Disposal III

Modern day: as the benefits of recycling have become increasingly clear, the interest in recovering more usable materials from the additional portions of the waste stream continues to increase, including:

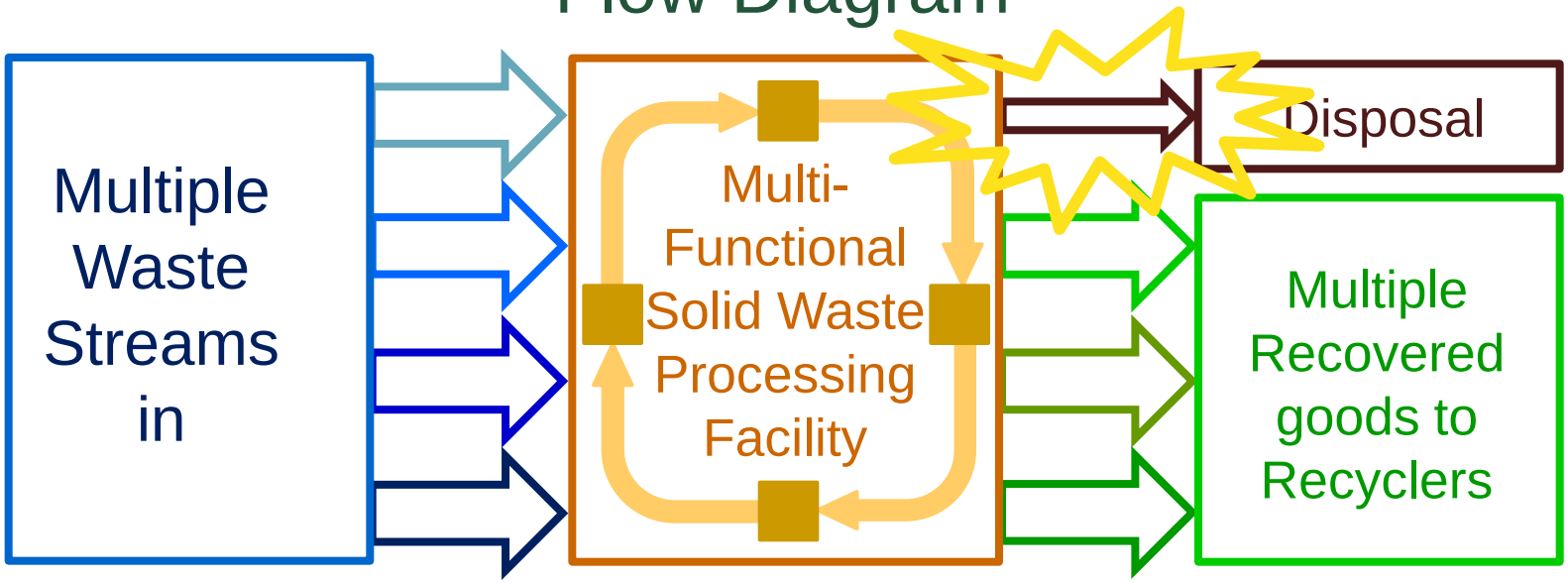
- Green and Wood Waste
- Construction and Demolition Debris
- Other Organics

Most of these materials are typically received and processed in transfer stations.

Solid Waste Systems III

To facilitate higher diversion and meet the demands of zero waste programs, modern solid waste processing facilities have become much larger and more complex.

Flow Diagram



Supporting Zero Waste Initiatives

Three Case Studies

- **Transfer Station Replacement**

  City of Tacoma, WA

- **Retrofitting Replacement of Existing Transfer Station and MRF**

  South Bayside Waste Management Authority, San Carlos, CA

- **Master Site Plan & Capital Improvement Plan**

  City of Redding, CA

Case Study #1

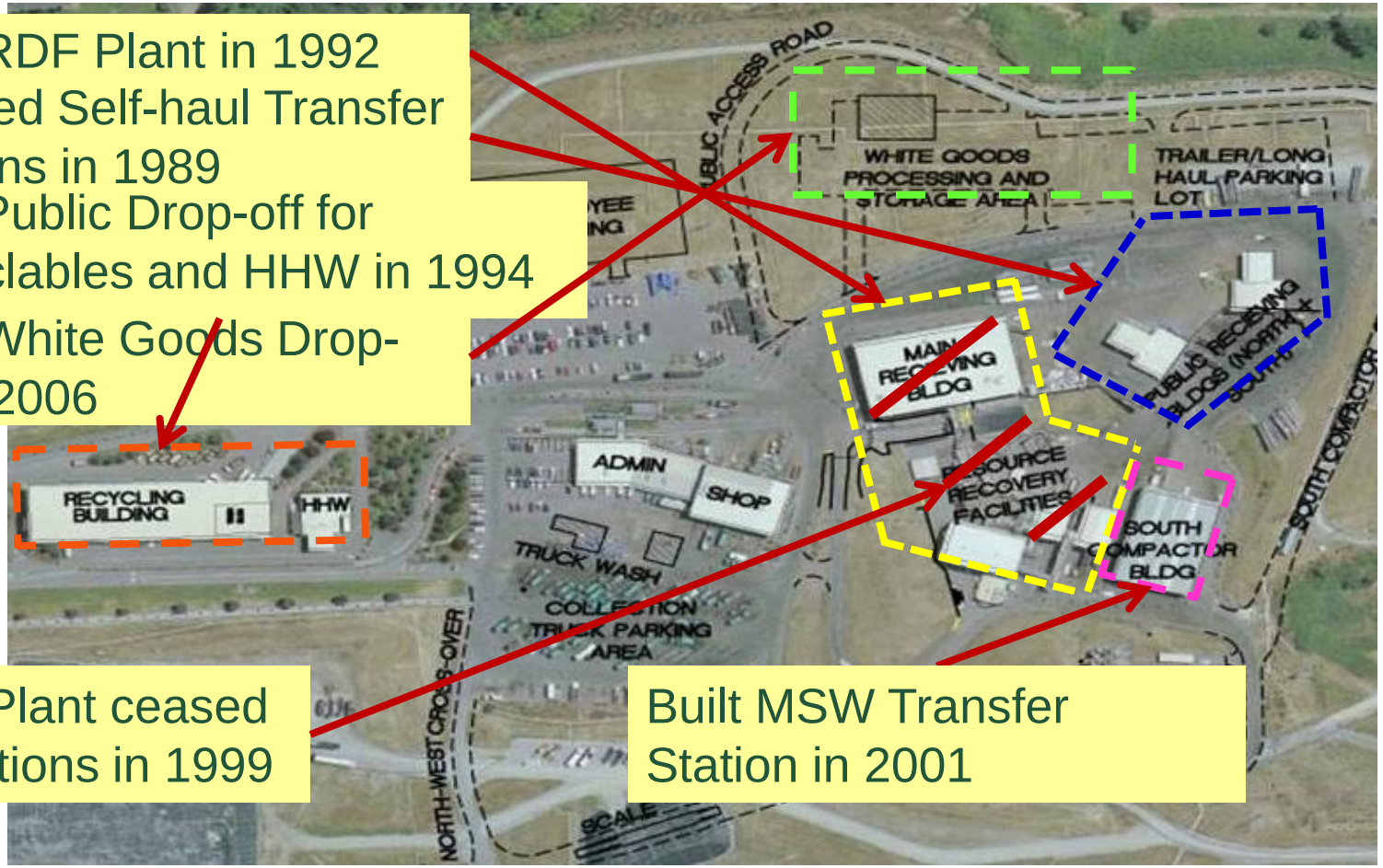
Tacoma Transfer and Recycling Center

Environmental Services Division

City of Tacoma Public Works

Tacoma Transfer and Recycling Center

Increasing Recycling and Landfill Diversion



Tacoma Transfer and Recycling Center

Design Goals for Replacement TS

1. **Increase operational efficiencies and provide flexibility**
   - Operations in several buildings
   - Limited floor space for surges / storage
   - Inefficient transfer loading
   - Direct dump self-haul area
2. **Improve Health and Safety of customers and employees**
   - Inefficient traffic circulation
   - Direct dump - fall hazard
3. **Increase Capacity**
   - Direct dump limited capacity
   - No space for material storage
   - Unloading is inefficient
4. **Design for sustainability**

➢ Target Budget: $10 M

Tacoma Transfer and Recycling Center

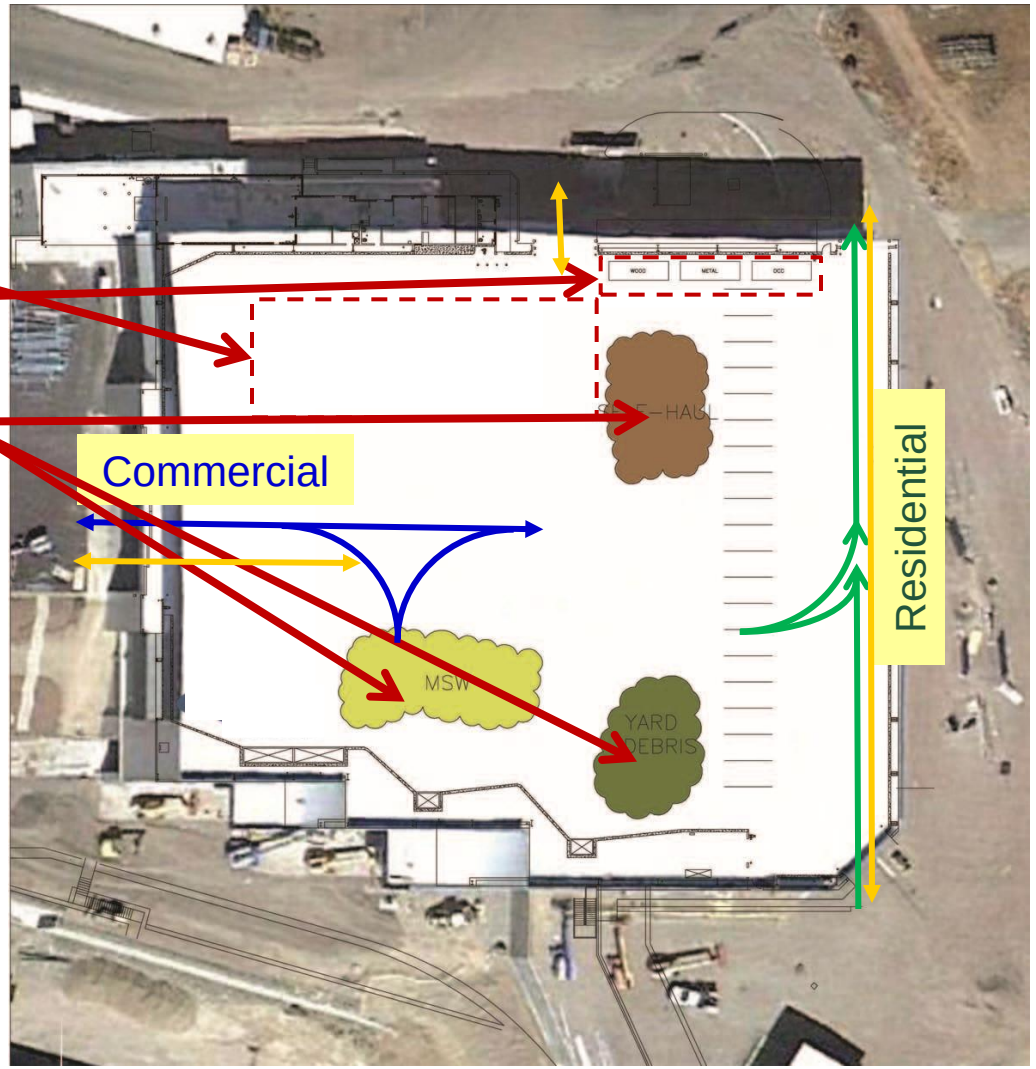
Additional analysis of their waste stream by the Design Team and Environmental Consultant revealed that at least 20,000 tons per year of additional materials could be diverted by providing a larger tipping floor that would accommodate additional recovery efforts.

A financial analysis concluded that increasing the size of the tipping floor would cost an additional $12 M to the original $10 M budget but would result in a Return on Investment in less than five years.

Tacoma Transfer and Recycling Center

Design Features

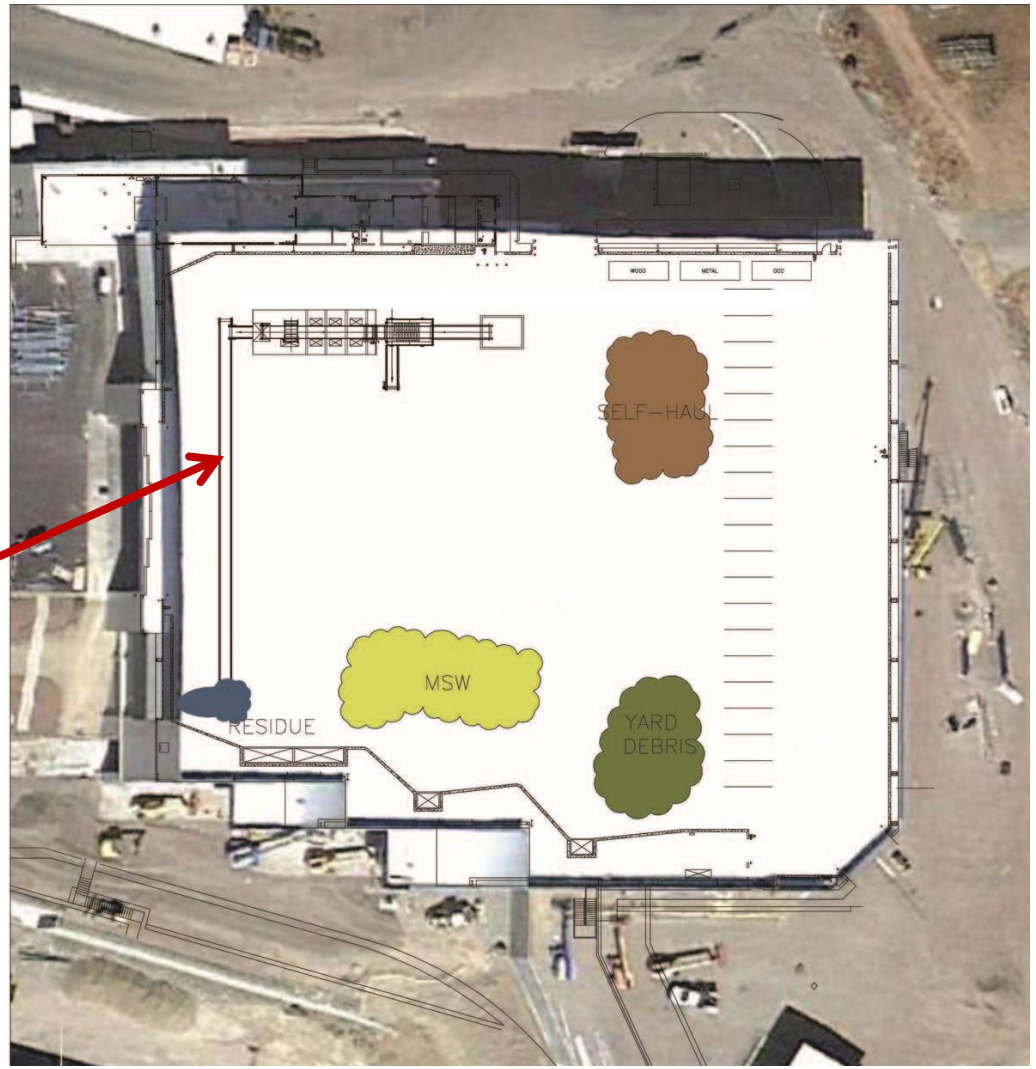
- Separation of customers
- Floor sort areas
- Space for recyclable materials bins
- Surge space for different materials
- Traffic Flexibility



Tacoma Transfer and Recycling Center

Design Features

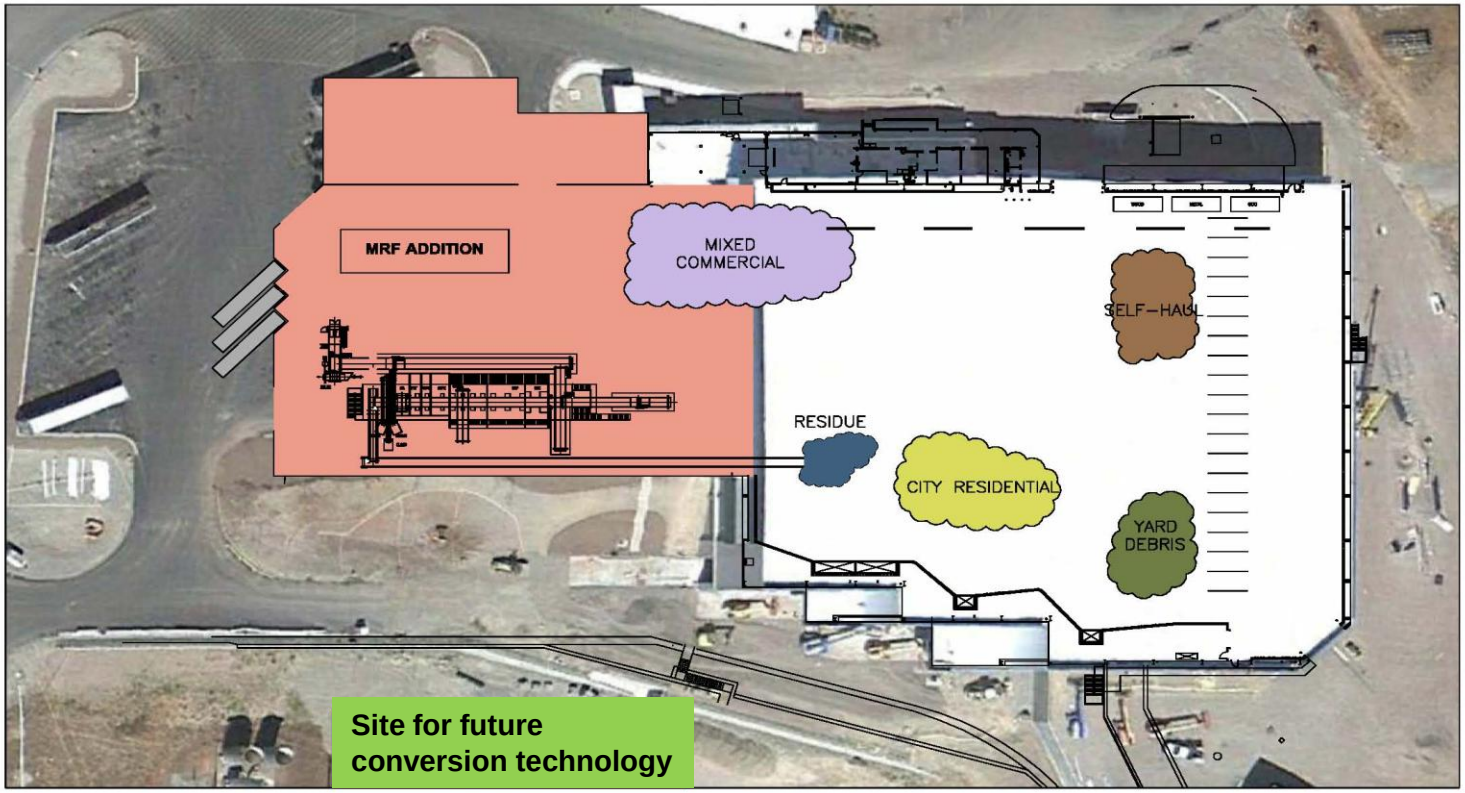
- Separation of customers
- Floor sort areas
- Space for recyclable materials bins
- Surge space for different materials
- Traffic Flexibility
- Flexibility to add basic sorting line



Tacoma Transfer and Recycling Center

Future Expansion Capabilities

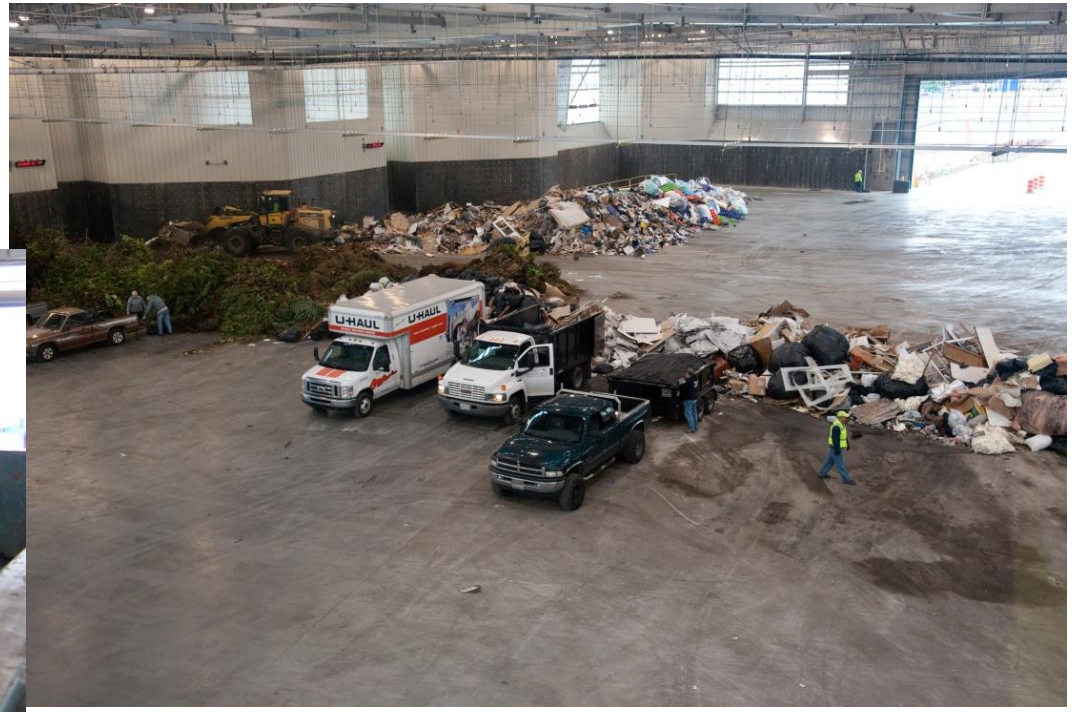
Building and site are designed to accommodate an addition that could house a complete MRF system.



Tacoma Transfer and Recycling Center

Tipping Floor Operations

- Recovery of additional materials – green waste, wood, metals, OCC



Tacoma Transfer and Recycling Center

- 75,000 sq ft transfer station opened in July 2011
- LEED® Gold Certification
- Construction cost - $19 M

Case Study #2

Shoreway Environmental Center (SEC)
South Bayside Waste Management Authority (SBWMA) San Carlos, CA

Rethink waste
South Bayside Waste Management Authority
Simple. Smart. Green.

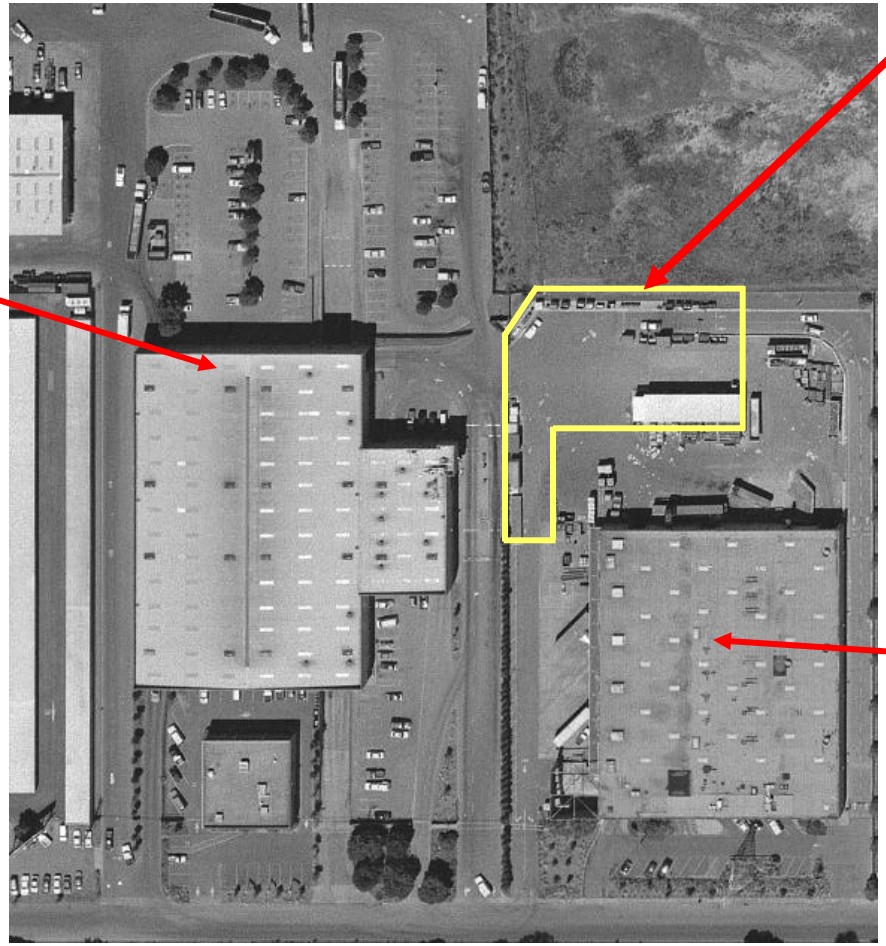
Shoreway Environmental Center

In order to increase its diversion rate and comply with State of California regulations, the South Bayside Waste Management Authority (SBWMA) decided in 2005 to change from a dual-stream collection and processing system to a single-stream system.

Facility modifications were necessary to accommodate the corresponding processing changes and maximize diversion potential.

Shoreway Environmental Center

Existing Site Layout



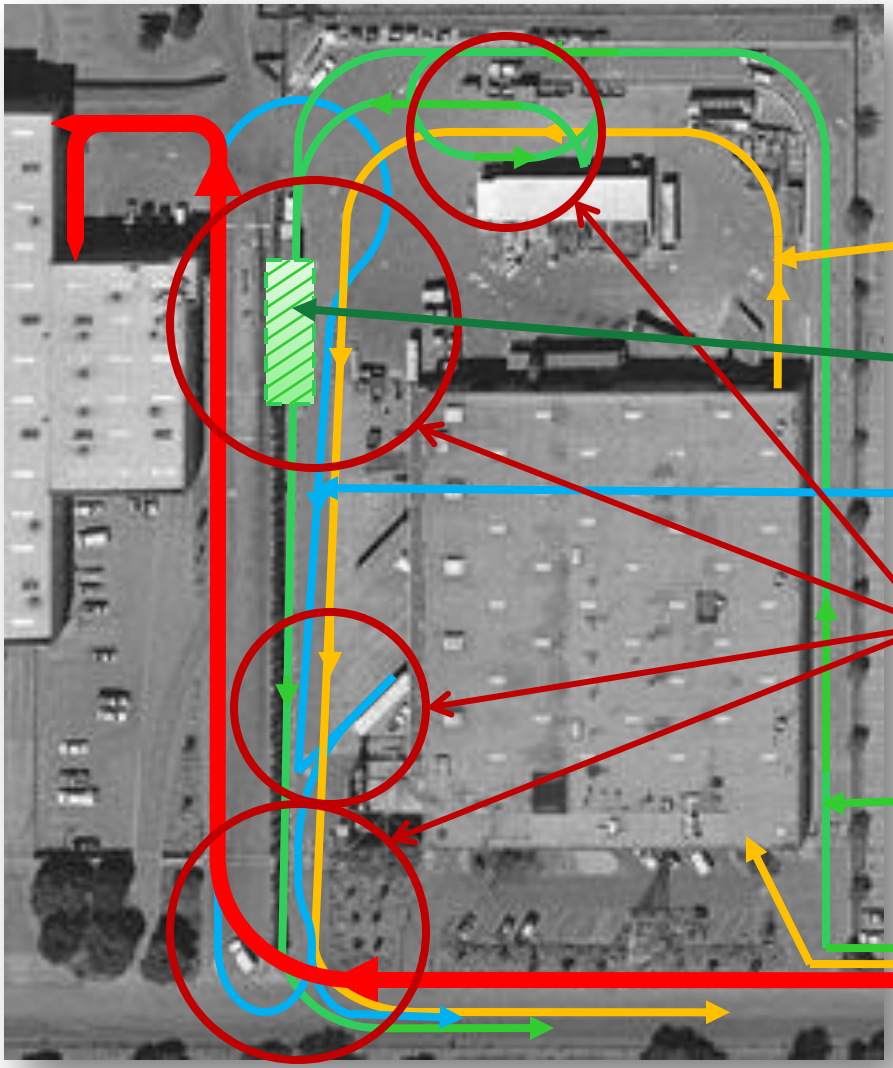
Shoreway Environmental Center

Goals and Objectives of Facility Modifications

- Replace MRF building and equipment to accommodate new processing system:
  - Residential single-stream
  - Clean commercial
- Expand Transfer Station capacity
- Improve capacity and safety of Self Haul area
- Improve traffic circulation and directive signage

Shoreway Environmental Center

Traffic and Queuing



On-site traffic is unsafe and inefficient

MRF Collection Vehicles

E-Waste Drop-off

Commodity Trucks

Critical inefficiencies and safety concerns

Recyclables Drop-off Traffic

Collection, Self-haul Vehicles

Shoreway Environmental Center

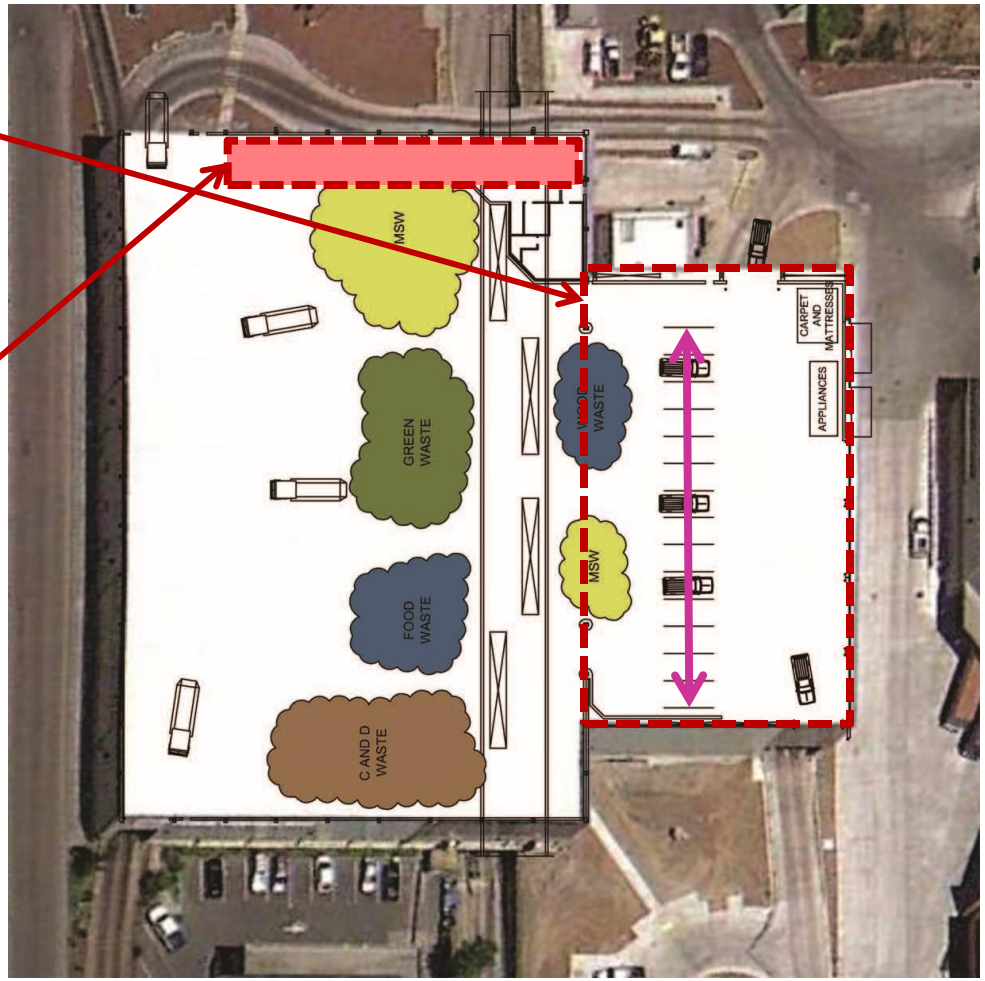
Design Features

1. **New MRF**
   Increased processing efficiency
2. **Expanded Transfer Station**
   Increased public capacity
3. **Improved Traffic Flow**
   Significant increases in safety, efficiency
4. **Education Center**
   Public learning resource, viewing areas
5. **Public Recycling Center**
   More convenient access, less intrusion

Shoreway Environmental Center

Transfer Station Design Features

- Added 16,000 sq ft of functional space
- Increased self-haul tipping spaces from four to 14
- Provided additional space on the main tipping floor for receiving and staging various waste streams
- Provided flexibility to expand



Shoreway Environmental Center

Diversion increases after improvements

Waste Stream	2006	2011-12
Residential SS	32,000 tpy	41,000 tpy
Organics	88,000 tpy	102,000 tpy
C/D waste	18,300 tpy	38,200 tpy
	Totals = 138,300 tpy	181,200 tpy

Total Increased Diversion = 31%

Shoreway Environmental Center

Additional Design Features:

- Photovoltaic roof panels
- LEED ™ Gold Certification

Case Study #3

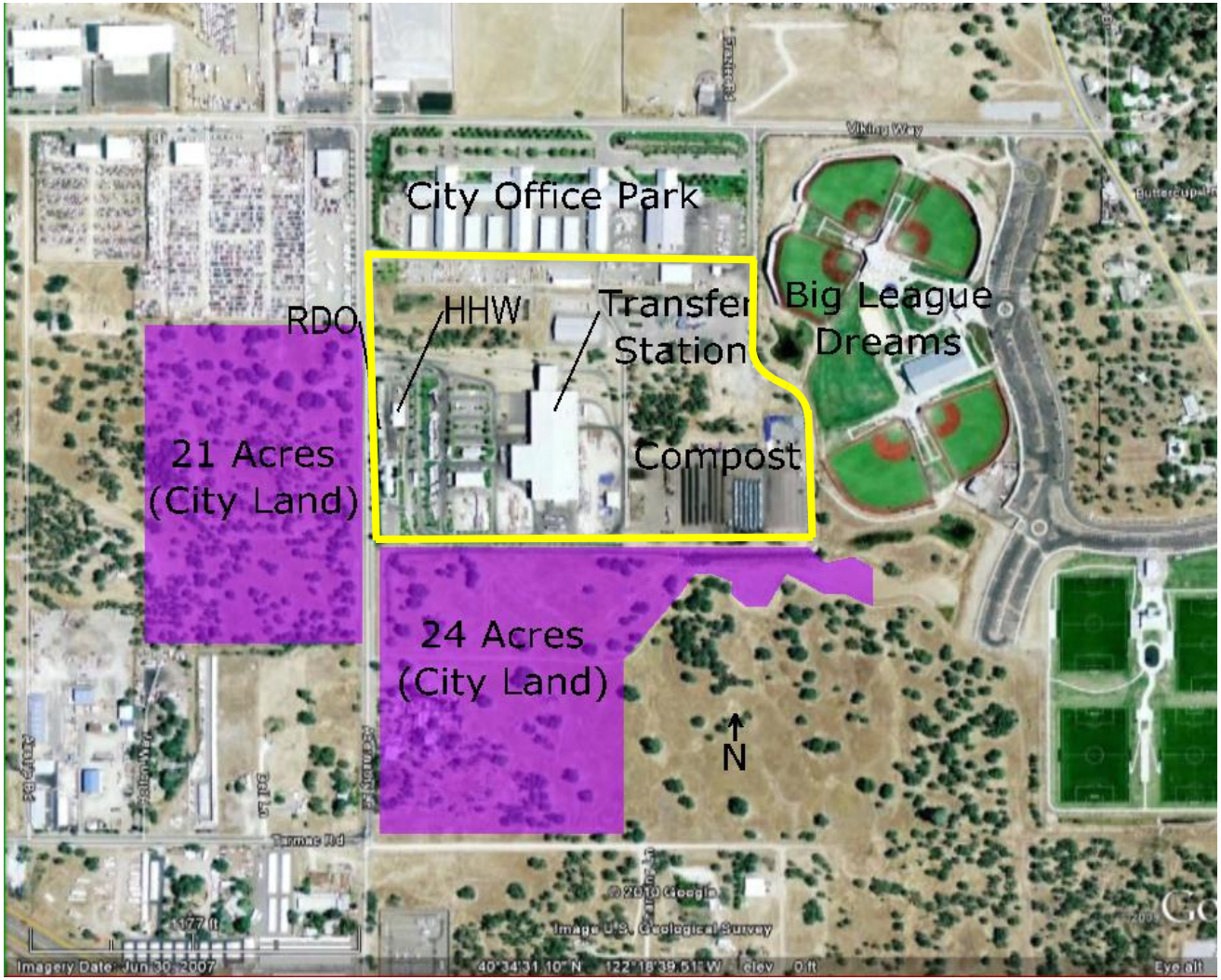
Master Site Plan
and Capital Improvement Plan

Redding Transfer & Recycling Station (RTRS)

City of Redding, CA

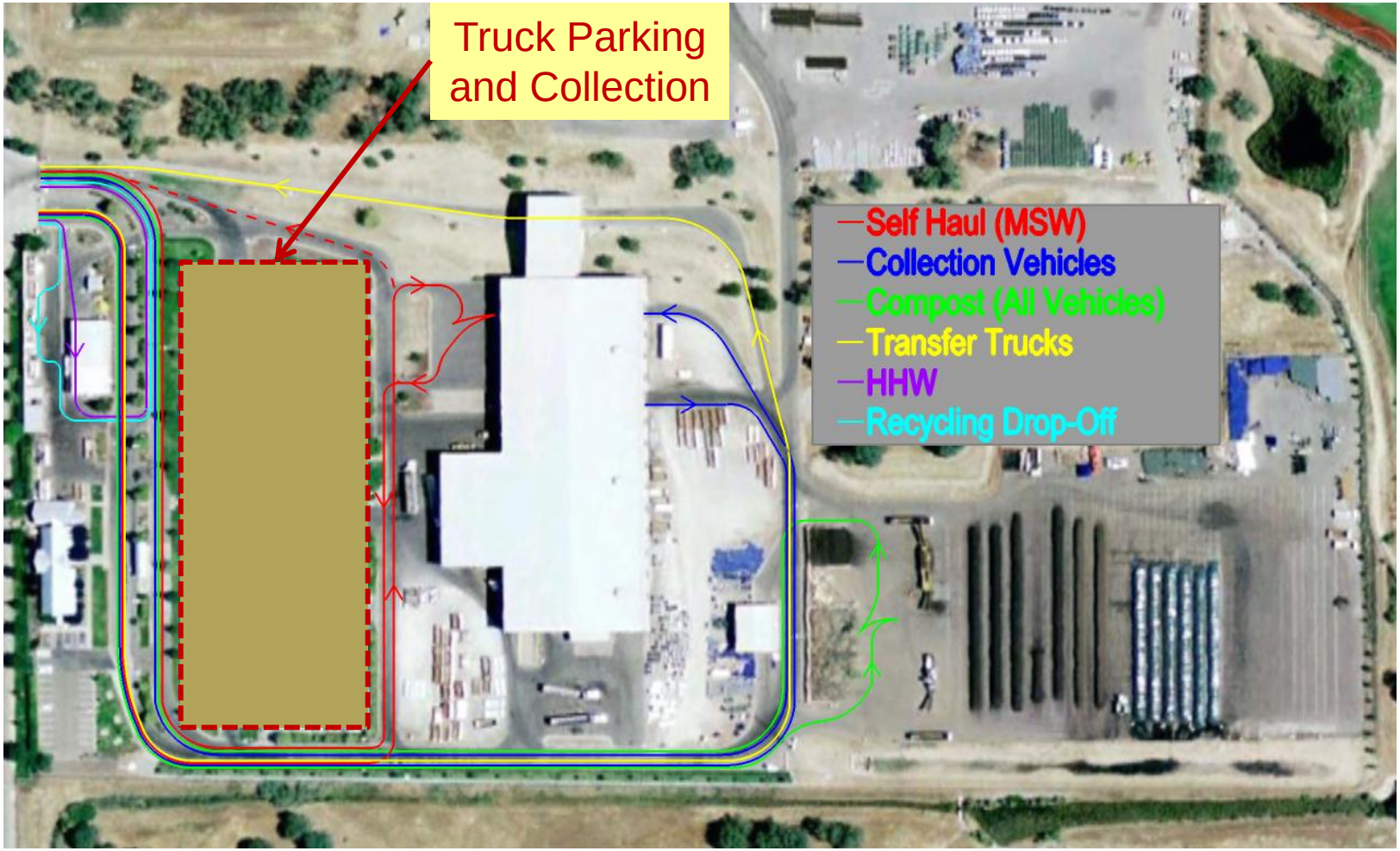
Redding Transfer & Recycle Station

RTRS Site and Surrounding Area



Redding Transfer & Recycle Station

Existing RTRS Site Traffic



Redding Transfer & Recycle Station

RTRS Planning Process

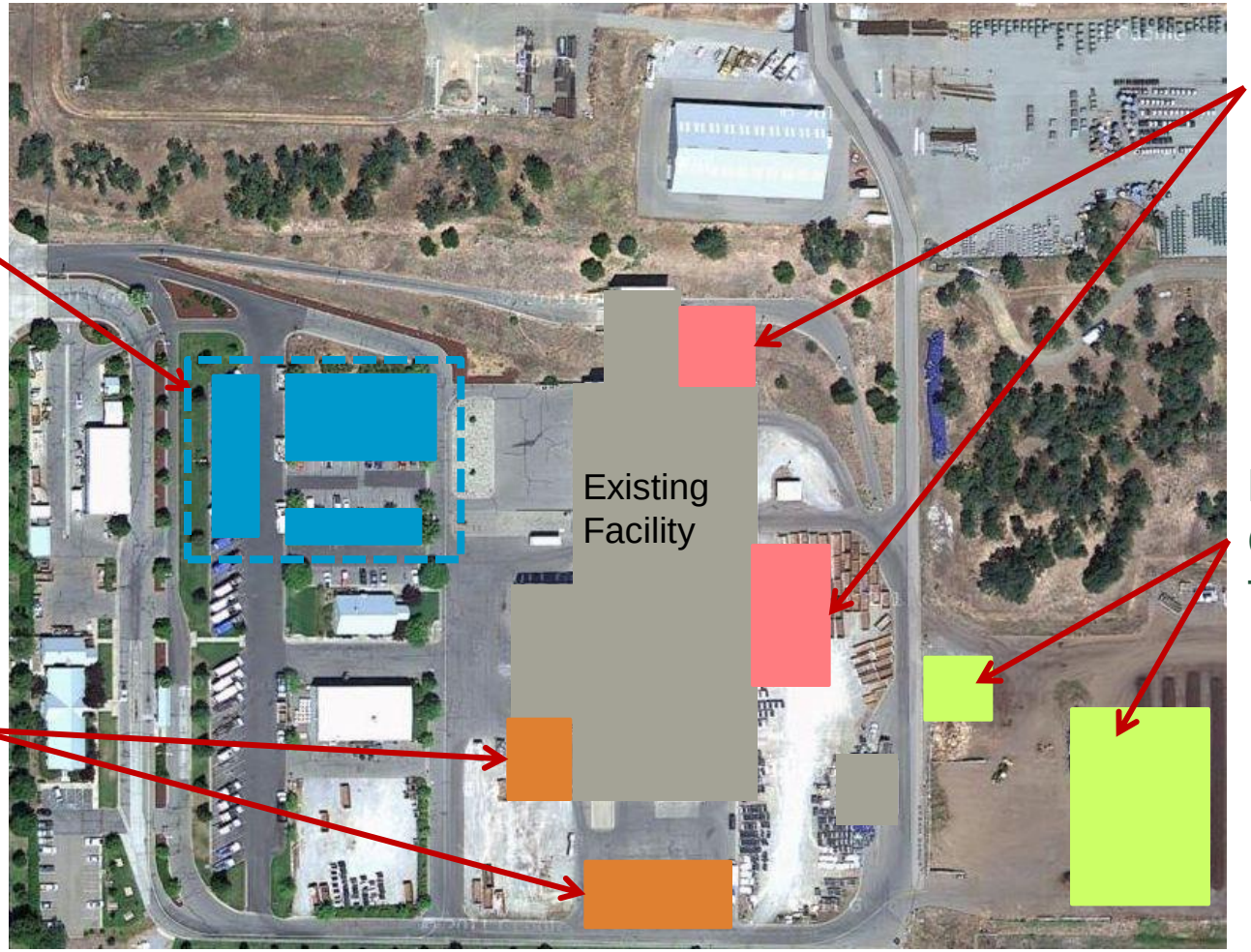
1. Establish baseline data and projections
2. Conduct surveys and interviews - Public; Recycling /HHW staff Operators, Drivers, and Management
3. Assess Facility Needs
    a. Immediate needs /deficiencies
        - Shipping dock
        - Tipping floor congestion
        - Traffic queuing at entrance
        - Collection truck parking
    b. Future system needs
        - Expand recycling
        - Provide additional bale storage
        - Provide for Conversion Technology plant
4. Develop Master Site Plan
5. Establish priorities and prepare Capital Improvement Plan

Redding Transfer & Recycle Station

First Phase: New collection yard with truck parking

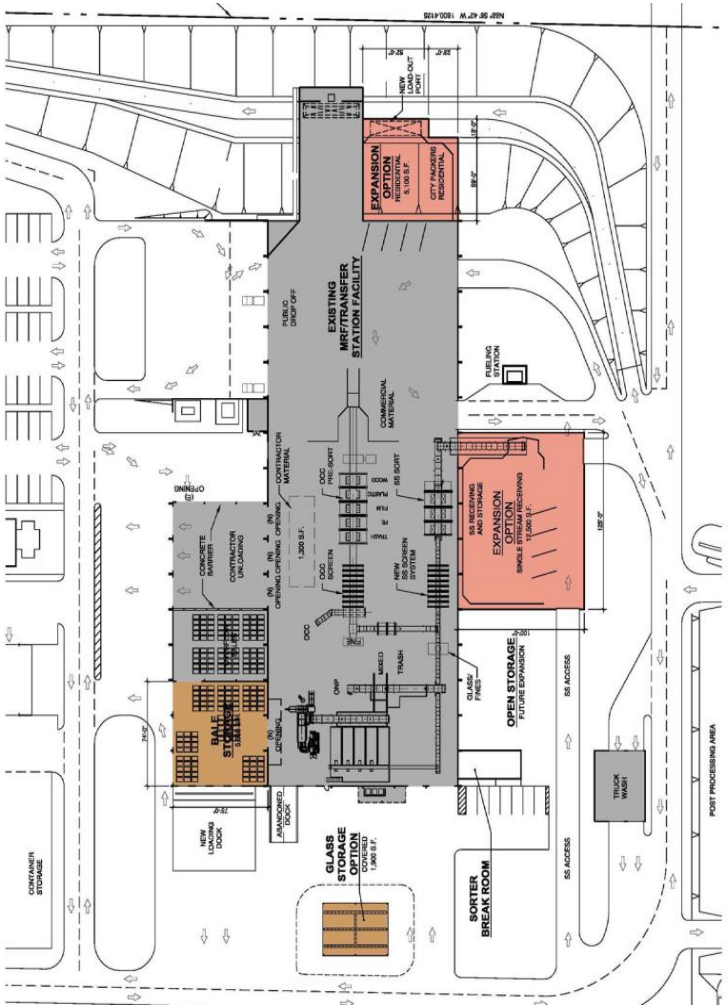
Redding Transfer & Recycle Station

Proposed Design Features



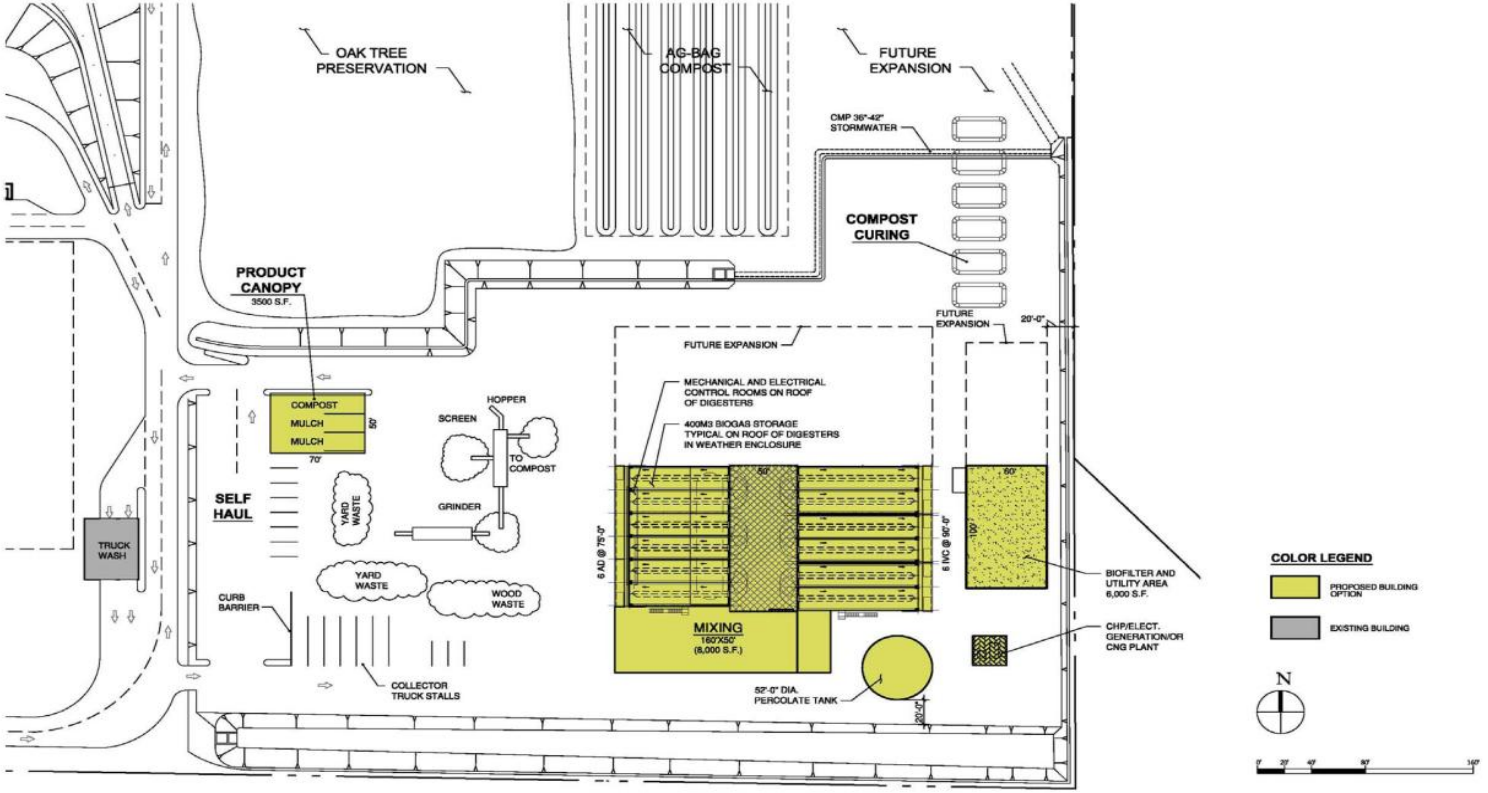
Redding Transfer & Recycle Station

Proposed Design Features



Redding Transfer & Recycle Station

Potential site for future Conversion Technology



Redding Transfer & Recycle Station

Goals of improved facility:

- Will facilitate positive changes in collection services and processing of the following waste streams:
  - Single stream and/or high-graded commercial loads
  - Construction debris
  - Yard waste
  - Food waste
- Will enable the City to add or significantly improve Public facilities:
  - Drop-off Center for Recyclables, HHW and E-Waste
  - Buy Back Facility
  - Re-Use Facility

Redding Transfer & Recycle Station

Diversion increases after improvements

Waste Stream	Annual Tons
C&D	3,800
Commercial	10,000
Self Haul	6,000
Food/Green	5,600
Total =	25,400

Projected Increased Diversion = 23%

Common Planning/Design Elements

Developing facility improvements to support Zero Waste initiatives:

1. Identify current deficiencies
2. Analyze needs
3. Create a Master Site Plan
4. Develop a Financial Model
5. Execute the most sound strategies